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Animal Assisted Therapy for Incarcerated Youth: A Randomized Controlled Trial

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Abstract

Teacher's Pet, an animal assisted therapy (AAT) was assessed in a randomized controlled trial with incarcerated youth from two Midwestern United States detention facilities. The AAT was expected to increase empathy and reduce behavior problems. Participants trained dogs one hour, twice weekly for 10 weeks. A control group walked but did not train dogs for the same duration. Both groups attended one hour, twice weekly animal didactics. Of 138 participants, 117 provided complete data, and 21 had some missing data imputed. Contrary to expectation, both groups increased slightly in self-reported empathy, and staff and youth rated internalizing problems. The time youth spent with dogs plus animal didactics may have increased empathy. Increased internalizing problems could be attributed to youth gaining greater emotional awareness. Alternately, this brief intervention may not have any immediate effects, given the small changes observed. Additional follow-up of these youth and other comparison groups are needed.

Keywords

AAT; animal assisted therapy; incarcerated youth; juvenile delinquency; empathy; internalizing behavior; externalizing behavior; dogs

There are numerous youth involved in the juvenile justice system in the United States. Hockenberry and Puzzanchera (2015) reported that 1,058,500 youth were seen in the system, and, of these, 221,600 were incarcerated. Successful treatment could have the potential to keep incarcerated youth from reoffending (recidivism) by providing them with tools to cope better with their emotions and social environment. The goal of the current study was to test whether participation in a specific animal assisted therapy (AAT) would decrease behavior problems and increase empathy in incarcerated youth.

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Antisocial Behavior and Development

Youth are primarily incarcerated for antisocial behavior or behavior that is illegal for persons who are not yet adults, such as alcohol use (Hockenberry & Puzzanhera, 2015). Antisocial behaviors in youth include lying, theft, vandalism, use of a weapon, and bullying (Lahey, Waldman, & McBurnett, 1999). Incarcerated youth are also likely to have academic deficits (Hinshaw, 1992), high levels of internalizing symptoms (e.g., depression, anxiety) (Armistead, Wierson, Forehand, & Frame, 1992), and poor understanding of others' emotions, an important component of empathy (Casey & Schlosser, 1994). Empathy is essentially "sharing the perceived emotions of another" (Eisenberg & Strayer, 1990, p. 5), in other words, feeling what another individual feels. Two important components of empathy are empathic concern and perspective taking (Davis, 1983). Empathic concern involves sympathy, which is understanding and caring about the difficulties of others, and having a general attitude of caring for others. Perspective taking involves adopting the "psychological point of view of others" (Davis, 1983, p. 113–114). There is a clear link between externalizing behavior and low empathy, both common characteristics of juvenile offenders (Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988). The lack of empathy could be due in part to having few adult models of empathic behavior and close relationships (Decety & Meyer, 2008).

Advances in developmental science emphasize a relational developmental systems approach (Overton, 2013; Overton & Lerner, 2014), as well as the importance of promoting healthy development in youth, as compared to focusing only on reducing problem behaviors (Benson, Scales, Hamilton, & Sesma, 2006). Consistent with these approaches, the development of antisocial behavior is best understood as subject to a number of influences, including genetics, epigenetics, neural/hormonal processes (e.g., dopamine levels, HPA axis functioning), psychological factors (e.g., trait impulsivity), family processes (e.g., coercive interaction style), neighborhood factors (e.g., exposure to crime, violence), and developmental timing (Beauchaine & McNulty, 2013; Slavich & Cole, 2013). It is important to take these characteristics into account, if possible, when working with these youth, and to focus on building positive attitudes and behaviors, not simply reducing or eliminating negative factors (Lipsey, 2009; Lipsey, Howell, Kelly, Chapman, & Carver, 2010). Treatment approaches that build positive behavior and attitudes have demonstrated that even persons with significant social difficulties and nonconformity to societal expectations possess positive attributes and the capacity for developing and strengthening positive life skills (Lerner, Fisher, & Weinberg, 2000). Providing a supportive environment that gives youth the opportunity to learn about and practice good social behaviors, including empathic concern and perspective taking, could be a way to improve the positive attributes and skills of incarcerated youth.

Treatment for Incarcerated Youth

The majority of incarcerated youth have some form of mental illness; these include not only disruptive behavior disorders (e.g., Attention Deficit Hyperactivity Disorder, Oppositional Defiant Disorder, Conduct Disorder) that place youth at greater risk for antisocial behavior (Lahey et al., 1999) but also internalizing disorders (e.g., depression, anxiety; Teplin,

Abram, McClelland, Dulcan, & Mericle, 2002). The majority of these youth have at least two diagnoses of psychiatric disorders, which complicates treatment (Abram, Teplin, McClelland, & Dulcan, 2003; Shufelt & Coccozza, 2006). The most common type of treatment is for substance abuse (Schubert & Mulvey, 2014) and one study showed that only about half of facilities provide some form of mental health counseling beyond substance abuse treatment (Young, Dembo, & Henderson, 2007). Treatment for substance abuse alone is not likely to be sufficient to address the complex problems identified in these youth. Still, many incarcerated youth do not receive any mental health treatment (Schubert & Mulvey, 2014), despite the fact that interventions in these settings, such as group and individual cognitive-behavioral therapy, have been successfully implemented and shown to reduce recidivism rates (Lipsey et al., 2010; Lipsey, Landenberger, & Wilson, 2007).

Promoting social and emotional development is important, given the demonstrated problems these youth are likely to have in these domains (Casey & Schlosser, 1994; Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988) that can grow worse as youth get older (Nagin & Trembaly, 1999). Social and emotional learning interventions have demonstrated efficacy in the prevention of behaviors associated with delinquency, such as aggression and substance abuse, (Brown, Catalano, Fleming, Haggerty, & Abbott, 2005) as well as promoting skills, such as problem solving and self-management, which are associated with decreased risk for delinquency (Domitrovich, Cortes, & Greenberg, 2007). However, more research is needed on whether and how these programs can be effectively implemented in juvenile justice settings (Tolan, Nichols, & DuVal, 2015). One meta-analysis found that interventions focused on improving social skills reduced recidivism by 12% (Lipsey, 2009). Elements of those programs included learning to read social cues and taking the perspective of others, which are related to the concept of empathy (Landenberger & Lipsey, 2005; Miller & Eisenberg, 1988). Programs focused on building skills in youth, such as social skills, were more effective at reducing recidivism than those that focused directly on instilling discipline and identifying maladaptive behavior (Lipsey et al., 2010).

The use of comprehensive, evidence-based treatments with incarcerated youth has been increasing, although many states still lag behind in implementing these interventions (Greenwood, Welsh, & Rocque, 2012). There is a great need for incarcerated youth to be provided with high quality treatment that addresses factors underlying the occurrence of psychological problems, given the high probability of difficulties beyond substance abuse. However, the fact that only 54% of facilities have provided some type of treatment beyond substance abuse (e.g., counseling, family therapy, skills training) indicates that there is a large gap in need versus availability of services (Young et al., 2008).

Animal Assisted Therapy and The Current Study

AAT is a form of treatment that has promising potential for use with incarcerated youth. AATs have been conducted with a variety of animals, including dogs, cats, rabbits, and horses; in a variety of settings, such as nursing homes, hospitals, and prisons; and with different populations, including children with autism, older adults, and criminals (Nimer & Lundahl, 2007). The International Association of Human-Animal Interaction Organizations (IAHAIO) defines AAT as follows:

[AAT] is a goal oriented, planned and structured therapeutic intervention directed and/or delivered by health, education and human service professionals. Intervention progress is measured and included in professional documentation. AAT is delivered and/or directed by a formally trained (with active licensure, degree or equivalent) professional with expertise within the scope of the professionals' practice. AAT focuses on enhancing physical, cognitive, behavioral and/or socio-emotional functioning of the particular human recipient (Jegatheesan et al., 2014, p. 5).

There is a growing evidence base for interventions such as AAT. These programs have been linked to increased prosocial behavior and decreased levels of stress, depression, and anxiety. As Beetz, et al. (2012) discussed, activation of the oxytocin system, a hormone linked to positive social interaction and reduction of stress, may be one mechanism to explain these findings. There is some evidence showing that humans produce higher levels of oxytocin when they interact with animals, particularly familiar animals such as pets (Miller et al., 2009; Odendaal & Meintjes, 2003). Despite advances in the field, many studies have methodological problems, including no control group and relatively small sample sizes (Kruger & Serpell, 2010), although there has been movement toward more rigorous research methodology (May, Seivert, Cano, Casey, & Johnson, 2016). A review of experimental and quasi-experimental studies of AAT with youth showed the most support for equine interventions for children with autism, demonstrating improvements in a variety of psychological outcomes (Hoagwood, Acri, Morrissey, & Peth-Pierce, 2016). In that review of methodologically rigorous studies, support for the efficacy of AATs with other kinds youth was present, but to a lesser degree; there were relatively fewer studies that focused on youth with other problems compared to those that focused on youth with autism. Methodologically sound studies on AAT with other youth populations and different types of animals are needed.

AAT offers a unique experience for incarcerated youth that could help them manage their emotions more adaptively and develop empathy. Evidence shows that AATs reduce internalizing symptoms (Beetz et al., 2012; Souter & Miller, 2007). One study observed improved mood in children with psychiatric problems after a single therapy session with a dog (Prothmann, Bienert, & Ettrich, 2006). There is less support for AATs' effect on externalizing behavior problems, such as aggression, and thus needs further investigation. Two studies found lower levels of aggression in a classroom setting with the presence of a dog versus no dog (Hergovich, Monshi, Semmler, & Zieglmayer, 2002; Kotschal & Ortbauer, 2003). Several studies have reported an association between empathy and time spent with animals in children and adults (Daly & Morton, 2006; Hergovich et al., 2002; Paul, 2000; Poresky & Hendrix, 1990). However, due to methodological weaknesses, research has not established direct relations between empathy and time spent with animals (Beetz et al., 2012).

There has been growing interest in AATs with incarcerated individuals (Strimple, 2003). One quasi-experimental study examined an 8–10 week program in which adult inmates trained shelter dogs with the aim of readying them for adoption in the community (Fournier, Geller, & Fortney, 2007). Compared to the control group, participants demonstrated increased social skills and reduced frequency of institutional infractions. Specifically,

participants significantly increased in their social sensitivity, the ability to appropriately interpret verbal communication with others and being sensitive to social norms, which is related to the conceptualization of empathy in the current study (Davis, 1983; Riggio, 1986). However, due to the lack of random assignment, it is unknown if the results were due to the program implemented or other factors.

There have been few studies that examine AAT with incarcerated youth. One study (Arduini, 2000) included a sample of 106 male violent offenders (i.e., convicted of murder, rape, arson, and/or robbery) ages 15–25 years. They participated in a 13 week program learning to train and care for shelter dogs. After the program, facility staff rated the youth as having greater social skills and empathy. However, this study was limited in its conclusions due to the absence of a control or comparison group. In addition, standardized outcome measures were not used. Another study (Harbolt & Ward, 2001) was a three-week program in which incarcerated teens learned to train and take care of shelter dogs. During the program, teens walked the dogs three times per day and spent two hours in the afternoon training and caring for the dogs under the supervision of a professional dog trainer and animal groomer. After three weeks, dogs were returned to the shelters for adoption. No standardized outcome measures were used to assess the program; however, researchers provided excerpts from letters written by participants that described their personal growth as evidence of the program's impact. Another study (Conniff, Scarlett, Goodman, & Appel, 2005) randomly assigned 23 incarcerated female youth to either an animal assisted activities group, involving animal grooming, playing fetch, and dog training, or a treatment as usual control group with no animal interaction. The program involved weekly, one-hour sessions over eight weeks. Quantitative results from standardized assessment measures showed no significant difference from pre to post intervention on the youth's self-report of standardized emotional and behavioral measures. Qualitatively, the youth reported finding the program helpful and enjoyable. Although these studies offer some support for the positive impact of AATs for incarcerated youth, more scientifically rigorous studies of these types of programs are needed.

The current study examined a specific AAT with incarcerated youth. This intervention aimed to promote the formation of a close relationship between individual youth and their dog, teaching the youth how to deal with both positive and negative interactions with not only their dog but also with people, in order to promote empathy and reduce behavior problems. The current intervention program was designed to foster the development of new skills, while taking into account the atypical environment of an incarceration facility. Furthermore, it was a basic assumption that these environments would likely amplify youths' need for close relationships, as their access to families and other historically caring adults in their lives was severely limited (Lerner et al., 2000). Thus, environments designed to punish and prevent access to free-ranging behavior that might lead to further behavior problems, might also provide a place to facilitate the formation of positive relationships through social and instructional interaction with dogs.

Based on the previously described research, the aim of the current study was to decrease internalizing and externalizing behavior problems in incarcerated youth who participated in the AAT, as well as increase their empathic concern and perspective taking, compared to

youth assigned to a control group that walked dogs. This study also improved on the methodology of previous research on AAT with incarcerated youth via the use of an experimental design, a larger sample, and standardized outcome measures.

Method

Procedures

This study was a randomized controlled trial (RCT) of incarcerated youth assigned to either the AAT treatment group or a dog-walking control group. The study was supported by the Eunice Kennedy Shriver National Institute of Child Health & Human Development and Mars-WALTHAM® (Grant #R03HD070621). Researchers obtained approval from the Institutional Review Board at Wayne State University, affirming the ethics of the study. The Institutional Animal Care and Use Committee was also consulted but a formal review was not deemed necessary because the dogs in the study were not research subjects.

The AAT program was Teacher's Pet: Dogs and Kids Learning Together (www.teacherspetmi.org), herein referred to as TP, which had already been implemented among other incarcerated youth in the study centers for several years prior to the start of this research project. The leadership and staff of the program met the previously described standards suggested by the IAHAIO (Jegatheesan et al., 2014) for AAT. Specifically, the program director and creator of TP was a Licensed Professional Counselor with extensive experience working clinically with incarcerated youth as well as the therapeutic inclusion of animals in interventions. Other members of the study team authoring this report included two clinical psychologists with expertise in therapeutic interventions as well as experience working with incarcerated youth and shelter animals, and two advanced doctoral students in clinical psychology, who had extensive intervention experience with youth. Certified dog trainers who had been working in the TP program for over three years implemented the intervention, under the supervision of the program director. TP had also been implemented in other settings, including an alternative middle and high school and a summer camp. Previous implementations included neither a comparison condition nor explicit measurement of outcomes.

Conditions.—Empirically supported treatments must have demonstrated efficacy through rigorous scientific evaluation, typically including the use of experimental research designs (Chambless & Ollendick, 2001). The detention center administration expressed concern about whether a control group was necessary, as they wanted all the youth to be able to participate in the program. Researchers agreed to a randomization such that approximately 60% of participants were placed in the intervention group, in order to maximize the number in the intervention and still maintain scientific integrity. As interested youth volunteers were given permission by their parents or guardians, they were randomly assigned to one of two groups, either the intervention or control condition. The program was run in cohorts with a group of 10 participants, approximately six individuals in the intervention and four in the control condition, who completed the entire 10-week program together. The program was designed to be completed in 10 weeks to balance feasibility of testing the intervention with the amount of time believed to be required to observe intervention effects. Two related

studies described previously were conducted in a similar timespan and showed increases in measures related to empathy, a primary outcome measure in this study (Arduini, 2000; Fournier et al., 2007).

All youth participated in two-hour sessions twice per week for a total of 10 weeks. Sessions for all participants included a didactic one-hour animal education component and a one-hour dog interaction component. The didactic portion of the program took place in classrooms on the detention facilities' campuses. Examples of materials covered in the class sessions included identifying emotions in animals and people, taking care of animals, desirable pet behaviors, and a discussion about animal abuse. Table 2 provides a description of the material covered and activities conducted during each classroom session. For the intervention group (TP), the dog interaction component consisted of experiential learning in the form of positive dog training with the aim of readying a shelter dog for adoption. Having responsibility for the animal as well as spending time with it was theorized to generate a greater awareness and sensitivity to the animal's needs, and thus help form a close, positive relationship between each individual youth and his or her assigned dog. TP participants were assigned one dog to work with for the first half of the program and another dog during the second half.

The control group, herein referred to as Dog Walking (DW), had the same time spent in dog interaction and education content as the intervention group, but did not engage in dog training and were not assigned to any specific dogs. These youth simply walked a variety of dogs for the same duration (one hour, twice per week, or 30 minutes four times per week) as the intervention group spent the time training their dogs. In other words, the distinction between the two groups is that the TP group spent time with the same animals working on a common set of goals and the DW group spent time with different animals but with no particular goals other than walking the dogs. The DW group was designed in this manner to prevent the formation of a close relationship between the youth and a particular dog. This close relationship with a dog was a key distinction between groups, given previous research on a potential link between spending time with familiar animals and positive social interactions (Miller et al., 2009; Odendaal & Meintjes, 2003). The assignment of individual dogs to individual youth in the TP group versus time spent with multiple dogs in the DW group permitted examination of the specific effects of experiential learning during training particular dogs on outcomes, not just the passage of time or contact with the animals. Weather permitting, program activities involving dog contact took place outdoors; during bad weather, gymnasiums at the two facilities were used for time spent with the dogs.

Animals incorporated in the project.—Dogs at the county animal shelters underwent a health exam and received vaccinations; if deemed healthy, they were eligible for the program. They were also screened through a temperament evaluation by qualified dog trainers and animal shelter staff, testing for aggression and reactivity toward other dogs and humans. If the dogs passed these examinations, they were deemed safe for human interaction and suitable for participation in the program. By design, most of the shelter dogs in the program were over one year old and had correctable behavior issues, including jumping and pulling (when leashed), as well as lacking socialization, but were not aggressive. Each day of the program, program staff transported the dogs between the county

shelter and the detention centers. Researchers provided \$500 to the shelters from which the dogs were obtained, to aid with the cost of animal care.

Participants

Youth assent and parental or legal guardian's consent were obtained for each participant. Participants were given a \$50 gift card to a retail store upon their release from the facility. A total of 138 youth assented to participate with their parents or guardians providing permission. Demographic characteristics (See Table 1) were as follows: 69.6% male, 45.7% White/Caucasian, 44.2% Black/African American, 3.6% Hispanic/Latino, 2.9% Biracial, 3.6% Other. The mean age was 15.7 ($SD = 0.9$), range 13 – 18 years. More than two-thirds had previously received a psychiatric diagnosis or psychological treatment of some kind prior to entering detention. Participants were recruited from two juvenile detention center sites. Sites 1 and 2 housed both violent and non-violent offenders. Examples of common reasons for incarceration included assault/domestic violence, sexual offenses, destruction of property, truancy, and theft. No restrictions were made regarding who could participate in the intervention based on type of offense. Most of the youth were sentenced to 9–12 months, with the time of release depending on their behavior while incarcerated. Roughly three-quarters of the participants came from Site 1, which was a high-security facility similar to adult prisons, located in a suburban area. Site 2 was located in a rural setting in a separate county, and youth at that facility were allowed somewhat more freedom than the youth at Site 1. For example, at Site 1, youth strictly participated in program activities within the guarded areas of the facility (e.g., fenced in yard) whereas, at Site 2, youth participated in program activities on facility grounds that were not as highly guarded (e.g., open field with no fence), although program and detention center staff monitored youth during their participation. The difference in security level between sites was due to institutional preference, not severity of crimes. Youth at both facilities participated in traditional individual, group, and family therapy in addition to the TP/DW program.

Measures

Internalizing and externalizing behaviors.—Internalizing and externalizing behaviors were assessed at baseline and post-intervention using the Teacher Report Form (TRF), completed by facility staff, and the Youth Self Report (YSR), completed by the youth themselves, of the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach, 2009). These two measures come from the same family of measures as the Child Behavior Checklist (CBCL), one of the most commonly used instruments assessing behavior problems in youth. However, parents were not informants in the current study, so the CBCL was not appropriate. Thus this project included the TRF, very similar to the CBCL in content and format, but designed to be completed by individuals who are teachers or caregivers rather than parents, and the YSR, which was completed by youth, to obtain their own perceptions of their behavior problems. The ASEBA measures are broad screening tools; respondents rate question items on a 0 – 2 scale (0 = Not true, 1 = Somewhat or Sometimes True, 2 = Very True or Often True). Taken together, responses to these items provide scores for broad scales assessing the level of Internalizing and Externalizing Problems. The Internalizing scale includes behaviors associated with depression, anxiety, and somatization. The Externalizing scale includes behaviors associated with aggression,

conduct problems, and hyperactivity/impulsivity. These measures have demonstrated excellent psychometric properties (Ebesutani, Bernstein, Martinez, Chorpita, & Weisz, 2011; Greenbaum & Dedrick, 1998). Participants and their facility staff completed their respective forms before the program activities started (pre-intervention) and again for each youth upon completion (post-intervention). Scale T-scores for each youth were calculated through ASEBA software, and were used to compare symptoms from baseline to post-intervention for the intervention and control groups. Scores between $T = 65 - 69$ are considered in the Borderline range, close to being at a level representing behavior difficulties that need clinical intervention. Scores of $T \geq 70$ are considered elevated to a level that implies clear likelihood of behavior problems that negatively affect a youth's life.

Empathy.—The Interpersonal Reactivity Index (IRI; Davis, 1983), a self-report measure of dispositional empathy, was used to assess Empathic Concern and Perspective Taking. The measure was given pre- and post-intervention. Each subscale contains 7 items that are rated on a scale of 0 – 4 (0 = Does not describe me well, and 4 = Describes me very well). Total scores for each scale were used for analysis and were obtained by summing all of the items on each respective scale. As with the ASEBA measures, participants completed the form before the intervention and at post-intervention. This measure has been used with good reliability in studies of offenders, including youth offenders (Lindsey, Carlozzi, & Eels, 2001; Jolliffe & Farrington, 2004). Reliability in the current sample was acceptable for both the Empathic Concern ($\alpha = .72$) and Perspective Taking ($\alpha = .70$) scales.

Hypotheses

It was expected that participants in the TP group would show decreased Internalizing and Externalizing Behavior Problems on the TRF (Hypothesis 1) and the YSR (Hypothesis 2) from pre- to post-intervention, compared to the DW group. Youth in the TP group were expected to show increased Perspective Taking and Empathic Concern on the IRI from pre- to post-intervention, compared to the DW group (Hypothesis 3).

Results

Preliminary Analyses

Of the total 138 incarcerated youth in both the TP ($N = 83$) and DW ($N = 55$) groups, 21 participants did not have one or more of the TRF, YSR, and IRI measures completed at one or more time points. Due to illness or transfer to another facility, six youth did not complete the study. Behavior problems caused one participant to be removed from the program. Data were not gathered for 14 other participants who completed the study, due to logistical difficulties (e.g., youth was not present on day of post assessment, staff did not complete measure for those particular youth). Preliminary tests were conducted to examine whether systematic biases in the data existed with regard to these missing cases, but none were found. Due to the lack of significant findings, missing data points for these measures were treated as random.

For all of the previously discussed variables, missing data were imputed via the SPSS Missing Value Analysis Expectation Maximization (EM) method. This method assumes data

were missing at random; it was preferable to other methods of imputing missing values because it introduced less bias into the imputed data (Roth, 1994). Preliminary analyses were conducted to test for baseline group differences between youth in the intervention (TP group) versus control condition (DW group). MANOVA results detected no significant differences between groups in age; pre-test scores for TRF and YSR Internalizing, Externalizing, and Total Problems; or for pre-test scores for both empathy measures (Perspective Taking and Empathic Concern).

Intervention Effects on Behavior Problems and Empathy

Repeated measures multivariate analyses of variance (RM MANOVA) were used to test hypotheses, further described below. Assumptions of RM MANOVA were tested and met. Effect sizes reported below for overall effects, regardless of group, were calculated using the standardized mean difference (SMD) method advocated by Lipsey and Wilson (2001) for single-group, pre-post designs, analogous to Cohen's d (Cohen, 1992). Effect sizes for group differences reported below were calculated using the method described by Morris (2008) of SMDs for repeated measures, experimental designs, also analogous to Cohen's d . These calculations were done using programs created by Lenhard & Lenhard (2016). Effect sizes for all statistical analyses conducted are presented regardless of their statistical significance ($p < .05$), per the recommendation of Durlak (2009).

Staff ratings of behavior problems.—A RM MANOVA examined Hypothesis 1, which predicted a decrease in staff reported Internalizing and Externalizing Behavior Problems on the TRF from pre- to post-intervention for the TP group, compared to the DW group. Results indicated an overall significant difference pre to post for Internalizing problems, regardless of TP or DW group assignment, $F(1, 136) = 5.323, p = .023$, Wilks' $\lambda = .962, d = 0.113$. Mean Internalizing T-scores increased slightly pre to post from 56.4 to 57.4 (see Table 3). No group effects for Externalizing [$F(1, 136) = 0.133, p = .716$, Wilks' $\lambda = .999, d = -0.064$] or Internalizing [$F(1, 136) = 0.015, p = .901$, Wilks' $\lambda = 1.000, d = 0.162$] problems were observed. In addition, there were no overall effects seen in Externalizing problems of the participants [$F(1, 136) = 0.771, p = .382$, Wilks' $\lambda = .994, d = 0.042$] as rated by the staff. Using Achenbach (2009) norms, the combined mean (TP and DW) pre Internalizing score was at the 73rd percentile and mean post Internalizing score was at the 77th percentile; thus, neither group's scores were in a range considered to be clinically elevated.

Youth self-report of behavior problems.—A second RM MANOVA examined Hypothesis 2, which predicted a decrease in youth reported Internalizing and Externalizing Behavior Problems on the YSR from pre- to post-intervention for the TP group, compared to the DW group. There was a significant pre to post difference for the youths' Internalizing problems, regardless of whether they were in the TP or DW group, $F(1, 136) = 126.069, p < .001$, Wilks' $\lambda = .519, d = 0.094$. Mean Internalizing T-scores increased slightly pre- to post-intervention, from 54.8 to 55.8 (see Table 3). No Group effects for Internalizing [$F(1, 136) = 0.637, p = .426$, Wilks' $\lambda = .995, d = -0.026$], Externalizing [$F(1, 136) = 0.037, p = .847$, Wilks' $\lambda = 1.000, d = -0.019$], or overall effects on Externalizing [$F(1, 136) = 0.318, p = .574$, Wilks' $\lambda = .998, d = -0.026$] were found for youth reported symptoms. The

combined mean (TP and DW) pre-intervention Internalizing score was at the 70th percentile and mean post Internalizing score was higher, at the 73rd percentile. As was the case for staff reported behavior problems, neither percentile was considered clinically elevated (Achenbach, 2009).

Youth self-report of empathy.—A third RM MANOVA examined Hypothesis 3, which predicted an increase in youth reported Empathic Concern and Perspective Taking from pre- to post-intervention for the TP group, compared to the DW group. Results showed a significant increase in Empathic Concern pre to post intervention across all participants regardless of being in the TP or DW group, $F(1, 136) = 44.197, p < .001$, Wilks' $\lambda = .755, d = 0.105$. Group differences (TP vs. DW) for Empathic Concern were not significant [$F(1, 136) = 2.485, p = .117$, Wilks' $\lambda = .982, d = -0.298$]. Also, both overall Perspective Taking [$F(1, 136) = 3.766, p = .054$, Wilks' $\lambda = .982, d = 0.114$] and a group difference (TP vs. DW) for Perspective Taking [$F(1, 136) = 3.271, p = .073$, Wilks' $\lambda = .977, d = -0.204$] did not reach significance. Overall, the youth showed modestly increased Empathic Concern regardless of being in the TP or the DW group.

Exploratory Analyses

Due to the unexpected finding of an increase in Internalizing Problems per youth and staff report, additional analyses were conducted to examine the effect of Time Incarcerated on Internalizing Problems. A longer time incarcerated could conceivably lead to more serious problems, including behaviors consistent with internalizing symptoms. As such, Time Incarcerated was calculated using the total number of days the youth had been at the facility at the end of the intervention (gathered from youth's records). Of the 138 total participants used in previous analyses, data on length of time incarcerated were available for 132 participants, with average length of time being 157 days (5.2 months). Mean substitution was used to impute the incarceration length for the six youth whose data were missing. Due to the inclusion of a covariate in these models, effect size was calculated in the metric of partial eta squared (η_p^2) as the SMD method used above was not appropriate.

Time Incarcerated was used as a covariate in two separate RM MANCOVAs. The first included staff reported Internalizing and Externalizing Behavior Problems from the TRF as outcome variables and Group (TP vs. DW) as the between subjects factor. The second analysis included youth reported Internalizing and Externalizing Behavior Problems from the YSR as outcomes and Group as the between subjects factor. Before conducting the analyses, assumptions of RM MANCOVA were tested and met. For the staff reported Internalizing and Externalizing Behavior Problems, change in the pre to post Internalizing score was no longer significant when time incarcerated was included in the model [$F(1, 135) = 0.082, p = .775$, Wilks' $\lambda = .999, \eta_p^2 = .001$]. For Youth Reported Behavior Problems, the analysis of Internalizing scores was also no longer significant when time incarcerated was included in the model [$F(1, 135) = 2.970, p = .087$, Wilks' $\lambda = .978, \eta_p^2 = .022$]. In sum, accounting for the length of time youth were incarcerated resulted in a lack of significant differences for Internalizing Problems from pre- to post-intervention for both staff and youth report.

Discussion

The current study's aim was to test the effectiveness of a specific AAT (TP) on increasing empathy and decreasing internalizing and externalizing behavior problems in incarcerated youth. Despite the high incidence of mental illness in these youth (Teplin et al., 2002), the complex problems they face have been inadequately addressed (Greenwood et al., 2012; Young et al., 2008). The current study used not only a novel intervention approach but its targets for treatment, internalizing and externalizing behavior problems as well as empathy, have rarely been examined with respect to incarcerated youth, despite that population's demonstrated difficulties in those domains (Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988; Teplin et al., 2002). It was also one of the few studies in the AAT literature that has used a control group to assess effects on empathy and externalizing behavior problems (Beetz et al., 2012).

Impact of Program on Empathy

A statistically significant increase from pre- to post-intervention for Empathic Concern was observed in all youth, regardless of group. This could indicate that a combination of engaging with dogs and animal-related didactics increased empathy in incarcerated youth. Researchers initially thought that any observed effects would be present to a greater extent in the TP group given that each participant was assigned a unique dog, compared to youth in the DW group who did not consistently work with the same dog. The key distinction in the TP group, compared to the DW group, of being able to form a close relationship with particular dogs was theorized to lead to increased levels of oxytocin, which has been associated with prosocial behaviors such as empathy (Beetz et al., 2012). Previous research has shown greater increases in oxytocin levels when individuals interact with dogs that are familiar to them (Miller et al., 2009; Odendaal & Meintjes, 2003), although this was not measured in the current study. Due to the consistency of dogs in the TP group, researchers expected these youth to be able to form a closer relationship with their dogs compared to the DW group, who walked different dogs. However, consistently training the same dog did not show any benefit to the youth above and beyond simply spending time with a variety of dogs, at least not in terms of how the youth rated themselves immediately following the intervention.

The youth in the DW group did not engage in dog training, yet they nevertheless had the opportunity to form relationships with the animals, even though there was no time to form a longer relationship with a particular dog. Furthermore, simply attending the didactic portion of the project could have impacted the entire sample's empathy, as seen in the significant overall effect. Examples of classroom components that could have supported empathy development included learning to read emotional cues in dogs and humans, and writing letters to the dogs' potential adoptive families. Consistent with this notion, one study found that an animal education curriculum with no in-vivo animal contact time increased empathy in children (Ascione, 1992). Clearly additional research is needed before firm conclusions can be drawn.

An alternate interpretation is that there was no impact of the intervention on empathy using the methods described in this study, given the small effect observed. Perhaps empathy is a

skill that is not easily learned, particularly for those who struggle with it in the first place, as the youth in the current study likely did (Jolliffe & Farrington, 2004; Miller & Eisenberg, 1988). Although a 10 week, 4 hours per week intervention was more intensive than many interventions examined in child therapy (Weisz, Doss, & Hawley, 2005) and AAT for children literatures (May et al., 2016), it may not have been enough to impact these youth in the way researchers had hypothesized. In addition, this was among the first known intervention studies of its kind with incarcerated youth to examine empathy using a validated instrument. The effects of increasing empathy seen in one similar study could have been erroneously reported, as that study did not use valid, reliable outcome measures (Arduini, 2000). Although the empathy measure in the current study had been used previously with incarcerated youth, the measure was not originally validated with such youth; better measures are needed (Davis, 1983; Jolliffe & Farrington, 2004). Perhaps empathy increased but it was not detected by this measure. Alternative measures that could capture empathy more accurately with incarcerated youth should be developed.

Some scholars have advocated for testing interventions aimed at increasing empathy in incarcerated youth (Forth & Flight, 2007; Jolliffe & Farrington, 2004; Lindsey et al., 2001), however, explicit examination of changes in adolescent offender empathy using valid, reliable measures of that construct is rare. The current study addressed the need for interventions to focus on empathy and showed that it could be a worthwhile target of treatment for these youth.

Impact of Program on Behavior Problems

Contrary to expectations, a significant increase in Internalizing Problems, per both staff and youth report, was observed. It should be noted that the effect sizes for these findings were small, and Internalizing Problems were not clinically elevated at either pre- or post-intervention, as determined by the Achenbach (2009) criteria. Another study found a slight increase in depression symptoms after non-incarcerated teens participated in an AAT with dogs that focused on anger management, although the sample size was small (Hanselman, 2001). One potential explanation for the increase in internalizing symptoms was that the youth might have become more aware of their emotions through their interaction with the dogs and the classroom curriculum. Being with the animals as well as working through topics covered in the didactic component (e.g., emotion identification, discussion of animal abuse) could have elicited emotions from the participants, particularly sad feelings, more deeply than is typically the case for incarcerated youth. Thus, the youth possibly gained greater awareness of a wider range of their own emotions, causing a slight increase in those negative behaviors associated with internalizing problems. Further investigation into this finding is needed, specifically using a prospective research design that uses a measure of emotional awareness or healthy emotional expression (e.g., Emotion Expression Scale for Children; Penza-Clyve & Zeman, 2002) in addition to internalizing problems.

An increase in internalizing behavior problems could also be attributed to the length of time the youth had spent incarcerated. Spending greater time in an environment where freedom is limited, and youth were isolated from the outside world, could conceivably have increased feelings of depression and anxiety, accounting for the increase in internalizing problems.

Although the exploratory analyses conducted provided some support for this notion, these results should be interpreted with caution as they provide a post-hoc explanation. Any youth who were incarcerated at these facilities could have shown similar increases in internalizing problems, though unfortunately, no data existed to confirm whether this was the case. No known studies have tracked and reported behavior problems or symptoms of incarcerated youth over time, so the typical progression of problems in these youth during their time incarcerated was unknown.

It is also worth noting that the small effect size could indicate that there was no effect of the intervention on internalizing symptoms. Although there is evidence from other research showing that AATs can reduce internalizing symptoms (Beetz et al., 2012; Souter & Miller, 2007), one similar study with incarcerated female teens found no change in self-reported internalizing problems over the course of the intervention (Conniff et al., 2005). The primary outcome of treatment studies with this population has most commonly been recidivism rate (Lipsey et al., 2010), which was not the focus of the current study. Few studies (Conniff et al., 2005; Lipsey et al., 2010) explicitly addressed internalizing symptoms with incarcerated youth, despite their high rates of clinical depression and anxiety (Teplin et al., 2002). However, mental health interventions that improve internalizing symptoms, such as cognitive-behavioral therapy, are commonly used in this setting (Lipsey et al., 2010; Weisz, McCarty, & Valeri, 2006). The current intervention utilized similar strategies shown to be effective at reducing internalizing symptoms with youth (e.g., cognitive, behavioral, and interpersonal components; see Table 2 for further details; Weisz et al., 2006). One important distinction between the current intervention and other internalizing interventions studied was that most of these intervention elements were applied to the youth's work with the dogs, rather than the youth as individuals, which could account for the lack of substantial effects. The initial idea was that the emphasis on processing the experience of the animals would generalize to the youth having greater ability to process their own experiences, however, it appeared that this might not have been the case. Targeting these symptoms could have been beyond the scope of the intervention described in the current study.

The lack of significant effects on externalizing problems could be due to the components of the intervention. Much of the classroom intervention involved the youth exploring their feelings through activities such as journaling, identifying emotions in animals and people, and promoting positive attitudes toward dogs. The only times during the program that externalizing behaviors were focused on explicitly were during the discussion of dog fighting rings animal abuse. Perhaps a greater focus on the causes of aggression towards animals and humans and methods for decreasing aggression could have led to decreased externalizing behavior in the youth.

Implications and Future Directions

The current intervention could have potential for demonstrating effects beyond those seen immediately post-intervention. Possible delayed effects of the intervention, such as greater empathy, could have developed but not been readily observable immediately following completion of the intervention. Because low empathy has been linked to aggression and externalizing behavior in adolescents who are not incarcerated (Jolliffe & Farrington, 2004;

Miller & Eisenberg, 1988), interventions that increase empathy could thereby decrease the likelihood of youth being aggressive and committing crimes in the future. As a result, these youth could have reduced rates of recidivism, becoming less likely to enter detention again as teens or be imprisoned as adults. However, the circumstances of the current project did not permit examination of any possible effects emerging beyond the immediate end of the intervention.

The methodological rigor of the current study was a significant strength, as many other AAT studies have not included important design aspects such as the use of control groups, randomization to groups, adequate sample size, and multi-informant outcome measures (Kruger & Serpell, 2010; May et al., 2016). Furthermore, the mutual benefit for both the youth and animals that participate, as training makes them more readily adopted, was an important component that made this intervention unique. The incorporation of traditional didactics as well as active learning components in the intervention could allow benefits to a greater number of youth than typical treatments seen in similar settings, such as individual and group counseling. In addition, the current study provides details regarding the TP intervention (see Table 2) that are often absent in other AAT studies (Hoagwood et al., 2016). Providing this description allows researchers to compare components of the current intervention to other AATs.

There are several avenues for further pursuit of this line of research. Researchers are encouraged to use a dismantling strategy to identify the possible active ingredients, such as classroom didactics, dog walking, forming close relations with dogs, or comprehensive TP programming. This would allow for further clarity of any intervention effects. In addition, mediators such as the closeness of a youth's relationship with a dog assessed through observation, or development of an appropriate self-report measure of closeness or feelings of a strong bond with a particular dog versus dogs in general could be beneficial at examining potential mechanisms. Although some self-report measures of dog bonding exist (Kafer, Lago, Wamboldt, & Harrington, 1992; Poresky, Hendrix, Hosier, & Samuelson, 1987), they were not appropriate for the youth in this study, as those measures assumed a prior relationship with an animal, such as pet ownership. Oxytocin levels measured through salivary assessment or administering oxytocin via nasal sprays could be examined to explore oxytocin's effect on empathy in this population. Including alternative outcomes such as physiological measures is difficult, given a strong concern for any kind of medical treatment or data gathering on prisoners (Gostin, Vanchieri, & Pope, 2007). Also, as previously noted, researchers should focus on developing measures of empathy specifically validated for incarcerated youth, such as through qualitative methods, including in-depth interviews, and other forms self report or self reflection.

In addition, taking into account important aspects of the youths' developmental environment, e.g. their families, neighborhoods and schools before they were incarcerated, might lead to improved treatment outcomes. However, in this context, it is often impossible to gather such data, especially given varied information in the youth records concerning their home environments (Heilbrun, Goldstein, & Redding, 2005). An incarcerated youth's initial feelings toward animals in general or owning a pet in the past could also influence AAT outcomes; measuring and accounting for that could help explain the results of such

interventions. Examination of differential effects for those incarcerated youth with a troubled relational history (e.g., maltreatment, foster care) and other background characteristics could reveal important individual differences in treatment response. Finally, a multi-method assessment could provide alternative perspectives and increase the likelihood of detecting treatment effects, if any exist. For example, measures of externalizing behavior that were not included in this study, such as number of disciplinary actions youth received before, during, and after the intervention, could also be particularly informative and appropriate to the environment of incarceration.

There were also some notable threats to the validity of the study, especially for researchers interested in developing research programs for incarcerated youth. As for internal validity, all the detainees in the study participated in traditional individual, group, and family therapy in addition to the TP program; therefore, it is not known to what degree the effects, or lack thereof, of this specific AAT could have been attributable to other forms of treatment that were co-occurring with this program. Also, given that the TP program had been implemented in the two sites prior to the current study being conducted, youth could have had certain expectations regarding their participation that influenced outcomes. As for ecological and external validity, a positive feature of the study was that it was conducted in actual juvenile detention centers in the Midwestern United States. However, given the differences in the way juvenile justice is dealt with across the globe (Junger-Tas, 2006), it is unclear the extent to which a similar AAT could be executed in other types of facilities and other methods of juvenile justice. The generalizability of the program and findings to other parts of the world is unknown. Considering modern views in developmental science, including relational developmental systems theory (Overton & Lerner, 2014), it is not known if the effects seen in the study were sustained post-incarceration for these youth, given the importance of context in not only the development of problematic behaviors but also maintaining any potential changes that occurred. Certainly the youth in this project once released enter an environment greatly different from their incarceration. Additional follow-up of these youth in their post-incarceration milieu was needed, and is strongly recommended as a design feature for similar research in the future.

There is great potential for researchers interested in developing and testing the effects of AAT with incarcerated youth. This research study was among the first to use rigorous research methodology, including the use of well-established measures and experimental design, to test an AAT with incarcerated youth. The previously described challenges, limitations, and recommendations proceeding from of this project indicate that much can be done concerning AAT as an intervention for incarcerated youth. Future research could develop theoretical models, create more useful measures, and test interventions that have the potential to not only change the immediate behavior of incarcerated youth, but to improve their lives once they are no longer incarcerated.

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Table 1.

Demographics of Sample

Variable	% of Sample	Total	TP	DW
Ethnicity				
White/Caucasian	45.7	63	41	22
Black/African American	44.2	61	33	28
Hispanic/Latino	3.6	5	3	2
Biracial	2.9	4	3	1
Other	3.6	5	3	2
Sex				
Male	69.6	96	52	44
Female	30.4	42	31	11
History				
Lifetime Psychiatric Diagnosis or Treatment	66.7	92	55	37
Site 1	73.2	101	63	38
Site 2	26.8	37	20	17
Totals				
Intervention (TP)	60.1	83		
Control (DW)	39.9	55		
Overall	100.0	138		

Note: TP = Teacher's Pet (Intervention), DW = Dog Walking (Control)

Table 2.

Description of Classroom Material Covered by Session

Session	Activities	Description
1	<ul style="list-style-type: none"> • Introduction/class overview • Journal • Stress reduction • Positive dog training 	Students told structure of classes, i.e. 1 hour twice weekly and working with dogs two hours per week. Write in journals about current thoughts, feelings. Presentation on best way to approach stressed dogs and identify dogs' emotions. Students encouraged to think like a dog. Dogs' short attention spans (2–3 seconds) discussed and demonstrated.
2	<ul style="list-style-type: none"> • Journal • Body language • Hand out bags and treats • Positive dog training 	Students taught how to read dog's body language, to empathize with dog. Human's body language also discussed. Youth instructed to give dog treats and say "yes" after dog performs a specified command. Students meet their dogs for first time.
3	<ul style="list-style-type: none"> • Journal • Dog goal sheet • Positive dog training 	Students in intervention group set goals for dog and self. Discussion of positive reinforcement as best way to get desired results from dog. Instructors emphasize dogs should respond to trainer out of want for attention/affection/reward, not fear. Students in intervention group begin training their dogs, control group begin walking dogs.
4	<ul style="list-style-type: none"> • Journal • Review stress reduction • Video re: trainer 	Students given test on identifying emotions of dogs, followed by group discussion. Instructor shows video about girl abused as a child, who relied on comfort dogs to cope. She became a dog trainer, studying wolf packs in Israel and training dogs.
5	<ul style="list-style-type: none"> • Journal • Finish video about trainer • Dog behavior video clips 	Instructor finishes video presentation and shows video clips of dog training, emphasizing practice and persistence.
6	<ul style="list-style-type: none"> • Journal • Start Shelter Dogs video 	Documentary about a dog shelter. Discusses why dogs cannot live in shelters forever, and animal euthanasia versus no kill shelter debate.
7	<ul style="list-style-type: none"> • Journal • Update on goal sheets • Continue Shelter Dogs video 	Check on the students' progress in goals for their dogs and themselves.
8	<ul style="list-style-type: none"> • Journal • Create flyers, write letters • Write about reactions to film • Write a story from dog's point of view 	Students write letters to dog's potential adoptive families. Students can express emotions about no longer working with dogs, give instructions to future owner about their dog. Students write about film, and discuss. Students create stories from dog's perspective, e.g. living conditions, things endured, how the program has helped.
9	<ul style="list-style-type: none"> • Journal • Dog breed presentation 	Students given a presentation about different dog breeds and primary uses for certain breeds
10	<ul style="list-style-type: none"> • Journal • Finish breed presentation • Breed game • First graduation 	Student play breed game. If youth cannot identify a breed, they are out. Winner gets prize. Students in intervention group have completed training first dog, demonstrate what their dog has learned. After session, trainees get new dogs.
11	<ul style="list-style-type: none"> • Journal • Puppy mill presentation • Create public service announcement (PSA) 	Presentation on puppy mills, source for many pet stores. Discuss pros and cons of getting dogs from pet stores, breeders, or shelters. Students create a 30 second PSA about animal shelters and responsible pet ownership.
12	<ul style="list-style-type: none"> • Journal • Goal sheets for second dog • Puppy mill video (con't) 	Students create goals for themselves and their second dog. Students watch additional video on puppy mills.
13	<ul style="list-style-type: none"> • Journal • Object building exercise 	One student in a pair uses 5 Lego pieces to create object, which is photographed and disassembled. The other student in pair must reassemble, getting only prompts of "yes" for feedback, similar to how youth are to work with dogs.
14	<ul style="list-style-type: none"> • Journal • Presentation on dog fighting 	Animal abuse presentation, how dogs can be trained to fight other dogs. Discuss bad effects of fighting on dogs, their emotional response to animal abuse, and prevention.
15	<ul style="list-style-type: none"> • Journal • Dog fighting video 	Students watch video about dog fighting ring and trauma the dogs in the ring experienced.
16	<ul style="list-style-type: none"> • Journal • Finish dog fighting video 	
17	<ul style="list-style-type: none"> • Journal • Update goal sheets • Read poems • Rehearse for graduation 	Students update goals, discuss dog-fighting video. Read poems about animal abuse and "Ten Commandments of Responsible Pet Ownership." Graduation rehearsal, demonstrate dog's learning.

Session	Activities	Description
18	<ul style="list-style-type: none"> • Journal • Write flyers/letters • Careers with animals • Environmental impact of plastic bags • Rehearse for graduation 	Students write letters to potential adoptive families of the dogs. Presentation on jobs involving animals, volunteer opportunities. Discuss how items used for dog care can have negative impact on environment.
19	<ul style="list-style-type: none"> • Journal • Catch up work • Discussion of program • Rehearse for graduation 	Complete work students have left, discuss overall feelings about program.
20	<ul style="list-style-type: none"> • Graduation day • Discuss students' proudest moment in program 	Instructors state a meaningful experiences they had during program, talk about students' accomplishments. Students in intervention group demonstrate what their dog has learned.

Note: Students in the intervention group engage in active dog training for 1 hour between each session following session 3. Students in the control group walk the dogs for 1 hour between sessions following session 3 and do not engage in training.

Table 3

Results from Analyses of Relevant Variables

Variable(s)	Wilks' λ	F (df1, df2)	p	d
Overall Staff Report Internalizing	.962	5.323 (1, 136)	.023	0.113
Overall Youth Report Internalizing	.519	126.069 (1, 136)	<.001	0.094
Overall Empathic Concern	.755	44.197 (1, 136)	<.001	0.105
Group Differences (TP vs. DW) for Empathic Concern	.982	2.485 (1, 136)	.117	-0.298
Overall Perspective Taking	.982	3.766 (1, 136)	.054	0.114
Group Differences (TP vs. DW) for Perspective Taking	.977	3.271 (1, 136)	.073	-0.204

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Table 4

Means and Standard Deviations (SD) of Behavior Problems and Empathy Scores by Group

Variable	Group	Pre Mean (SD)	Post Mean (SD)
Staff Report Internalizing	TP	56.76 (9.09)	58.36 (9.50)
	DW	55.72 (9.18)	55.84 (9.62)
	Overall	56.35 (8.93)	57.36 (9.86)
Youth Report Internalizing	TP	55.43 (10.74)	56.33 (11.04)
	DW	53.89 (11.09)	55.07 (10.86)
	Overall	54.82 (10.70)	55.83 (10.95)
Empathic Concern	TP	17.74 (5.54)	17.67 (5.42)
	DW	16.85 (5.50)	18.43 (4.63)
	Overall	17.39 (5.52)	17.97 (5.12)
Perspective Taking	TP	14.30 (5.92)	14.47 (5.58)
	DW	14.93 (5.12)	16.25 (5.35)
	Overall	14.55 (5.60)	15.18 (5.54)

Note: TP = Teacher's Pet (Intervention), DW = Dog Walking (Control)