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BRIEF PRACTICE

Nice Doggie! Contact Desensitization Plus Reinforcement Decreases Dog Phobias for Children with Autism

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Abstract Dog phobias are common in individuals with autism; however, evidence supporting behavioral interventions is limited. The current study evaluated the efficacy of contact desensitization plus reinforcement on dog phobic behavior exhibited by three children diagnosed with autism. The treatment package improved contact with dogs in analog and naturalistic settings and the improvements were maintained at follow-up and in generalization tests. Parents/caregivers also provided high consumer satisfaction reports.

- Approximately 30 % of individuals diagnosed with autism also receive a comorbid diagnosis of a clinical phobia.
- Research has shown that behavioral treatment for dog phobias in individuals with intellectual disabilities is contact desensitization plus reinforcement using two hierarchies: size of the dog and distance to the dog; no escape extinction was necessary.
- The current systematic replication shows that this treatment package was effective for children with autism using only a single hierarchy composed of distance to the dog.
- Future practitioners may wish to examine whether this treatment package also produces changes in supplemental physiological measures such as pupil dilation, heart rate, galvanic skin responses, and respiration.

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Meta-analytic evidence suggests that around 30 % of individuals diagnosed with autism also receive a comorbid diagnosis of a clinical phobia (Van Steensel and Bogels 2011). While the phobic stimulus or event may vary from small animals to crowded places, phobias are characterized by avoidance of the stimulus, negative emotional reactions (e.g., crying, outbursts, physical aggression), negative verbal behavior (e.g., "Dogs scare me!"), increased autonomic arousal (e.g., heart rate, blood pressure), and physiological stress responses (i.e., increased cortisol). In the general population, phobias can impair familial, social, and occupational functioning and are often treated with pharmacological interventions such as anxiolytics (for a review see, Davidson et al. 1994). Cognitive-behavioral interventions (e.g., reappraisal) and behavioral interventions (e.g., exposure therapy) have also been shown to be effective in treating phobias (for a meta-analysis, see Feske and Chambless 1995). While both types of interventions, alone and in combination, have proven useful with the general population, there are a number of lingering questions about their short- and long-term efficacy and generalization of effects with these interventions for individuals with autism. Accordingly, clinical investigation is needed that explores the efficacy of noninvasive behavioral interventions for phobias in individuals with autism.

Contact desensitization plus reinforcement is one empirically supported behavioral treatment for non-canine phobias exhibited by individuals with intellectual disabilities (e.g., animatronic objects: Ricciardi et al. 2006; needles: Shabani and Fisher 2006). Contact desensitization resembles exposure-based interventions and uses positive reinforcement to gradually increase contact with the feared object. The combination of these elements into a single treatment package can be effective by targeting two

processes underlying phobias. First, contact desensitization effectively reduces fear and anxiety through gradual stimulus exposure, which functions as extinction, breaking the contingency between the feared object and an aversive physiological experience. Concurrently, positive reinforcement is used to shape increasing contact with the phobic stimulus and establish a new appetitive stimulus function of the feared object. As a result, the relationship between the feared object and aversive stimulus function is weakened and it is paired with the delivery of positive reinforcement.

Contact desensitization plus reinforcement has been used successfully to treat avoidance of dogs in two adults with intellectual disabilities in a community residential setting. Erfanian and Miltenberger (1990) found that participants would not approach (i.e., move to within 20 or 30 ft) a dog located on the other side of the room during baseline observations. Treatment involved contact desensitization training composed of two hierarchies involving the distance to the dog and the dog's size. Edibles and praise were delivered contingent on approach without any signs of distress. Following treatment, participants approached within 1 ft of the dog while exhibiting no emotional behavior. Results also showed generalization and maintenance.

The present paper reports on several cases where children with autism avoided dogs or responded to them with emotional behaviors. This aspect of the phobia impaired family function and routinely prevented community access (e.g., walks in the neighborhood, time in the park, play dates with peers that owned a dog). Moreover, the parents could not pursue their interest in dog ownership until their child's dog phobia was eliminated. Therefore, the goal of treatment was to increase approach toward dogs using an empirically supported treatment shown to be effective in adults with ID (Erfanian and Miltenberger 1990). The study used a multiple baseline across participants design to examine the effect of contact desensitization in conjunction with reinforcement (e.g., praise and highly preferred activities for approach) using a distance hierarchy with one 80-lb German shepherd.

Method

Participant, Setting, Materials

Three children with autism, John (age 5), Sally (age 7), and Bob (age 10), participated in this study. Each participant communicated receptively and expressively with complete sentences and could follow directions. Participants were enrolled with an autism behavioral care provider located in South Carolina. Parents referred their children to this study because of their child's vocal protests and avoidance of dogs within their homes and in public. An 80 lb German shepherd therapy dog was used throughout the study for all sessions. Participants had no exposure to this dog prior to the study. Approach toward the dog was assessed during behavioral avoidance tests (BAT). During BATs in the primary treatment evaluation, a trainer held a dog, 98 ft from the participant at the other end of the gym. Generalization was assessed in a parking lot next to a playground. Participants were exposed to a novel therapy dog. During the first generalization session for John and Sally, the dog was a black Labrador that weighed approximately 80 lb whereas a 60-lb Collie was used in the second session. Due to availability, the previous Collie and a 39-lb black Labrador were used for Bob's generalization probes. Each dog stood or was held on a leash by a novel trainer. Informed consent was obtained from all individual participants included in the study.

Response Definition, Measurement, and Treatment Fidelity

Avoidance of dogs was defined as shaking their head no, plugging ears, and refusing to enter, backing away, or fleeing from a room or area containing a dog. The dependent measure was the participant's distance (ft.) away from the dog when the child stopped making forward progress without exhibiting any signs of avoidance of dogs. This measure is reported for baseline and post-treatment BATs. Traffic cones were placed five feet apart to assist with data collection and distance was input in feet to the Catalyst® application on an iPad.®

Immediately following each treatment session (post treatment), a single BAT was conducted to measure the distance the child would approach the dog independently. Participants always started the BAT from 98 ft away from the dog. A total of 27 BATs were conducted excluding generalization and follow-up. Consistent with baseline, the duration of post-treatment sessions ranged from 1–8 min.

Prior to data collection, the first author trained observers to competency on operational definitions and treatment integrity scoring using instruction, feedback, modeling, and role-play. In 80 % of BATs, two observers independently recorded the distance between the participant and the dog using a tape measure and traffic cone markers. Interobserver agreement (IOA) was calculated by dividing the number of agreements by agreements plus disagreements and multiplied by 100. An agreement was defined as both observers recording the same distance in feet during the BATs; mean IOA was 100 %. Treatment integrity was calculated by the total number of correctly implemented steps divided by the total number of steps multiplied by 100 (described below in the treatment evaluation section). Treatment integrity was 96 %.

Experimental Design

A concurrent multiple baseline design across participants was used to evaluate the effectiveness of the treatment package

consisting of contact desensitization plus reinforcement on approach toward dogs.

Treatment Evaluation

Baseline During baseline, successive BAT sessions occurred in the gymnasium of a church activity center and occurred at least 30 min apart. The dog was seated on a mat next to the trainer for John and Bob. For Sally, the dog paced throughout the entire study based on an early baseline observation that Sally would approach a still dog but not a pacing dog. The gymnasium floor was marked with a line that the dog was kept behind by the trainer as it was pacing. The duration of baseline sessions ranged from 1–8 min. A therapist instructed the participant to, "Go as close as you can to the dog." No other verbal prompts were provided during baseline. If the client protested (e.g., whining, crying, physical aggression), the baseline session was ended and the closest distance was recorded for that session.

Contact Desensitization Plus Reinforcement During treatment, decreased distance to an 80-lb German shepherd dog was targeted. The participants advanced through treatment sessions until they met the final criteria, which were individually set based on parental goals (i.e., touching the dog for John and Sally, calmly and closely approaching the dog for Bob). Each child's starting distance from the dog was based on their average approach distance during baseline (John 75 ft; Sally 15 ft; Bob 40 ft). Treatment lasted 12 sessions for John, 8 sessions for Sally, and 7 sessions for Bob. The duration of a treatment session ranged from approximately 20–30 min. Up to two treatment sessions occurred on the same day with at least 30 min between sessions.

At the onset of treatment, the dog and its handler were located on the far side of the gym while the child was seated on the opposite end of the room. The child and therapist sat and watched a DVD or played a game on an iPod® depending on the results of their daily paired-stimulus preference assessment (i.e., non-contingent access to preferred technology throughout the session). Once participants showed no signs of distress, the therapist provided vocal and gestural prompts (e.g., "Let's come closer" while pointing forward) for the child to move 5 ft closer until reaching the 10-ft mark. Once the participant approached the 10-ft mark, the therapist would begin to prompt the child to move up by 1-ft intervals. Contingent on approach, the child was provided praise and their most preferred small edible. On a variable-time 60-s (VT 60-s) schedule, the child was asked to look up at and answer questions about the dog. If the child did not look at the dog and answer questions about the dog, a no-no-prompt would have been delivered until the child successfully followed through with the instruction; however, no child contacted this contingency. This process was repeated and the session was terminated at the end of the 30-min treatment session or when the client touched the dog—whichever came first. If at any point the child began to exhibit avoidance or resistance to forward movement, then she/he was moved 1 ft back from the dog, or to a distance at which no such behaviors occurred. Once avoidance stopped, the participant was prompted again to approach. Moving back was an infrequent event (i.e., less than seven times across all three participants). Subsequent treatment sessions began at a distance from the dog equal to the average approach distance obtained during the previous treatment session.

Generalization/Follow-Up

Approximately two weeks after treatment was discontinued for John and Sally, each child was exposed to generalization/follow-up probes in a parking lot with both a novel dog and handler. A second generalization/follow-up probe with a different, novel dog occurred 6 months later. For Bob, two

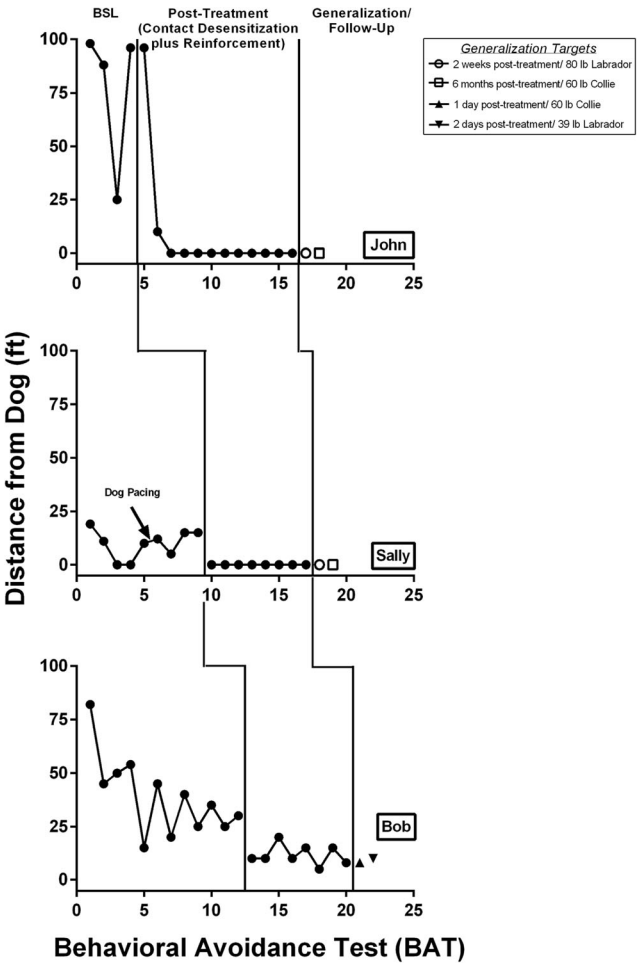

Fig. 1 The distance from the dog (ft) during the behavioral avoidance test sessions (pre- and post-treatment plus generalization/follow-up) across participants

generalization probes were assessed two consecutive days after the last treatment. The duration of generalization probes ranged from 10–20 min and ended once the client requested to do so.

Results and Discussion

Figure 1 displays the distance from the dog (ft) on the *y*-axis as a function of the BAT on the *x*-axis for three participants across baseline, treatment, and generalization/follow-up conditions. No treatment data are depicted. During John's third session, he approached within 25 ft of the dog, which was due to attempting to access a room full of toys (e.g., balls, scooters). After treatment, each participant's distance from the dog decreased (i.e., they approached much closer than previously) immediately. While John showed the largest absolute decrease, the other participants showed large decreases relative to their own baseline performance. Both John and Sally petted the dog across multiple BATs, while Bob approached within 12 ft of the dog, on average. During two generalization tests that were conducted 2 weeks and 6 months after treatment, John and Sally interacted with two different novel dogs in a parking lot next to a playground. For Bob, who was exposed to two generalization probes immediately following treatment, he approached within 9 ft of a novel dog without any avoidance even when the dog barked at him, which met his parents' behavior change goals. Further evidence for generalization and social validity comes from parental report that John began to pet their family dog which he previously refused to contact. Sally's parents provided photographs of an interaction with her teacher's dog during a show-and-tell. Bob's parents reported that he no longer showed signs of distress when in the park surrounded by dogs. Thus, the treatment package of contact desensitization combined with reinforcement was highly effective at reducing avoidance of dogs for three children with autism in the simulated treatment environment and produced clinically significant benefits for each in his or her natural environment.

Our treatment results are consistent with Efranian and Miltenberger's (1990) study that demonstrated the efficacy of the contact desensitization using distance and size of dog hierarchies with reinforcement (without escape extinction) with individuals with intellectual disabilities. Our contact desensitization procedure differed because we did not use a size of dog hierarchy. Instead, we relied on a distance hierarchy. From the perspective of practice, our results suggest that this may be a relatively more efficient protocol for treatment as you can use fewer dogs.

Our study was not without limitations. For instance, we did not measure autonomic responses to the phobic dog stimulus. Recent advances in technology permit mobile devices to collect data on physiological measures at an affordable cost. Practitioners and applied researchers may be interested in collecting supplemental physiological measures (e.g., heart rate, respiration, skin conductance) to examine whether behavioral treatments impact these biological responses. Evidence showing that these treatments impact the physiological correlates of emotional behavior may be especially important to parents and caregivers.

In summary, a contact desensitization plus reinforcement treatment package was used to treat dog phobias in children with autism. These results are noteworthy because this study represents the first practice-oriented treatment evaluation for this age of child with autism. Treatment effects were obtained using a streamlined single contact desensitization hierarchy, which may make this a more "practitioner-friendly" treatment option. Overall, these results add to a growing body of literature that has demonstrated contact desensitization plus reinforcement can be used as an alternative to medication for phobias.

Compliance with Ethical Standards

Conflict of Interest All authors declare that they have no competing interests.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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