

Adaptive Riding Incorporating Cognitive Behavioral Elements for Youth with Anxiety: Fidelity Outcomes

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Equine-assisted services include novel approaches for treating children's mental health disorders, one of which is anxiety (Latella & Abrams, 2019). Reining in Anxiety is a manualized approach to adaptive riding drawing on evidence-based cognitive behavioral therapy elements for youth with anxiety. This intervention was delivered by PATH Certified Therapeutic Riding Instructors (CTRIs) in a randomized pilot study. Fidelity checklists, developed to match the core components of the manualized intervention, were collected by independent observers. Fidelity scores addressed an average of 98.7% of components, well beyond the threshold for high fidelity (e.g. >80%) established in the literature (Garbancz et al., 2014). These findings show that the PATH CTRIs trained in the Reining in Anxiety intervention for this study, with supervision and implementation supports, delivered this intervention with high fidelity. This has important implications for expanding access to evidence-based community mental health services beyond traditional clinic settings and providers, and for addressing the gap between the need for and use of evidence-based youth mental health services.

Key words: adaptive riding, therapeutic riding, equine-assisted services, animal-assisted therapy, fidelity, youth anxiety, cognitive behavioral therapy, evidence-based

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Anxiety is the most common mental health problem in childhood, and, unfortunately, rates are increasing (Bitsko et al., 2018). Childhood anxiety can significantly impair children's functioning in multiple domains, including academic performance or school functioning, such as intrusive thoughts impeding focus; social relationships with peers, such as fear of rejection leading to avoidance of making friends; and difficulties at home or with family, such as excessive worries leading to trouble sleeping at night (Langley et al., 2004). Additionally, anxiety during childhood is strongly linked to risk for recurrent anxiety and depressive disorders in adulthood (Jakobsen et al., 2012; Pine et al., 1998).

Furthermore, at least half of children in the United States with mental health disorders do not receive needed treatment (Whitney & Peterson, 2019). Data from the National Comorbidity Survey showed that less than 20% of adolescents with anxiety disorders received services (Merikangas et al., 2010), constituting a large gap between the number of youth in need of mental health treatment, and the number of youth who receive services. In a recent commentary on this treatment gap, Kazdin (2019) noted that the dominant model of treatment delivery was a barrier to obtaining care. Kazdin defined 'dominant model of treatment delivery' as treatment sessions in-person and one-on-one with a client, administered by a highly trained (master's or doctoral level) mental health professional, and holding sessions in a clinic, private office, or healthcare facility. This dominant model is limiting in accessing care for several reasons, including that one-on-one therapy in-person limits the number of children a provider can serve at a time, as opposed to group interventions. The second point, that treatment is delivered by mental health professionals, is a barrier to care because there are too few mental health professionals in the United States to meet the needs of the population, and many professionals are concentrated in urban areas and are not specifically trained to work with children. Lastly, the fact that sessions are held in-person in healthcare facilities can be limiting due to services not being nearby (particularly in rural areas), needing transportation to the facility, and the stigma of visiting a mental health treatment facility. Clearly, novel treatments and delivery mechanisms are needed to address these barriers and expand access to mental health services.

Given that the rates of accessing community mental health services are so low, and that the mental health workforce is not large enough to meet the needs of the U.S. population, one way to potentially expand access is to expand the workforce and train lay health workers to deliver evidence-based interventions (Barnett et al, 2018; Kazdin, 2019). This is a tactic that supports the World Health Organization's Mental Health Gap Action Program (WHO, 2015). Similar to other branches of medicine or education, lay mental health workers, paraprofessionals, or paraeducators can play a vital role in access and engagement in the greater system of care. For example, in the substance abuse treatment field, peer workers have a legacy of successfully providing support due to their lived experience (Reif et al., 2014). Additionally, depending on specific state-by-state provider regulations, there is a spectrum of adjunctive providers, some of whom are unlicensed and self-regulated, that are recognized as complementary to the mental health field, such as bachelor's-level social workers, pastoral counselors, or coaches (Stanley et al., 2014; Nieuwsma et al., 2014).

Task shifting is a method of redistributing service delivery to individuals with less training and qualifications than traditional workers, leading to an increase in the total number of health workers to expand the mental health workforce (Kazdin, 2019). The delegation of simpler cases to less trained workers can help to alleviate the workload of mental health professionals, allowing them to focus on more complex cases, and increasing the overall

number of clients that can be served (Javadi et al., 2017). Task shifting has been assessed in controlled trials for the treatment of anxiety and other mental health disorders, with lay workers delivering evidence-based treatments, and results have shown that these individuals can successfully implement these treatments with favorable outcomes (Javadi et al., 2017; Kazdin, 2019; Stanley et al., 2014). However, task shifting still requires quality training of the lay workforce, regular supervision, and providing lay workers with resources and tools (Javadi et al., 2014).

Reining in Anxiety is a novel, manualized adaptive riding intervention with evidence-based cognitive-behavioral elements for youth with mild to moderate anxiety, delivered by lay workers trained by a mental health professional (Morrissette, Acri, & Hoagwood, 2019). Adaptive riding is defined as a service which adapts horseback riding to individuals with diverse needs, making the natural, healthful benefits of riding and interacting with horses accessible to that population (Wood et al., 2021). Adaptive riding is also commonly referred to as therapeutic riding; for the purposes of this paper, the term adaptive riding will be used.

Reining in Anxiety was constructed not only to alleviate anxiety, but was also intentionally designed to expand access to evidence-based services by delivering the anxiety intervention in a novel way. The delivery mode of Reining in Anxiety does not follow the aforementioned dominant model of mental health treatment delivery. The intervention was delivered in-person, but was delivered in small groups of two to three children, rather than the one-on-one model. The intervention was delivered by Professional Association of Therapeutic Horsemanship International (PATH) Certified Therapeutic Riding Instructors (CTRIs), who had training in teaching horseback riding and working with people with disabilities, but were not trained as mental health professionals. Towards the idea of task shifting and expanding the mental health workforce, a master's level mental health professional trained and supervised these instructors on the intervention. Lastly, the intervention was delivered in the setting of a therapeutic riding center, in a horseback riding arena, rather than in a clinic or healthcare facility, which may have aided in accessibility and lowered stigma of receiving services.

Besides the intervention being designed to expand the methods of mental health service delivery, adaptive riding was investigated for the intervention due to the existing evidence of the benefit of equine-assisted services (EAS), including both adaptive riding and psychotherapy incorporating horses, on the mental health of participants. Reining in Anxiety should not be considered a form of psychotherapy, as a licensed therapist does not deliver it; however, it incorporates cognitive-behavioral psychotherapy elements, which is why investigating previous studies of psychotherapy incorporating horses is relevant. For example, a previous study showed that working with horses in a therapeutic context, combined with cognitive behavioral strategies, showed positive results in a group of adults with social anxiety (Alfonso et al., 2015). Additionally, psychotherapy incorporating horses may be particularly effective when stigma is high or barriers to access create lack of engagement (Kendall et al., 2012; Wilson et al., 2017).

In particular, when working with clients with anxiety, the involvement of the horse may lead to diversion of attention to the horse, decreasing social anxiety and facilitating easier self-disclosure (Alfonso et al., 2015). It has also been suggested that horses can be useful in therapeutic contexts because they act as a 'biofeedback mechanism.' As prey animals, horses are sensitive to mood and behavior of the client; perhaps more sensitive than the therapist may be, which could be helpful in teaching emotion regulation for youth with anxiety (Wilson et al., 2017). Some psychophysiological data on various EAS has emerged as well; a randomized

controlled trial of equine-assisted learning in personal development showed decreased cortisol levels in the intervention group of adolescents at posttest, also suggesting that equine interactions may be beneficial in decreasing youth stress or anxiety (Pendry et al., 2014). However, there are currently no evidence-based, equine-assisted services that have been rigorously studied for youth with mild to moderate anxiety (Latella & Abrams, 2019); Reining in Anxiety aims to fill that gap.

Although various EAS have shown some efficacy in improving mental health problems in the publications noted above, the quality of scientific inquiry of many studies of EAS leaves something to be desired. In 2014, Anestis et al. reviewed the methodology of studies published on psychotherapy incorporating horses and therapeutic riding aimed at improving mental health. These authors surmised that all studies in their review had several threats to validity of the results; some of these major threats came from design issues, namely, a lack of randomization, manualized treatments, and fidelity checks. These issues have begun to be addressed in the literature on psychotherapy incorporating horses and adaptive riding, such as in fidelity checks conducted in a therapeutic riding intervention for youth with autism spectrum disorder (ASD) (Gabriels et al., 2015). Additionally, a study of cognitive processing psychotherapy incorporating horses for veterans with post-traumatic stress disorder utilized fidelity checks by reviewing audio from sessions (Wharton et al., 2019). However, further rigorous studies of psychotherapy incorporating horses and adaptive riding to treat mental health issues are still needed to improve the evidence-base of these interventions.

The pilot trial of Reining in Anxiety has attempted to build on previous promising work and address threats to validity by utilizing a manualized treatment, using randomization in assigning families to treatment groups, and incorporating fidelity checks. The latter element is particularly important due to the fact that the Reining in Anxiety intervention was delivered by lay workers, PATH CTRIs. This kind of expansion of the workforce necessitates that, for consumer protection, services are delivered under supervision of licensed mental health professionals and the protocol is delivered as intended. To ensure that the protocol is delivered as intended, it is necessary to carefully assess fidelity to the intervention. Thus, the purpose of this study is to examine fidelity to the Reining in Anxiety intervention, as one method of exploring the feasibility of using non-mental health professional therapeutic riding instructors to deliver a mental health intervention.

Methods

Randomized Trial

In 2019 and 2020, a small, randomized trial of Reining in Anxiety was conducted in a random sample of 41 youth (ages 6-17) who screened positively for mild to moderate anxiety, and their parents. Screening involved parent report of youth anxiety symptoms, using the Generalized Anxiety Disorder 2-item survey (GAD-2) (Kroenke et al., 2007), and functioning level, using the Children's Global Assessment of Scale (Shaffer et al., 1983). There was no formal mental health evaluation before the treatment began. Inclusion criteria were that the youth was between 6 and 17 years old, scored a 2 or above on the GAD-2, had a minimum score of 41 on the CGAS, and had a caregiver who spoke English. Eligible families were randomly assigned to Reining in Anxiety or the center's standard adaptive riding, services as usual (SAU) group. Children who were enrolled in the Reining in Anxiety group participated in the manualized intervention during a 10-week semester; their caregivers were also provided with psychoeducation about anxiety as well as the components of each session to reinforce learning at home. The preliminary results of the larger randomized trial indicate that children

in the Reining in Anxiety groups showed significantly greater improvements in anxiety and self-efficacy than those in the control group (Hoagwood et al., submitted). The New York University Langone Health Institutional Review Board (IRB) approved the protocol for this study.

Replication and manualization in the field of human-animal interaction is an important focus of the research agenda in a recent NICHD report (McCardle et al., 2020); to that end, further detail about procedures, measures, and results of the randomized trial can be found in Hoagwood et al., submitted.

Current Study

The intervention was designed to be delivered by PATH CTRIs, whose training involves mastering knowledge and skills in horsemanship, teaching, and understanding disabilities, but who typically do not have any formal mental health training. The current study focused on fidelity data gathered at 2 locations of a PATH-certified stable in New York City over four 10-week “semesters” (beginning in Spring of 2019, and concluding in Winter of 2020). All groups were delivered by PATH CTRIs employed at the stable. Intervention development and training were conducted by the research team. The research team consisted of individuals with expertise in clinical social work, school psychology, equine studies, and mental health services research. Three members of the research team were involved in the intervention development, one of whom trained the PATH CTRIs on the intervention. Fidelity was collected by seven different raters, five of whom were members of the research team (one of whom was the supervising trainer), and two of whom were employees of the PATH-certified riding stable.

Participants

Three PATH-certified instructors already employed at the stable were assigned to teach Reining in Anxiety groups, and were trained in the Reining in Anxiety intervention (one instructor was trained as a back-up to provide continuity in case of primary instructor absence). These instructors all had a baseline expertise of having completed PATH certification, which involved demonstrating evidence of equine handling and management skills, their own riding skill, and skill in riding instruction of people with disabilities. PATH certification required 25 hours of supervised therapeutic riding instruction, cardiopulmonary resuscitation (CPR) and first-aid training, passing two online exams, completion of an in-person 2.5-day workshop (combination of lectures and interactive activities), and finally, passing an in-person 2-day certification evaluation, demonstrating riding skills and teaching skills, through instructing a group lesson with riders with disabilities (PATH, 2020). The two instructors who delivered in the Reining in Anxiety sessions also both held bachelor’s degrees, and had 3-15 months of experience working as PATH-certified instructors.

Materials: Intervention

Reining in Anxiety was developed with mental health services researchers and PATH CTRIs by identifying evidence-based components found to be effective for treating youth anxiety (Morrissey, Acri, & Hoagwood, 2019). The researchers who developed the intervention included two PhD-level mental health services researchers who were also trained and worked as clinicians previously, along with a currently licensed, and actively practicing, master’s-level mental health clinician. All three of these researchers had expertise in delivering and researching the delivery of cognitive behavioral therapy (CBT). The CBT components used in this intervention were identified by working with PracticeWise, a company whose website contains a tool known as the PracticeWise Evidence-Based Services (PWEBS)

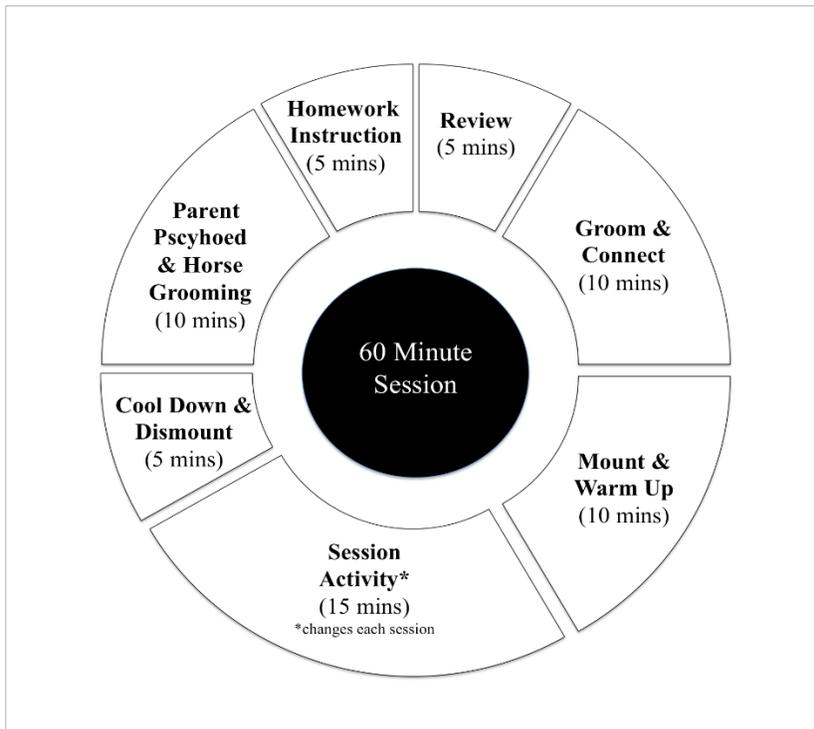
Database. PWEBS was a database containing synthesized versions of published treatment research on youth mental health, which meet specific standards for scientific quality. PracticeWise extracted the practice elements proven to be effective in each research study, then created PWEBS results showing the practice elements used to treat various conditions and what percent of research studies used that practice element. Further information about the development of PracticeWise can be found in Chorpita and Daleiden, 2009. The most frequently used practice elements that resulted from a search for youth anxiety were chosen to be integrated into the intervention; this included exposure, psychoeducation for both child and caregiver, cognitive restructuring, and relaxation (PracticeWise, 2019). Several of these practice elements fell under a broader category of mental health “treatment family” known as CBT, which is why this adaptive riding intervention was referred to as including “cognitive behavioral elements”.

These practice elements were then paired with progressive horsemanship skills to create a manualized intervention delivered in 10-week semesters; the focus of each of the ten sessions was detailed in Figure 1. Each session contained 30 minutes of mounted activities (warm-up, activity, cool-down), and 30 minutes of unmounted activities (see Figure 2). For example, in session one, the main activity while mounted was psychoeducation, teaching the children about differentiating between the three components of anxiety (thoughts, feelings, behaviors). Children were each given index cards with examples of thoughts, feelings, and behaviors, such as “I can’t do this,” “excited,” and “kicking dirt in the arena” respectively. Children were then asked to sort index cards into corresponding buckets, steering their horse around the arena to those buckets, with speed as an additional horsemanship skill to challenge advanced riders. Some examples of the unmounted activities included grooming and homework review before mounting, and providing parents with psychoeducation and a recap of skills learned after riding. Instructors conducted psychoeducation for parents as the last part of the session, with the children present as well. Further detail about the CBT evidence-based practice elements for youth anxiety can be found through PracticeWise’s website (PracticeWise, 2019) and further detail about manual development, and the integration of those practice elements into adaptive riding, can be found in Acri et al., in press.

Figure 1. Reining in Anxiety 10-Session CBT Component Focus. To provide some clarity on certain terms: Session 1, “Components of CBT” refers to teaching the riders to understand and identify the differences between thoughts, feelings, and behaviors. Session 5, “Fear Ladder” refers to using a ‘ladder’ to rank situations based on how much anxiety they cause the riders. Sessions 7 & 8, “Cognitive Distortions” refers to negative thoughts that youth with anxiety commonly experience, such as negative predictions of the future, like “I’ve never ridden this horse before, so I’ll definitely fall off.”; children learn about identifying and changing these thoughts. Session 9, “Problem Solving”, refers to teaching children steps for effective problem solving, practicing those steps, and identifying when to use this technique.

1. Components of CBT
2. CBT w/ Anxiety Focus
3. Relaxation Techniques
4. Review Sessions 1-3
5. Finalize Fear Ladder
6. Thought Changing
7. Cognitive Distortions
8. Cognitive Distortions
9. Problem Solving
10. Completion: Celebrate & Maintenance

Figure 2. Reining in Anxiety Session Breakdown



Procedure: Instructor Training

The three instructors assigned to the Reining in Anxiety groups participated in a 2-day in-person training with a master's level, licensed clinical social worker with a Post-Master's Certificate in Equine Assisted Mental Health. The supervising trainer had expertise in CBT and formal training in CBT elements through Managing and Adapting Practice (MAP), an evidence-based practices training that utilized PracticeWise resources (including PWEBS), and was also a PATH CTRI and a co-developer of the intervention. Although three instructors were trained, only two ended up delivering Reining in Anxiety groups during the randomized trial; the third instructor was an alternate who never ended up teaching a session. This training was framed by distribution of a PowerPoint presentation, the printed 75-page intervention manual (Morrissey, Acri, & Hoagwood, 2019), and the homework journal which the children in the intervention would complete, all of which were given to the instructors ahead of time. The first part of the training focused on introducing the project, explaining how the intervention was developed, communicating data collection expectations, and talking through what anxiety is and the therapeutic stance of the intervention in treating anxiety. Then, the supervising trainer went through the manual and homework journals for each of the 10 sessions, reviewing the content and structure, as well as discussing props and set-up for each session. Importantly, the instructors practiced the main activity of each of the 10 sessions (skipping the practice of warm-up, grooming, etc.) through role plays without horses, in which they took turns being the child or instructor, or the fidelity rater. The supervising trainer answered questions throughout and discussed potential challenges to implementation with instructors.

The training was given about a month before the start of the first 10-week semester of the study, Winter 2019, but unfortunately, no families were randomized to the Reining in Anxiety group in that first 10-week semester. Because of this, the supervising trainer did a one-day refresher training about 4 months after the original training, just before the start of the Spring 2019 10-week semester, in which there were Reining in Anxiety groups running. This refresher training involved updates on research subject recruitment and the intervention structure, the distribution and use of instruction aids, and another round of role-playing sessions. The refresher training also introduced a safety plan, explaining how the instructors should work with families and the licensed clinical mental health professionals on the research team if one of their riders were experiencing escalating mental health symptoms (such as the child mentioning suicidal ideation during a session).

Instructors were given implementation supports, including a fanny pack to be worn during session, which held instruction aids to be used in session, such as index cards, markers, a ball, and laminated tools such as fear thermometers and problem solving steps. Instructors were provided with the Reining in Anxiety student journals to give to each of their students. These journals were developed for each child to bring home to complete homework between sessions, then bring back and discuss with the instructor and group at the next session. The homework focused on having the children practice the skills they learned in session, and apply those skills to their lives outside of the stable. Additionally, instructors were given educational handouts to distribute to parents; the handouts listed each of the sessions and suggested what parents should be reinforcing at home from each of those sessions. Lastly, instructors received a small fidelity checklist that they could keep in their fanny pack throughout the session to keep themselves on task.

Once the Reining in Anxiety groups began running, the supervising trainer held weekly 30-minute supervision meetings via phone with the two instructors who were teaching these

groups. These meetings involved discussing the previous week's lessons, planning for the sessions in the coming week, strategizing about customizing interventions to each individual rider (such as tailoring exposures to individual fears), and talking through any crises of the week and instructor questions. The supervising trainer was also available to the instructors by phone and text message as needed for emergencies and safety planning. Additionally, fidelity checks served as a type of supervision; instructors reported feeling that they were being supervised, and raters would give feedback to the instructors if they missed any elements, or would give that feedback to the supervising trainer, who would bring it up in supervision.

Fidelity assessment

Fidelity checklists were assembled for each of the 10 sessions by pulling out key elements of the session, including both mounted and unmounted activities. Elements were organized in chronological order of the lesson, and separated by check-in, mount, warm-up, activity, cool-down, and end of session. For example, an item on the fidelity checklist for the "check-in" section was "instructor asked riders if anyone experienced a crisis of the week." An example in the "activity" section was "instructor guides riders through relaxation exercise (progressive muscle relaxation);" an example in the "end of session" section was "instructor assigned practice for caregivers and child to complete during week." See Figure 3 for a checklist example for session 1. The fidelity raters observed the sessions live at the stable. All raters completed the checklists by rating each element with a binary yes/no based on whether or not the instructor completed that part of the lesson.

For the first 10-week semester in which Reining in Anxiety was delivered, fidelity checks were conducted on all of the completed sessions. Because fidelity in this first 10-week semester was so high, checks were reduced, and conducted on 22.8% of the sessions in the remaining four 10-week semesters. The 22.8% that were checked were not randomized; these were chosen based on rater availability, with a conscious effort to try to space out fidelity checks among groups and checking different sessions within the 10-week semester. For 21.7% of sessions rated for fidelity, two raters conducted fidelity checks together, to ensure interrater reliability.

Total scores were calculated for each of the sessions by looking at the percentage of elements completed that were marked "Yes". Scores were averaged across individual 10-week semesters and individual instructors, and also averaged with both instructors across all sessions. Interrater reliability was determined for each of the sessions in which two raters checked the same session, by calculating the unweighted kappa using the observations of score 1 and score 2 in the statistical program "R".

Qualitative Data

After all Reining in Anxiety groups were complete, two members of the research team conducted qualitative interviews with the two PATH CTRIs who were trained in Reining in Anxiety and delivered the groups. Each interview lasted approximately one hour, and questions focused mainly on instructor satisfaction with Reining in Anxiety training and supervision, working with the research team, and delivering the intervention. Data for this paper were specifically taken from the questions about the instructor experience with fidelity checks; instructor responses were summarized for our results section.

Figure 3. Fidelity Checklist Example (Session 1)

Session 1: Psychoeducation on CBT Components		
A	CHECK-IN	DONE
1	Instructor introduced themselves and other staff members present in the room	<input type="checkbox"/>
2	Instructor asked riders to introduce themselves	<input type="checkbox"/>
3	Instructors introduced riders to the horse they will be riding	<input type="checkbox"/>
4	Instructors reviewed barn rules with riders	<input type="checkbox"/>
5	Instructor instructed rider on how to groom horse	<input type="checkbox"/>
B	RIDING	
6	Mount Instructor asked riders to mount the horse	<input type="checkbox"/>
7	Warm Up. Instructor conducted warm up activity (physical tasks=muscular movements; mental tasks=riders tell jokes)	<input type="checkbox"/>
8	Activity Instructor reviewed horse commands (WHOA BACK, WALK ON)	<input type="checkbox"/>
9	Instructor asked riders to define anxiety	<input type="checkbox"/>
10	Instructor described the three components of anxiety (what we think, feel and do)	<input type="checkbox"/>
11	Instructor elicited examples of the 3 components of anxiety from riders (aloud/index card)	<input type="checkbox"/>
12	Instructor had mounted riders sort index cards into buckets representing 3 components of anxiety	<input type="checkbox"/>
13	Cool Down Instructor explained importance of horse cool down	<input type="checkbox"/>
14	Instructor facilitated dismounting off of horse	<input type="checkbox"/>
C	END OF SESSION	
15	Psychoeducation. Instructor asked riders to tell parents examples of thoughts, feelings, and behaviors	<input type="checkbox"/>
16	Practice Instructor demonstrated/distributed practice journals for riders to complete	<input type="checkbox"/>
17	Instructor asked riders to make a safety plan in their journal for the week (names of people to call if they need help)	<input type="checkbox"/>

Results

In the first 10-week semester that families were assigned to Reining in Anxiety groups (Spring 2019), fidelity checks were conducted on 100% of the 25 completed sessions. Overall fidelity was very high (98.4%) in that first 10-week semester. Because it was so high, checks were planned to be conducted on only 20% of all sessions offered in the three remaining 10-week semesters. Due to student cancellations and the final 10-week semester being cut short in March 2020 due to the start of the COVID-19 pandemic, a total of 92 sessions were completed in the remaining 3 semesters, and 21 of those sessions (22.8%) were rated for fidelity. A total of 46 of 117 (39.3%) sessions across all 10-week semesters were rated for fidelity to the protocol.

With the data from all four 10-week semesters in which Reining in Anxiety was conducted, individual session fidelity ranged from 93.3-100%, with a mean of 98.7%. Separating out by instructor, Instructor 1 addressed 98.1% of elements across 10 sessions (range 88.9-100%), and Instructor 2 addressed 99.7% of elements across 10 sessions (range 98-100%). Finally, for 21.7% of the sessions for which fidelity was assessed, a second research team member observed and rated the sessions. Inter-rater reliability was excellent, at $k=1$.

In a qualitative satisfaction interview with instructors after completing all 10-week intervention semesters, one instructor mentioned that fidelity checks did feel like a bit of a burden at the beginning, but that it was helpful to have fidelity checkers there for the launch of the trial because this made them stick to the protocol. The other instructor mentioned that fidelity checks did make them slightly nervous in the beginning, but once they were more comfortable with executing the protocol themselves, they felt they understood the protocol and the presence of the fidelity checker did not matter.

Discussion

To our knowledge, this pilot study is the first to demonstrate fidelity of implementation of a novel approach to adaptive riding for youth with anxiety. Fidelity findings confirmed that the intervention was delivered as intended. Indeed, the very high fidelity average of 98.7% far exceeded the 80% threshold for high fidelity established in the literature (Garbacz et al., 2014). Hence, with appropriate training and weekly supervision by an experienced master's level licensed mental health professional, plus implementation supports, our findings suggest that PATH CTRIs can successfully deliver Reining in Anxiety, a manualized approach to adaptive riding that incorporates evidence-based practice elements of CBT (Morrissey, Acri, & Hoagwood, 2019). This demonstration of successful implementation has important implications for expanding access to community-based mental health services, potentially helping to address the gap between the need for and use of evidence-based youth mental health services. The high fidelity attained in this Reining in Anxiety pilot trial shows an opportunity for expanding access to services beyond traditional mental health settings, which can also help lessen the stigma around service use.

Limitations of this study include the small sample size, and the yes/no style of the fidelity checklists. This was a pilot study and consequently only two instructors were trained to provide the Reining in Anxiety intervention, and 46 sessions were assessed for fidelity. The data collection period was shortened due to the COVID-19 pandemic, which closed the riding stable. Consequently, the study ended early in March 2020. These limitations constrain the ability to generalize these findings, and clearly additional research is needed with larger sample sizes of instructors and students. Secondly, the yes/no style of the fidelity checklists assesses only the existence of core elements, and does not allow for quality assessment. A potential

concern of delivery by PATH CTRIs, and not by licensed mental health professionals, is that they may not be as well versed at adapting the intervention to the client's needs as they arise. The yes/no checklist cannot fully assess this type of individualized service delivery, and because no licensed mental health professionals were delivering this intervention in comparison, it is currently unknown if intervention quality would differ based on provider qualifications. Future studies could therefore include a comparison group of licensed mental health professionals, and also enhance fidelity checklists to include scales for quality assessment for key items, such as using a 5-point scale for how well an item was implemented throughout the session.

Nevertheless, the ability to achieve high levels of fidelity with an intervention delivered by PATH CTRIs by adhering to a detailed protocol, instituting implementation supports, and providing ongoing consultation can provide a model for future studies of other novel approaches to adaptive riding. Similarly, another study of a randomized trial of adaptive horseback riding for youth with autism spectrum disorder, delivered by PATH CTRIs, included fidelity measures that also showed very high rates of fidelity to the intervention (Gabriels et al., 2015). These results, combined with the results of the current study, indicate the potential of PATH CTRIs to deliver interventions for youth mental health with fidelity.

A recent NICHD report reviewing the past decade of progress in human-animal interaction research calls for replication of manualized interventions to advance this field of research (McCardle et al., 2020). To address this goal, we plan to expand our research of Reining in Anxiety by training more PATH CTRIs at a different stable, taking fidelity ratings of their delivery, and learning more about how generalizable these findings may be. Additionally, a call in the literature has proposed including physiological indicators to measure mechanisms of change in human-animal interactions to increase scientific rigor (Esposito et al., 2011). A position statement from the American Psychological Association Section on Human-Animal Interaction suggests bringing attention to the wellbeing of animals involved in intervention work, and measuring the impact of interventions on the animal's welfare (Johnson & Eccles, 2020). As such, we plan to include feasibility testing for collecting both horse and rider salivary biomarkers (such as cortisol or alpha-amylase), in order to add an additional, psychophysiological outcome measure of stress and anxiety levels to our existing self-report measures, in preparation for a larger randomized trial.

References

- Acri, M., Morrissey, M., Peth-Pierce, R., Seibel, L., Seag, D., Hamovitch, E., Guo, F., Horwitz, S., Hoagwood, K. (in press). An equine-assisted therapy for youth with mild to moderate anxiety: Manual development and fidelity. *Journal of Child and Family Studies*.
- Alfonso, S.V., Alfonso, L.A., Llabre, M.M., Fernandez, M.I. (2015). Project Stride: An equine-assisted intervention to reduce symptoms of social anxiety in young women, *EXPLORE*, 11(6), 461-467. <https://doi.org/10.1016/j.explore.2015.08.003>.
- Anestis, M.D., Anestis, J.C., Zawilinski, L.L., Hopkins, T.A., Lilienfeld, S.O. (2014). Equine-related treatments for mental disorders lack empirical support: A systematic review of empirical investigations. *Journal of Clinical Psychology*, 70 (12), 1115-1132. doi.org/10.1002/jclp.22113
- Barnett, M.L., Lau, A.S., Miranda, J. (2018). Lay health worker involvement in evidence-based treatment delivery: A conceptual model to address disparities in care. *Annual Review*

- of Clinical Psychology*, 14(1), 185-208. <https://doi.org/10.1146/annurev-clinpsy-050817-084825>
- Bitsko, R. H., Holbrook, J. R., Ghandour, R. M., Blumberg, S. J., Visser, S. N., Perou, R., & Walkup, J. T. (2018). Epidemiology and impact of health care provider-diagnosed anxiety and depression among U.S. children. *Journal of Developmental and Behavioral Pediatrics*, 39(5), 395–403. <http://doi.org/10.1097/DBP.0000000000000571>
- Chorpita, B. F., & Daleiden, E. L. (2009). Mapping evidence-based treatments for children and adolescents: Application of the distillation and matching model to 615 treatments from 322 randomized trials. *Journal of Consulting and Clinical Psychology*, 77(3), 566–579. <https://doi.org/10.1037/a0014565>
- Esposito, L., Mccune, S., Griffin, J. A., & Maholmes, V. (2011). Directions in human-animal interaction research: Child development, health, and therapeutic interventions. *Child Development Perspectives*, 5(3), 205–211. <https://doi.org/10.1111/j.1750-8606.2011.00175.x>
- Gabriels, R.L., Pan, Z., Dechant, B., Agnew, J.A., Brim, N., Mesibov, G. (2015). Randomized controlled trial of therapeutic horseback riding in children and adolescents with autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, 54(7), 541-549. <https://doi.org/10.1016/j.jaac.2015.04.007>.
- Garbacz, L. L., Brown, D. M., Spee, G. A., Polo, A. J., & Budd, K. S. (2014). Establishing treatment fidelity in evidence-based parent training programs for externalizing disorders in children and adolescents. *Clinical Child and Family Psychology Review*, 17(3), 230-247. <http://doi.org/10.1007/s10567-014-0166-2>
- Hoagwood, K. E., Acri, M., Morrissey, M., & Peth-Pierce, R. (2017). Animal-assisted therapies for youth with or at risk for mental health problems: A systematic review. *Applied Developmental Science*, 21(1), 1–13. <https://doi.org/10.1080/10888691.2015.1134267>
- Hoagwood, K., Acri, M., Morrissey, M., Peth-Pierce, R., Seibel, L., Seag, D., Vincent, A., Guo, F., Hamovitch, E., Horwitz, S. (under review). Adaptive riding incorporating cognitive-behavioral elements for youth with anxiety: Results of an exploratory randomized controlled study. *Submitted to Human Animal Interaction Bulletin, Special Issue*.
- Jakobsen, I., Horwood, L., Fergusson, D. (2012). Childhood anxiety/withdrawal, adolescent parent–child attachment and later risk of depression and anxiety disorder. *Journal of Child and Family Studies*, 21, 303–310. Doi: 10.1007/s10826-011-9476.
- Johnson, A. & Eccles, E. (2020). Position statement on animal welfare in animal-assisted interventions. American Psychological Association (APA), Section 13 Human-Animal Interaction, Division 17 (Society of Counseling Psychology).
- Kazdin A.E. (2019). Annual research review: Expanding mental health services through novel models of intervention delivery. *Journal of Child Psychology and Psychiatry*, 60(4)4: 455–472. <https://doi.org/10.1111/jcpp.12937>
- Kendall, E., Maujean, A., Pepping, C.A., Downes, M., Lakhani, A., Byrne, J., Macfarlane, K. (2012). A systematic review of the efficacy of equine-assisted interventions on psychological outcomes. *European Journal of Psychotherapy & Counseling*, 17(1), 57-79. <https://doi.org/10.1080/13642537.2014.996169>

- Kroenke, K., Spitzer, R.L., Williams, J.B., Monahan, P.O., Löwe, B. (2007). Anxiety disorders in primary care: Prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine*(146), 317-25. doi:10.7326/0003-4819-146-5-200703060-00004
- Langley, A. K., Bergman, R. L., McCracken, J., & Piacentini, J. C. (2004). Impairment in childhood anxiety disorders: Preliminary examination of the child anxiety impact scale-parent version. *Journal of child and adolescent psychopharmacology*, 14(1), 105–114. <https://doi.org/10.1089/104454604773840544>
- Latella, D., & Abrams, B. N. (2019). The role of the equine in animal-assisted interactions. In A. H. Fine (Ed.), *Handbook on animal-assisted therapy: Foundations and guidelines for animal-assisted interventions* (p. 133–162). Elsevier Academic Press: London.
- McCardle, P. D., McCune, S., Griffin, J. A., eds. (2020). Human-animal interaction (HAI) research: A decade of progress. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88963-601-3
- Merikangas, K. R., He, J. P., Burstein, M., Swendsen, J., Avenevoli, S., Case, B., Georgiades, K., Heaton, L., Swanson, S., & Olfson, M. (2011). Service utilization for lifetime mental disorders in U.S. adolescents: Results of the National Comorbidity Survey-Adolescent Supplement (NCS-A). *Journal of the American Academy of Child and Adolescent Psychiatry*, 50(1), 32–45. <https://doi.org/10.1016/j.jaac.2010.10.006>
- Morrissey, M., Acri, M., Hoagwood K. Reining in anxiety: Equine-facilitated group therapy with cognitive-behavioral components for youth with anxiety. New York University: New York, New York. It may not be reproduced without permission from the author(s). Version 3.0, March 15, 2019.
- Nieuwsma, J. A., Fortune-Greeley, A. K., Jackson, G. L., Meador, K. G., Beckham, J. C., & Elbogen, E. B. (2014). Pastoral care use among post-9/11 veterans who screen positive for mental health problems. *Psychological services*, 11(3), 300–308. <https://doi.org/10.1037/a0037065>
- Pendry, P., Smith, A.N., Roeter, S.M. (2014). Randomized trial examines effects of equine facilitated learning on adolescents’ basal cortisol levels. *Human-Animal Interaction Bulletin*, 2(1), 80-95.
- Pine, D. S., Cohen, P., Gurley, D., Brook, J., & Ma, Y. (1998). The risk for early-adulthood anxiety and depressive disorders in adolescents with anxiety and depressive disorders. *Archives of general psychiatry*, 55(1), 56–64. <https://doi.org/10.1001/archpsyc.55.1.56>
- Practicewise, LLC. (2019) *Evidence-based youth mental health services literature database*. https://www.practicewise.com/pwebs_2/index.aspx
- Professional Association of Therapeutic Horsemanship (PATH) International. (2020, October 7). *Certifications*. <https://www.pathintl.org/resources-education/certifications>
- Reif, S., Braude, L., Lyman, D. R., Dougherty, R. H., Daniels, A. S., Ghose, S. S., Salim, O., & Delphin-Rittmon, M. E. (2014). Peer recovery support for individuals with substance use disorders: Assessing the evidence. *Psychiatric services (Washington, D.C.)*, 65(7), 853–861. <https://doi.org/10.1176/appi.ps.201400047>
- Shaffer, D. (1983). A Children’s Global Assessment Scale (CGAS). *Archives of General Psychiatry*, 40(11), 1228. <https://doi.org/10.1001/archpsyc.1983.01790100074010>
- Stanley, M. A., Wilson, N. L., Amspoker, A. B., Kraus-Schuman, C., Wagener, P. D., Calleo, J. S., Cully, J. A., Teng, E., Rhoades, H. M., Williams, S., Masozera, N., Horsfield, M., & Kunik, M. E. (2014). Lay providers can deliver effective cognitive behavior therapy

- for older adults with generalized anxiety disorder: A randomized trial. *Depression and anxiety*, 31(5), 391–401. <https://doi.org/10.1002/da.22239>
- Wharton, T., Whitworth, J., Macauley, E., & Malone, M. (2019). Pilot testing a manualized equine-facilitated cognitive processing therapy (EF-CPT) intervention for PTSD in veterans. *Psychiatric Rehabilitation Journal*, 42(3), 268–276. <https://doi.org/10.1037/prj0000359>
- Whitney, D. G., & Peterson, M. D. (2019). US national and state-level prevalence of mental health disorders and disparities of mental health care use in children. *JAMA Pediatrics*, 173(4), 389-391. <https://doi.org/10.1001/jamapediatrics.2018.5399>
- Wilson, K., Buultjens, M., Monfries, M., & Karimi, L. (2017). Equine-assisted psychotherapy for adolescents experiencing depression and/or anxiety: A therapist’s perspective. *Clinical Child Psychology and Psychiatry*, 22(1), 16-33. <https://doi.org/10.1177%2F1359104515572379>
- Wood, W., Alm, K., Benjamin, J., Thomas, L., Anderson, D., Pohl, L., & Kane, M. (2021). Optimal terminology for services in the United States that incorporate horses to benefit people: A consensus document. *The Journal of Alternative and Complementary Medicine*, 27(1), 88-95. <https://doi.org/10.1089/acm.2020.0415>
- World Health Organization. (2015). *mhGAP Humanitarian Intervention Guide (mhGAP-HIG): Clinical management of mental, neurological and substance use conditions in humanitarian emergencies*. World Health Organization.