Equine Assisted Learning: An Evidence-Based Intervention for Families

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Abstract

Background: It is estimated that 50% of all mental illness arises prior to age 14, an incident attributed in part to disruptions and imbalances within the family system. Equine assisted learning is a complementary and alternative approach to family therapy which is being used increasingly to promote mental health in both adults and children. This study sought to build and deliver an evidence-based, family-centered equine assisted learning program aimed at promoting family function, family satisfaction and child social-emotional competence, and to measure its acceptability and preliminary effect.

Method: Twenty families with children 10 years and older were recruited to participate in a 3-week equine assisted learning program at a therapeutic riding center in Phoenix, Arizona. Sessions included groundwork activities with horses used to promote life skills using experiential learning theory. The study design included a mixed-method quasi-experimental one-group pretest posttest design using the following mental health instruments: Devereaux Student Strengths Assessment, Brief Family Assessment Measure (3 dimensions), and Family Satisfaction Scale to measure child social-emotional competence, family function, and family satisfaction, respectively. Acceptability was determined using a Likert-type questionnaire with open-ended questions to gain a qualitative thematic perspective of the experience.

Results: Preliminary pretest and posttest comparisons were statistically significant for improvements in family satisfaction ($p = 0.001$, M = -5.84, SD = 5.63), all three domains of family function (General Scale: $p = 0.005$, M = 6.84, SD = 9.20; Self-Rating Scale: $p = 0.050$, M = 6.53, SD = 12.89; and Dyadic Relationship Scale: $p = 0.028$, M = 3.47, SD = 7.18), and child social-emotional competence ($p = 0.015$, M = -4.05, SD 5.95). Effect sizes were moderate to

large (d > 0.5) for all but one instrument (Self-Rating Scale), suggesting a considerable magnitude of change over the three-week period. The intervention was highly accepted among both children and adults. Themes of proximity, self-discovery, and regard for others emerged during evaluation of qualitative findings. Longitudinal comparisons of baseline and 3-month follow-up remain in-progress, a topic available for future discussion.

Discussion: Results help to validate equine assisted learning as a valuable tool in the promotion of child social-emotional intelligence strengthened in part by the promotion of family function and family satisfaction. For mental health professionals, these results serve as a reminder of the alternatives that are available, as well as the importance of partnerships within the community. For therapeutic riding centers, these results help equine professionals validate their programs and gain a foothold within the scientific community. Additionally, they invite future riding centers to follow course in incorporating evidence into their programs and examining new directions for growth within the mental health community.

Keywords: equine assisted learning, families, mental health

Equine Assisted Learning: An Evidence-Based Intervention for Families

In the wake of a growing public interest in alternative treatments and therapies, equine assisted learning emerges as a novel alternative approach to mental health. This report offers a detailed account of a unique and innovative family-centered intervention, built and delivered from start to finish, thus inviting new perspectives in mental health, learning, and the power of animals.

Background and Significance

It has been estimated that nearly half of all adult cases of mental illness begin prior to age 14 years (National Institute of Mental Health, 2018). According to the World Health Organization, as many 1 in 5 children struggle with social, emotional, or behavioral challenges (2012). Left untreated, many of these issues will progress well into adulthood, manifesting in criminality, drug abuse, and homelessness (American Psychiatric Association, 2013), and ultimately, they will be long-term predictors of success or failure in life itself (Thomson, Richardson, Gademann, Emerson, Shoveller, & Guhn, 2019).

Social-Emotional Health

Within the different domains of child development, social-emotional health is of particular interest to mental health professionals. Child social-emotional health is now being recognized as an important prerequisite for success across a wide variety of outcomes. Skills like self-control, conflict resolution, cooperation, teamwork, and emotional regulation are among the many non-cognitive or “soft” skills which have been noted in longitudinal studies to influence future career, relationship and life success (Lippman, Ryberg, Carney, & Moore, 2015).

Children who fail to develop skills within the social-emotional domain are predictably more likely to suffer from mental illness, including mood disorders, behavioral issues, and internalizing and externalizing symptoms (Thomson et al., 2019). Similarly, rates of criminality, substance use, school failure, physical illness, and suicidality are much higher (Moffitt et al., 2011). For these reasons, and in recognizing the value of prevention, it is relevant to begin discussing how these skills might be better cultivated.

Role of Parenting

Adolescence is now being recognized as the second most critical neurodevelopmental period in one's lifetime (Dahl, Allen, Wilbrecht, & Suleiman, 2018). As children enter emerging adulthood, supportive relationships and structure become vital, and it is thought that parenting plays a critical role in child social-emotional health. Actions like sharing, showing sensitivity, and seeing from another's perspective allow parents to promote altruism and moral reasoning in children during brain development (Lam, 2018). Cohesive relationships between family members, especially those that include support, affection, and closeness, are predictive of child well-being during this vulnerable period (Crespo, Kielpikowski, Pryor, & Jose, 2011). Within these respects, the quality of the parent-child relationship cannot be overemphasized.

This places an undue burden on parents today, who are challenged by the slow decay of the traditional family structure. Divorce, separation, and single parenthood are among some of the signficant barriers adults face in raising emotionally healthy children (O'Connell, Boat, & Warner, 2009). Separation is now listed as an adverse childhood experience (CDC, 2016), and divorce is an ever-growing concern. Of all marriages in the United States, approximately 3% each year will end in divorce, comprising about half the rate of new ones (CDC, 2018). Among

other factors, family dysfunction appears to contribute significantly to the development and perseverence of mental illness within children (O'Connell et al., 2009).

The modern era brings with it challenges never before seen. The value of spending quality time with your children is now burdened by an ever-growing wave of digital age distractions. Today, teens are inundated with a flood of social media demands, text messages, video games and other diversions, predisposing them to new threats like cyberbullying, gangs, and peer pressure, which are now being recognized as risk factors for self-harm, suicide and mood disorders (John et al., 2018). Today, 95% of teens own a smartphone and 45% report they are online "almost constantly," yet nearly 70% do not see any clear positive benefit (Anderson & Jiang, 2018). The long-term effects of increased screen time on the developing brain largely remain to be seen. Meanwhile, parents are faced with the increasingly arduous task of connecting meaningfully with their children.

Conventional Approaches

When traditional family approaches fail, therapy is the mainstay of treatment. Conventional approaches like Whole Family Therapy, once the gold standard of treatment, have been in a steady state of decline over the last few decades, partly due to emerging therapies like Relational Therapy and Marital Family Therapy (Breunlin & Jacobsen, 2014). These newer approaches focus on a subset of the family unit, an unfortunate reality for children. Therapists today are reluctant to allow children in sessions, and upon doing so, fail to engage them as active participants. Reasons for this include therapists' unfamiliarity in working with children, lack of training, and a lack of confidence in implementing strategies required for child engagement (Lund, Zimmerman, and Haddock, 2002).

Probably most significant is the loss of physical touch which has become the archetype for professional behavior among mental health professionals today. While this “hands-off” approach is meant to set a precedent for healthy boundaries, in doing so, providers fail to deliver the essential non-verbal messages of care, compassion and security inherent in these actions (Kelly et al., 2017). For many families, therapy will be avoided altogether. The stigma of mental illness is ever-present and remains a major barrier to treatment. Feelings of shame and blame are prevalent among people with mental illness (Parcesepe & Cabassa, 2013). The restrictive nature of the traditional office setting creates additional challenges. The thought of visiting a mental health professional, for many, provokes feelings of insecurity, guilt, and self-recrimination (Shea, 1998). Herein lies the problem with traditional approaches to mental health care; they simply lack the sensory stimulation and emotional connectivity to captivate audiences.

Animals and Mental Health

In the history of human and animal interactions, humans have developed the capacity to form intimate emotional connections with other species. The human-animal bond, as otherwise known, is a phenomena that deserves greater consideration in modern medicine, and especially in mental health. Animals possess many inherent qualities which make them ideal for psychiatric treatments. While a seasoned mental health professional may strive to exert unconditional positive regard, for animals it is a natural inclination. Their need for proximity resonates easily to humans, sending a message that they desire love, affection, and companionship. Animals simply want to be near us. Until recently, the impact of animals on humans was a phenomenon neither well understood nor well described in scientific literature. In the wake of a growing interest in

alternative medicine, however, this past decade has seen research abound in animal assisted interventions for mental health (Fine, 2010).

Equine Assisted Learning

Equines have seen increasing public interest in the last few decades for their contributions to mental health. Apart from other domesticated animals, equines possess unique species traits which make them particularly useful for psychiatric education. For such large creatures, horses are extremely emotional beings. As a pray species, they are highly attuned to their environment and as such will react dramatically and immediately to very subtle changes in the ambience. This inherent herd quality provides a valuable opportunity for learning insofar emotions and behaviors of participants are mirrored by the horse (Fine, 2010). This heightened awareness is another reason why, when given a verbal command, horses will choose either to follow or to refuse, based on the confidence of the commander rather than his articulative skills. This ability to prioritize body language is a valuable tool, and perhaps one reason why horses are often used for leadership training and corporate events. Finally, horses are noble creatures that require an abundance of care by their owners. This provides an opportunity for emphasizing the relationship between ownership and responsibility, skills which offer an added philanthropic benefit (Fine, 2010).

Equine Applications in Mental Health

No longer just anecdotal, information today is abound on the therapeutic benefits of horses (Maujean, Pepping & Kendall, 2015). Studies involving these creatures are now supported by complex psychosocial measures and biophysiologic processes. In the last twenty years or so, equine assisted learning programs have concentrated their interests to several

populations, the first being children with autism. Beginning in the mid-1990's, the impact of equines on various outcomes for children with autism has been studied extensively. Among mental health outcomes, equines have been found to improve communication and social interaction and reduce problematic behaviors in these children (Mcdaniel Peters & Wood, 2017). A more recent population of interest is the incarcerated. For example, by 2013 there were already 13 states in which research was available on prison-based equine programs (Bachi, 2013). Here, equine training programs serve as a source of revenue for prisons, and in turn, they offer rehabilitative benefits for the incarcerated. Probably one of the most recent developments still has been the study of at-risk youth, specifically children referred from school welfare teams or rehabilitation centers. Here, similar psychological benefits are seen, including improvements in social skills and reduction in problematic behaviors. Also seen are improvements in broader measures like self esteem and quality of life (Kendall et al., 2015).

It would appear at present that mental health and equine professionals have aligned their interests in recognizing the value of skill building within the social-emotional domain. Here, the potential exists for long-lasting partnerships between professions, however significant barriers exist. Reimbursement by third party payers remains a major challenge; one which could be eliminated with improved riding center accreditation and implementation of best practices. To date, only a fraction of riding centers are accredited through national authorities like the Professional Association of Therapeutic Horsemanship, International (PATH, Intl.), which provides standards for safety and equine welfare (2019). In addition, it is unclear to date whether or not these facilities are implementing best practices to maximize client outcomes for their clients. Progress in these areas will certainly help to increase scientific rigor of programs

delivered, and will ensure sustainability of partnerships within the community, including those with mental health professionals.

Problem Statement

Families of today face a number of unique challenges, predisposing them to increased dysfunction and placing undue burden on children, who rely on relationships for development and refinement of social-emotional skills. Mental health professionals are limited in their ability to help families because trends suggest that all-inclusive family therapy programs are dwindling, and the fact remains that many simply do not want these types of treatments.

In the last decade, therapeutic riding centers have begun to assume a greater role in promoting mental health and particularly so in building of social-emotional skills. With the growing public demand for alternatives, and given riding centers' growing interest in serving the public and families, it is unclear to date whether these centers are equipped to deliver newer programs. It therefore becomes critical to determine whether evidence from the literature is sufficient in guiding development and implementation of a family-centered equine learning intervention, and upon doing so, whether or not this informed program may be effective in promoting child social-emotional health and family function.

Evidence from Scientific Literature

In order to gain knowledge of the most current evidence to date on equine assisted learning programs, a scoping review of the literature was conducted using Arizona State University's online databases. To guide this literature search, the following PICOT question was developed:

> "In a population of Phoenix families, does implementation of an evidence-based, equine assisted learning intervention improve elements of family function or social emotional health in children?"

Following this search, a critical appraisal of articles and a synthesis of evidence were conducted to gain insight in the building of a family-centered intervention. These processes and subsequent findings are described in detail here.

Search Strategy

To begin, 4 scientific databases were searched using Arizona State University's online library, including Cumulative Index of Nursing and Allied Health Literature (CINAHL), Cochrane, PubMed, and ProQuest PsychINFO databases. Advanced search criteria included articles: obtained from peer-reviewed journals in medical or social sciences, written in English language, available in full text, and less than 10 years of age from the original date of publication. Keywords used in the search included: equine, child, youth, family, social-emotional, and mental health. Due to a paucity of research in equine-assited activities for children and adults with mental illness, more refined searches did not return equally refined results. For this reason, combining the term "equine" with 1 or 2 other search terms using Boolean feature was optimal in achieving relevant studies meeting initial criteria for critical appraisal. This search strategy was implemented for all 4 databases (Figures 1-4, Appendix A). After accounting for duplicates, there remained 19, 6, 9, and 42 articles from the respective databases. Four additional literature reviews and a meta-analysis were retained as resources for a hand ancestry search. From this list, 94 articles in total were examined for relevance to the PICOT question. Those involving psychotherapy or hippotherapy as a primary intervention were

excluded, as these interventions are outside the capacity of the horsemanship professionals at our project site. Studies with geriatric populations, studies examining children with attention-deficit hyperactivity disorder, or those involving children with physical disabilities (such as cerebral palsy) or major cognitive deficits (such as autism) were also excluded due to anticipated difficulties in working with or evaluating the effectiveness of these special populations within our program, resulting in a final count of 11 articles retained for critical appraisal.

Rapid Critical Appraisal

The last decade has seen mounting evidence in support of equine assisted interventions, a change in part due to recognition by the scientific community that higher quality studies were needed. Today, this quality is manifested in study designs that use randomization, wait-list controls, and even use of inanimate objects as controls. Summarized below is a synthesis of the highest quality evidence to date on equine-assisted activities and interventions for children and young adults with mental illness, from 4 continents of the world (Tables 1 and 2, Appendix B).

Of the 11 studies chosen for appraisal and synthesis, 7 were exclusively quantitative by design, using randomization or a control group or both. Three others were strictly qualitative in nature, and 1 included a quasi-experimental design. A review of levels of evidence showed that 5 articles were level II evidence, 2 articles were level III, 1 was level IV and all 3 of the qualitative studies were level VI (LoBiondo-Wood & Haber, 2006). Use of wait-list controls was common. Despite this increase in higher level studies, the enduring presence of descriptive studies in the literature suggests that certain phenomena within equine programs, such as the human-animal bond, are compelling yet difficult to describe using parametric language (Kendall, Maujean, & Pepping, 2014).

Population Characteristics

The target population for this literature review was children and young adults, and summaries are seen in the corresponding synthesis tables (Tables 1 & 2, Appendix C). All 11 studies involved interventions for children or young adults. Children were boys and girls aged 10-17, adults were men and women aged 18 to 29 years. Two-thirds of the studies included only children. Several of the studies targeted children through after-school programs or by working in coordination with school welfare teams. Others were recruited by case managers of group homes or through referrals by officers at local detention centers. Overall, 9 studies in total recruited participants using teams of professionals established through partnerships. This may be an important consideration for future recruitment and sustainability efforts. Demographic variables in studies were often sparse, as were discussions about children's feelings and attitudes towards animals or their skills with horses prior to the interventions.

Program Characteristics

Programs were reviewed and described using several synthesis tables (Tables 1 & 2, Appendix C). On the surface, there appeared to be a great degree of heterogeneity in level of exposure through session length and duration. This was evident by inconsistencies in hours per session (45 minutes to 3 hours, M = 1.9 hours per session), total number of sessions (3 to 24 sessions), and total program duration (3 to 16 weeks). Beyond these aspects, however, programs were actually quite similar. For example, all 11 programs included groundwork activities with horses, and 5 of these also incorporated riding activities. The vast majority of studies involved interventions using group activities (n = 10); of these, four also contained individual activities. This is consistent with other findings from the literature, which discuss the importance of groups

in providing an atmosphere for interpersonal interactions and respectful dialogue (Kendal et al., 2014). Furthermore, this extensive use of groups in equine-assisted learning programs helps to validate the application of a family-focused intervention.

The majority of programs' interventions (n = 9) and outcomes of interest (n = 9) focused on the core social-emotional aspects of human development (Table 3, Appendix C). The aforementioned use of group activities was also reflected in the widespread use of session themes that included an interactive component, such as communication, relationships, and teamwork. What is interesting is that, despite this widespread use of groups and use of interactive session themes, outcomes were highly individualized. This represents a methodological weakness that has been noted in other reviews of equine programs (Kendall et al., 2015).

Theory is important because it provides a framework for the development and delivery of programs, and offers some degree of consistency over time. Although only about half of the riding centers had formal programs in place (n = 7), nearly all referenced a theoretical framework in support of each's program. Theories varied considerably, from Aboriginal Worldview to more contemporary models. Experiential learning was the most common theory, accounting for more than half of the studies examined (n = 7). For horsemanship professionals, experiential learning theory has great significance. The outdoor environment through which equine programs are delivered offers an exceptional sensory experience, ideal for the application of experiential learning theory.

Only about one-half of the reviewed programs were delivered by certified horsemanship professionals. Less than half of these specified any riding center accreditation. Riding centers with certification offer additional measures that ensure the safety and consistency of programs

delivered, an important consideration when involving children. A failure to mention accreditation or certification in studies is also consistent with findings in literature reviews (Kendall et al., 2015).

Overall, information from the critical appraisal and synthesis was beneficial in that many similarities were noted. The program that was subsequently developed was unique in that it contained elements of individual programs from the literature, as well as group activities also thought to benefit the those who participated.

Purpose Statement

Evidence from the literature was sufficient in guiding an informed approach to the development and delivery of a family-centered equine assisted learning program. The purpose herein was to describe the recommendations made and the implementation process, and also to examine the preliminary effects of this program on family function, family satisfaction and child social-emotional intelligence. This project additionally sought to determine among adults and children the acceptability of the intervention, as well as to gain a qualitative perspective of the participant experience.

Procedural Frameworks

Theoretical Framework

Experiential learning was first described by such notable minds as Dewey, Lewin and Piaget, and was later expanded by David A. Kolb, who has dedicated his life's effort to exploring and refining this theoretical model (Kolb, 2015). While a number of models have been identified in equine assisted learning programs, experiential learning theory is of particular interest because

equine activities and the outdoor environment both offer a rich sensory experience. Experiential learning is well-supported and validated by professional horsemanship associations, including PATH, Intl., whose certified staff are specially trained in these concepts and techniques (2018).

Experiential learning is a complex, adaptive process that involves collective interaction of many key brain regions (Figure 1, Appendix D). Within Kolb's framework, there are 4 key concepts: the concrete experience, a reflective observation, an abstract conceptualization, and active experimentation. During the concrete experience, participants are awakened by their environment, promoting sensory and motor stimulation. Next, participants make reflective observations about activities and challenges (i.e. what worked and what didn't), enhancing memory and emotional processing. Through abstract conceptualization, participants make deeper connections between concepts, thus engaging the frontal cortex and higher learning. During active experimentation, participants apply these abstract concepts in a new setting (i.e. the home), promoting active decision-making. Behavior change becomes possible when participants gain insight and use knowledge productively to sharpen these skills (Kolb, 2015). When delivered in sequence, these mechanisms can greatly enhance learning and promote enduring change.

Evidence Based Practice Model

Selecting an evidence-based practice (EBP) model for a therapeutic riding center was challenging. The project site for our EBP implementation was a therapeutic riding center that employed a small group of non-healthcare professionals, many of whom had overlapping roles and responsibilities. It became clear that an organized approach was needed in order to identify the ideal EBP model for project implementation. For this reason, best-fit determinants were

developed to identify key components of an ideal model. This included the degree of collaboration required, the degree of ambivalence to change, and the number of opportunities for feedback before, during, and after project implementation. Through these determinants, Johns Hopkins Nursing Evidence-Based Practice Model was selected as a model that was best suited for project development and implementation (Johns Hopkins Medicine, 2017). Equally beneficial is the fact that this model is designed for individual rather than organizational use, a key feature which makes it an ideal framework for applications in smaller settings (Schaffer & Sandau, 2013).

The most attractive element of the Johns Hopkins Nursing EBP Model is the ongoing collaborative exchange that occurs prior to project implementation (Figure 2, Appendix D). This component was fundamental to program development and refinement prior to implementation at the riding center. For example, it was advised that a refined screening process was needed for applicants. When resistance was met, evidence was needed to support this change, which required more information gathering, additional meetings, and further deliberation. The cycle of translating evidence into practice was ongoing prior to the start of the intervention, and it helped inform processes continuously as they developed. Upon completion of the intervention and once data were collected and analyzed, additional revisions were likely, this is where the opportunity for feedback became highly relevant. There was an expressed interest in continuing the program for years to come, so recommendations would be necessary in order to ensure future sustainability of the program.

Recommendations for Program Development

Based on a rigorous evaluation of the most current evidence to date on equine assisted learning programs, four separate recommendations were made in the building of an evidence-based, family-centered intervention. These recommendations included:

1. Use of experiential learning theory
2. Session duration of 3 weeks minimum
3. Content and outcomes within the social emotional domain
4. Participant age minimum of 10 years

These recommendations, discussed in detail below, comprise the informed approach to the development and delivery of an evidence-based family-centered equine assisted learning intervention.

Experiential Learning

Programs rooted in theory are extraordinary becasue theory provides a framework for curriculum development, delivery, and replication. Experiential learning theory is seen time and again in the literature on equine assisted learning. It is a necessary component for equine assisted learning programs. According to the theory, concepts must be delivered in succession in order for behavior change to occur. Prior to project implementation, riding center staff were educated on the importance of the theory and its core concepts, and were given examples of how to apply abstract conceptualization in round-up discussions following each learning activity.

Session Duration

The average duration for any equine assisted learning program in the literature is 7.8 weeks, with the minimum program being delivered over a 3-week period. Prior to an evidence-based application, the pre-existing program was offered as a single-session with the option of

add-on sessions. Recommendations from the literature suggests that, in order for a program to demonstrate both effectiveness and lasting impact over time, it must meet the minimum required number of weeks duration. Due to time and cost constraints, due to the limited number of available sessions per week, and in order to meet the goal of recruiting 20 families over a 7-month period, session duration greater than 3 weeks would be optimal but not feasible for the purposes of this study. For this reason, it was decided that a minimum of 3 weeks duration would be appropriate.

Session Themes

The pre-existing program contained a number of different sessions available to families. From a large list, four session themes were chosen based on their association with the social-emotional domain and their potential for interpersonal interaction among group members. These themes included perspective, communication, understanding and accepting differences, and boundaries. Session themes within the social-emotional domain were matched with outcome measures that supported them, which will be discussed in detail later.

Participant Age

Age of children was an important consideration in building this program. For the purposes of this study, children were required to be at least 10 years old for two reasons. Experiential learning theory uses abstract concepts that are not appropriate for children of all ages. Abstract conceptualization, an important concept within the theory, requires that the learner be capable of thinking abstractly and applying ideas in a different context. For example, upon failing to communicate effectively with a horse, a child must not only be able to understand that body language is important for horse communication, but these actions also have consequences

in human interaction. Another reason for the age limit was acceptability of the intervention. Acceptability would be measured using a 6-item Likert-type questionnaire; children would be required to complete items like "strongly agree, agree, neutral," and so on. Generally speaking, children younger than 10 years tend to have difficulty with Likert-type concepts (Mellor & Moore, 2014). Therefore, it was determined that 10 years would be an appropriate cutoff for age. In order to avoid turning down families with younger children, it was decided that children ages 7 through 9 would be permitted to participate in sessions alongside family members but would remain invisible from a research perspective. This decision was based on riding center restrictions, which allowed children ages 7 and older to participate in programs.

Program Description

Based on the most recent evidence to date on equine assisted learning programs, recommendations from the literature were used to inform the development of a family-centered equine assisted learning program. The Program included a 3-week, 3-session intervention involving groundwork activities with horses. Each family, which consisted of at least one adult caregiver and one child 10 years or older, participated separately in a 1-2 hour session each week under the supervision of an equine specialist, during which time they learned about life skills through horsemanship activities. Themes of perspective, communication, understanding and accepting differences, and boundaries were incorporated into sessions consistent within the social-emotional domain of health. After each activity, families gathered for a "round-up" discussion in which they reflected on skills learned using the Cowboy Code of Ethics, a talking point for discussion (Center for Cowboy Ethics and Leadership, 2018). During this time, participants were encouraged to conceptualize this knowledge in an abstract way and apply it in

a different setting. Outcomes measured for the study were reflective of session themes and included measures within the social-emotional domain of health, to include child social-emotional competence, family satisfaction, and family function.

Method

Setting

All sessions of the program were carried out at a therapeutic riding center in Phoenix, Arizona. The riding center, built in 1987, serves the the needs of the cognitively, physically, and mentally disabled. The riding center and its employees are both accredited and certified by PATH, Intl. All sessions were facilitated by an equine specialist in mental health and learning (ESMHL). Four ESMHL staff with varying levels of experience facilitated the sessions, with one ESMHL assigned to each family during the 3-week intervention. In addition, 1 to 2 volunteers with Level II Horsemanship training were also used during each session to move horses between activities and to provide passive support to participants. For program consistency, all ESMHL staff received training and practice sessions prior to the start of the intervention and were provided with note cards to maintain a scripted criterion for each of three sessions. To prevent bias, ESMHL facilitators were blinded from family dysfunction endorsed during the eligibility screening process which occurred prior to the intervention.

Horses were selected for the activities based on each's individual temperament and on availability. Six horses in all were used for the intervention, including four quarter horses (two geldings and two mares), one morgan cross mare and one gypsy vanner gelding. All horses at the riding center were required to complete a preliminary trial prior to being used for programs at the

facility; this included being tested and observed for adverse behaviors which might compromise the safety of participants.

Recruitment

Over a period of 6 months, 20 families were recruited by rolling convenience sampling from the greater Phoenix Area using flyers, social media outlets, newspaper articles, open house invitations, and word of mouth. Screening for eligibility occurred in two distinct phases. Families interested in the program first contacted the program coordinator and were screened for initial criteria. Families were required to include at least 1 parent or caregiver and at least 1 child aged 10-17 years, as well as an expressed willingness to attend all 3 sessions.

Those who met initial criteria were referred for secondary screening by a mental health professional. Participants were selected based on their account of expressed concern regarding family dysfunction (such as recent divorce, separation, or single parenthood) or statements of risk factors for child social-emotional issues (such as a parent-child relational conflict, behavioral concerns, or school concerns). Children were excluded from the study if it was determined that safety might be compromised (i.e. if children had a history of physical aggression towards people or animals, a history of fire setting, or significant a fear of horses), or if they endorsed any cognitive or physical disability which might prevent them from completing the activities and the post-intervention survey (i.e. child must be able to read, write and understand English).

Ethics

Prior to the start of sessions, consents and assents were obtained from all adult and child participants, respectively. Participants were given the opportunity to ask questions or voice

concerns in a quiet, safe place. Participants also completed a liability release form and health information form based on requirements established by the riding center. Prior to the start of sessions and intermittently throughout, staff members reinforced safety measures required when handling horses or being in close contact with them. Permission for the study was granted by the Office of Research Integrity & Assurance at Arizona State University. Through contact with Institutional Animal Care and Use Committee it was determined that a full review was not necessary for the purposes of this study.

Instruments

Three professional mental health instruments were utilized for the purposes of measuring outcomes related to social-emotional health, which are discussed here. The first of these was the Family Satisfaction Scale (FSS; Olson, Gorall, & Tiesel, 2006), which was developed in 1983 as a shortened version of the original FACES IV instrument. The tool measures the degree that family members are satisfied with one another using three dimensions (cohesion, flexibility, and communication). It is a 10-item Likert-type scale that is written at a 6th grade level, can be scored in less than 5 minutes, and has an alpha reliability of 0.92 and a test-retest alpha coefficient of 0.85.

The Brief Family Assessment Measure III (Brief FAM-III; Skinner, Steinhauer, & Santa Barbara, 2008) is an instrument designed to measure 3 dimensions of family functioning. These dimensions include the General Scale (a parent's evaluation of the family), the Self-Rating Scale (a parent's evaluation of self in relation to family), and the Dyadic Relationship Scale (a parent's evaluation of the parent-child relationship). Each subscale contains 14 Likert-type questions, all

of which can be completed in less than 10 minutes. The alpha reliability is 0.86 to 0.95, and validity has been affirmed in a number of cross-cultural studies.

Devereaux Student Strengths Assessment (DESSA; LeBuffe, Shapiro, & Robitaille, 2018) is a mental health instrument that is used to measure social-emotional competence in children. DESSA-mini is the shortened form, which is widely used among teachers, parents, and mental health professionals. The DESSA-mini includes 8 Likert-type items which can be completed in less than one minute. The test-retest reliability for DESSA mini ranges from 0.88 to 0.94 with a median alpha reliability coefficient ranging from 0.915 to 0.924. DESSA-mini has excellent positive and negative predictive values, as well as sensitivity and specificity ratings, making it an ideal tool for measuring social-emotional competence in children (Naglieri, LeBuffe & Shapiro, 2011).

A program feedback form (PFF) was completed by all participants at the end of the third and final session. This form was initially developed by the staff at the riding center and altered slightly for the purposes of this intervention. It included 6 reverse Likert-type questions (1 = strongly agree, 5 = strongly disagree), which were used to measure acceptability of the intervention, and 5 open-ended questions (e.g. “What was the best part about today’s activity for you?”), which were used to gain a qualitative perspective of the participant experience. A child version was available for persons less than 18 years old. In addition, a socio-demographic form was used to collect information on participant characteristics such as age, gender, number of children in family, race, parents’ highest level of education, and whether or not children in the family qualified for free or reduced school lunch.

Collection Points

One parent from each family completed mental health instruments for the entire family, including the Family Satisfaction Scale, Brief Family Assessment Measure, and Devereaux Student Strengths Assessment. These instruments were completed at 3 separate collection points by the same family member. Collection points were as follows: prior to the first session (T_0), immediately following the third and final session (T_1), and 3-months post completion of the intervention (T_2). In addition, this same adult family member also completed a socio-demographic form prior to the beginning of the intervention. The program feedback form was completed by all adults and children age 10 years and older immediately following the third and final session (T_1).

Statistical Methods

Due to the small sample size, nonparametric statistics were implemented for all pretest and posttest measures using Wilcoxon Signed-Ranks test. A confidence interval was set at 95% with a corresponding level of significance of $p = 0.05$. Mean sum scores for 20 pretest and 19 posttest measures were compared first for Family Satisfaction Scale. For Brief Family Assessment Measure and DESSA-mini, and prior to calculation, sum scores for each scale were matched with corresponding t scores. Effect sizes were calculated using Cohen's D and were based on the following scale: $d > 0.8$ (large), $d > 0.5$ (moderate), and $d > 0.3$ (small). Due to time constraints, T_2 data were not yet available at the time of this analysis, so comparisons of pretest and posttest only (T_0 vs T_1) are provided and discussed hereafter. Acceptability was calculated separately for adults and children and expressed first as a percentage of the whole based on 3 separate groupings (Agree or Strongly Agree, Neutral, or Disagree or Strongly Disagree) and

next as a mean score. Content analysis was used to examine the 5 open-ended questions from the Program Feedback Form for themes that emerged regarding the participant experience.

Results

Sample Characteristics

Twenty families were successfully recruited to participate in the intervention. Of the twenty families enrolled, nineteen (95%) completed the 3-week intervention and posttest surveys (T_1); the remaining family withdrew for personal health reasons. Six families had 1 session cancelled due to rainy weather or health reasons (i.e. sick child, sick grandparent), however all 6 of these families were able to reschedule and attend a make-up session within the same 3-week intervention period. While families were encouraged to bring all members for the intervention, children under 7 years of age were not permitted in classes due to riding center restrictions. Children aged 7-9 years were permitted to attend sessions with their families (n = 5) but were excluded from the study and also hereafter from the discussion.

Sample characteristics are summarized in Table 1 (Appendix E). Families in attendance ranged from 2 people (one adult and one child) to 5 people (two adults and three children or three adults and two children). Five families included non-parent relatives, including 3 grandparents, an aunt, and a cousin. Participants were primarily of Caucasian ethnicity (85%), the remainder were Hispanic or Latino (15%). One parent or guardian from each family was invited to complete pretest (T_0) and posttest (T_1) mental health instruments. A total of 20 parents or guardians completed pretest and 19 completed posttest measures. These parents' ages ranged from 30 to 50 years (M = 42.2), and 80% were female (n = 16). Three quarters (n = 15) of families had at least 1 parent who completed a bachelor's degree education or higher, and one-

fifth of families (n = 4) had children who qualified for free or reduced school lunch. Child participants included 13 girls and 12 boys aged 10 to 17 years (n = 25, M = 12.3 years). A single child from each family was selected by a parent to be evaluated using the DESSA-mini and the Brief FAM-III Dyadic Relationship Scale.

Family Satisfaction

Results for family satisfaction are summarized in Table 2 (Appendix E). Family satisfaction showed positive improvement between pretest (T_0) and posttest (T_1) comparisons, a change that was also statistically significant ($p = 0.001$, M = -5.84, SD = 5.63). Effect size was large (d = 1.05), and greatest among all other instruments used, suggesting the largest magnitude of change from the 3-week intervention.

Family Function

Three dimensions of family function were evaluated using Brief Family Assessment Measure, the results of which are summarized in Table 3 (Appendix E). All 3 scales showed positive improvements in family function. The Brief FAM-III General Scale was statistically significant ($p = 0.005$, M = 6.84, SD = 9.20) with a moderate effect size (d = 0.74). The Self-Rating Scale was also statistically significant ($p = 0.050$, M = 6.53, SD = 12.89) with a moderate effect size (d = 0.51). The Dyadic Relationship Scale also showed positive change that was statistically significant ($p = 0.028$, M = 3.47, SD = 7.18). Effect size for Dyadic Relationship was small (d = 0.48) and yet nearly moderate, but overall with the smallest magnitude of change of the 3 family function measures.

Child Social-Emotional Intelligence

Devereaux Student Strengths Assessment was used to compare child social-emotional health using pretest and postest mean t scores. Results are summarized in Table 4 (Appendix E). Social-emotional health showed positive improvement over the course of the 3-week intervention, and this change was also statistically significant ($p = 0.015$, M = -4.05, SD = 5.95) with a moderate effect size (d = 0.68). Level of significance for parametric and nonparametric measures were comparable for all 3 mental health instruments, further validating these findings and also suggesting that the population sample, though small, assumed a fairly normal distribution.

Acceptability

A total of 55 participants, including adults (n = 32) and children (n = 23), completed the Program Feedback Form, the first 6 questions of which were used to measure acceptability of the intervention. Results for percentages are seen in Table 5 (Appendix E). All adults (100%) either agreed or strongly agreed that the program was positive, educational, and engaging. Additionally, 100% also either agreed or strongly agreed that they could apply the Cowboy Code of Ethics to their own life and that they would recommend this program to friends or family. Similarly, 96.9% of adults either agreed or strongly agreed that the round-up questions were helpful, and only 1 family member was neutral. Nearly all (87.5%) of adults either agreed or strongly agreed that they learned something new about themselves or their family members during the sessions. Mean scores for all 6 questions on the reverse-Likert scale all fell below 1.5, suggesting that the program was well-accepted among adults (Figure 1, Appendix E).

Children also accepted the intervention however to a lesser extent. Results for percentages can be found in Table 6 (Appendix E). For example, over 95% of children either

agreed or strongly agreed that the program was positive, educational, and engaging. Seventeen children (74%) either agreed or strongly agreed that they could apply Cowboy Ethics to their life, and that the roundup questions were useful. Only two-thirds (64%) of child participants either agreed or strongly agreed that they learned something new about themselves, while the other third (36%) were either neutral or in disagreement. About three-quarters (78%) of child participants either agreed or strongly agreed they would recommend this program to others. Mean scores for all 6 questions fell below 2.1, suggesting that the intervention was well-accepted by child participants (Figure 2, Appendix E).

Qualitative Findings

Fifty-five participants, including both adults (n = 32) and children (n = 23) answered open-ended questions from the second half of the program feedback form. These 5 questions were used to gain a qualitative perspective of the participant's experience. Using content analysis, 3 themes emerged from the answers provided, which are discussed here.

Proximity. One experience shared by adults and children was proximity with the horses. When asked about their favorite part of the program, many participants cited proximity. This took the form of petting, hugging, walking alongside, and grooming the horses. One child participant stated "Just being with the horses made my day!" This desire for closeness is a basic human need, however in the presence of horses, it appeared to be more evident. It is possible that our interest in other species is representative of a potentially unmet need for love and affection within our own.

Self-Discovery. Through activities with horses, children and adults gained personal insight and reflected upon this. Adults commented frequently on their parenting roles. One adult participant noted "I guess I doubt my ability to lead horses just like I often doubt my parenting skills." Another parent noted "I could be less assertive." Children discovered things about themselves as well. One child noted "I am stronger than I thought." These comments suggest that activities with horses allowed both children and adults to discover personal attributes that were not otherwise evident prior to sessions.

Regard for Others. Participants cited regard for others on multiple occasions. This took the form of watching their family members working with the horses or attempting to gain new skills. One participant stated "It was very nice to just stop and be with family and horses, to observe them and observe ourselves in an unusual situation." Within this context, a number of people also considered how their actions might affect others, and participants explored ways they might change in order to benefit others. "My energy is visible to those around me. I have the ability to set the tone for the group through my behavior." This suggests that participants were able to gain personal insight and apply it in a broader sense by considering its impact on others.

These themes signified that the experience was very personal, and yet it extended beyond the self insofar participants gained awareness of an obligation to others within the family. This is consistent with the widespread use of the word "family" in feedback given by parents and children, which occurred 47 times in the qualitative data. The topic of family was an enduring theme when participants reflected on activities at the riding center. Overall, these themes suggest that parents and children were able to conceptualize activities beyond a simple concrete message,

gain personal insight and meaning from the experiences, and apply this knowledge in meaningful ways both personally and within the context of their own families.

Discussion

Design Limitations

The small sample size and non-representative sample limited the external validity (generalizability) of the findings. This study used a one-group pretest posttest design due to the small sample, and as such, the study was neither randomized nor controlled. For these reasons it is challenging to assure that the program was the sole source of the positive effect, as pre-existing factors were not taken into account. Similarly, it cannot be inferred that the intervention is truly what caused the measured effects. As with other equine studies, blinding of participants is difficult, yet without it, studies like this one carry the potential for bias by the rater, and this degree of bias remains unknown.

While most instruments in the study were completed by a single family member, information from additional family members might have improved validation and added depth to the conversation, especially measures like the Brief Family Assessment Measure which is designed to gain multiple family members' perspectives. This was not without benefits, however, as several of the instruments allowed one family member to rate another member (i.e. DESSA-mini), reducing the possibility of monomethod bias.

Program Duration

Program duration was extremely short compared to other equine learning programs, which can extend as long as 16 weeks. For studies of shorter duration, it is generally not

recommended to use such broad indicators like quality of life or, in our example, family satisfaction (Kendal et al., 2015). This indicator surprisingly showed the largest magnitude of change, a result which may have occurred for several reasons. The Family Satisfaction Scale inquired about families' ability to spend quality time together and share positive experiences. Based on comments from the Program Feedback Form, it was evident that these two elements were easily achieved.

Program duration is an important aspect to consider, as interventions involving equines can be quite expensive. Riding centers benefit from determining the lowest dose required for a therapeutic effect. Some equine interventions such as therapeutic riding have achieved effectiveness in as little as one week (Kaiser, 2004), however it is unlikely these results are maintained over time. A third data point, collected at 3-months' follow-up (T_2), will provide valuable feedback and will help to determine the Program's enduring effect, as there is limited information to date on the longitudinal impact of equine learning programs (Selby & Smith-Osborne, 2013). By examining the rate of decline (if such is the case), adjustments can be made either by increasing total program duration, offering additional sessions at some point in the future, or taking greater precautions to ensure that the skills learned are in fact retained.

Educating staff in experiential learning theory may help to ensure that skills learned are enduring. Concepts within experiential learning theory, particularly abstract conceptualization, can be difficult for children to achieve. Child developmental psychologist Jean Piaget has asserted that abstract conceptualization is not typically achieved until about age 11; this may explain why about one-third of our child participants were either unsure or in disagreement that the program helped them to learn something about themselves (Saddock, Saddock & Ruiz,

2015). If ESMHL staff are unfamiliar with these techniques it may be important to provide more opportunities for learning, either through local educational events or regional conferences.

Making Headway

The project described here is the first of its kind to design, implement and test an equine assisted learning intervention for families. This was achieved using evidence from the literature on individual programs, which most often were found to be delivered in group settings. The group dynamic is an element that deserves greater attention in equine literature. Groupwork provides a climate for building interpersonal skills necessary for successful relationships. Given that parent-child relationships are an important predictor of childhood mental health outcomes, it becomes necessary to gain a perspective of the relational benefits seen from these activities. The improvements in family function and family satisfaction seen here between pretest and posttest comparisons suggest that more research is needed in this area.

The program described here was highly accepted by participants, and especially among adult participants. Parents provided a rich description of self-discovery during the 3-week intervention that often included reflections on their parenting styles. It's possible that equine learning programs may be of particular use for parents seeking to gain skills within this important leadership role. A number of riding centers to date offer leadership and team building retreats for corporations, this is one area to consider for future direction.

Community Partners

Community partnerships are important to the successful recruitment and sustainability of therapeutic riding centers. As seen in the above review of literature, most participants were recruited using referrals from school welfare programs, foster homes, and youth detention

centers. While time constraints within this study prevented the establishment of community partners, connections with the community are important nonethelesss.

To date there are over 5,000 mental health nurse practitioners in the United States (American Association of Nurse Practitioners, 2019). This number continues to grow, as does the demand for alternative and complimentary services. As equine specialists in mental health and learning gain a greater foothold within the scientific community, they too will begin to assume a more prominent role in mental health. This project serves as an example of how two emerging professions can benefit one another simply by sharing common interests.

Conclusion

In recent years, equine assisted learning has made great strides among animal assisted interventions in the promotion of mental health. Findings from this project suggest that the development and implementation of an evidence-based, family-centered equine assisted learning intervention is possible. These findings also suggest that family-centered programs hold promise in promoting both individual outcomes such as child social-emotional health, as well as group outcomes, such as family function and family satisfaction.

The use of animals in the promotion of mental health in humans is a phenomena that deserves greater attention in modern medicine, and especially in mental health. Today, it is estimated that over 60% of households own a pet, suggesting that animals have value beyond the metrics scientists would use to describe them. This paper gives a unique account of a mental health intervention for families using equines; its success demonstrates how evidence-based practice can be used in unpredictable places. What is more, this project represents a unique opportunity for two very different fields to connect and make progress toward a common goal, and in doing so, improve outcomes for the community.

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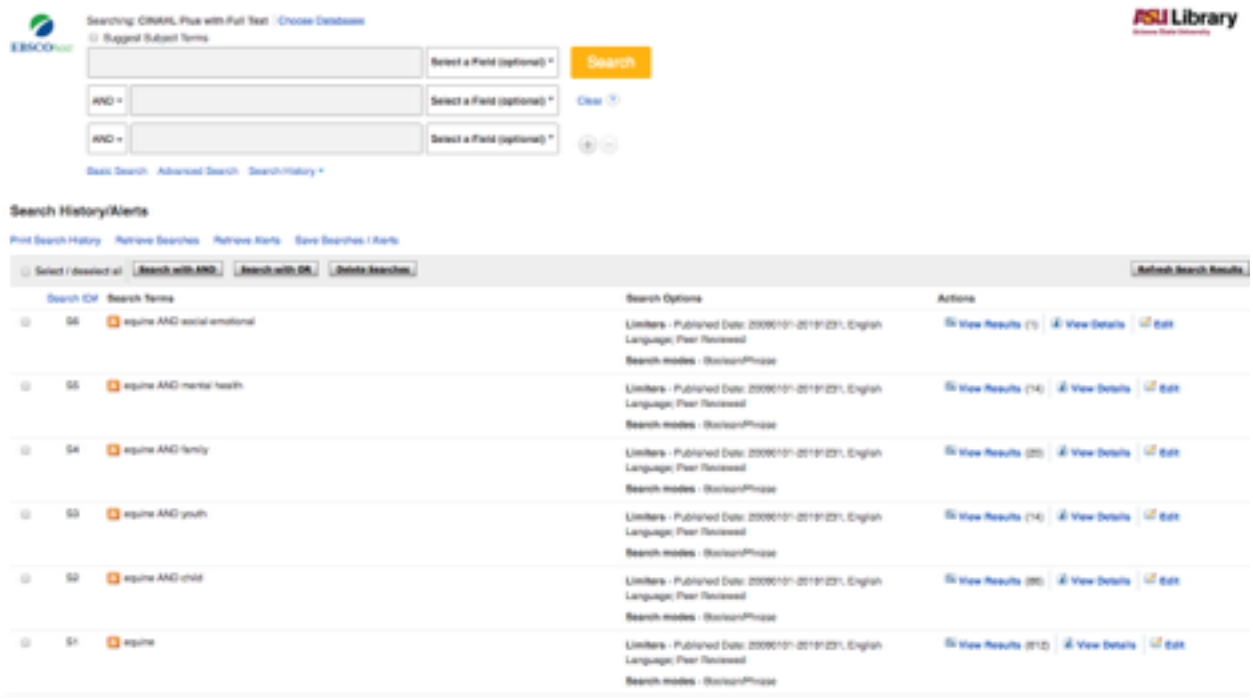
Appendix A

Figure 1

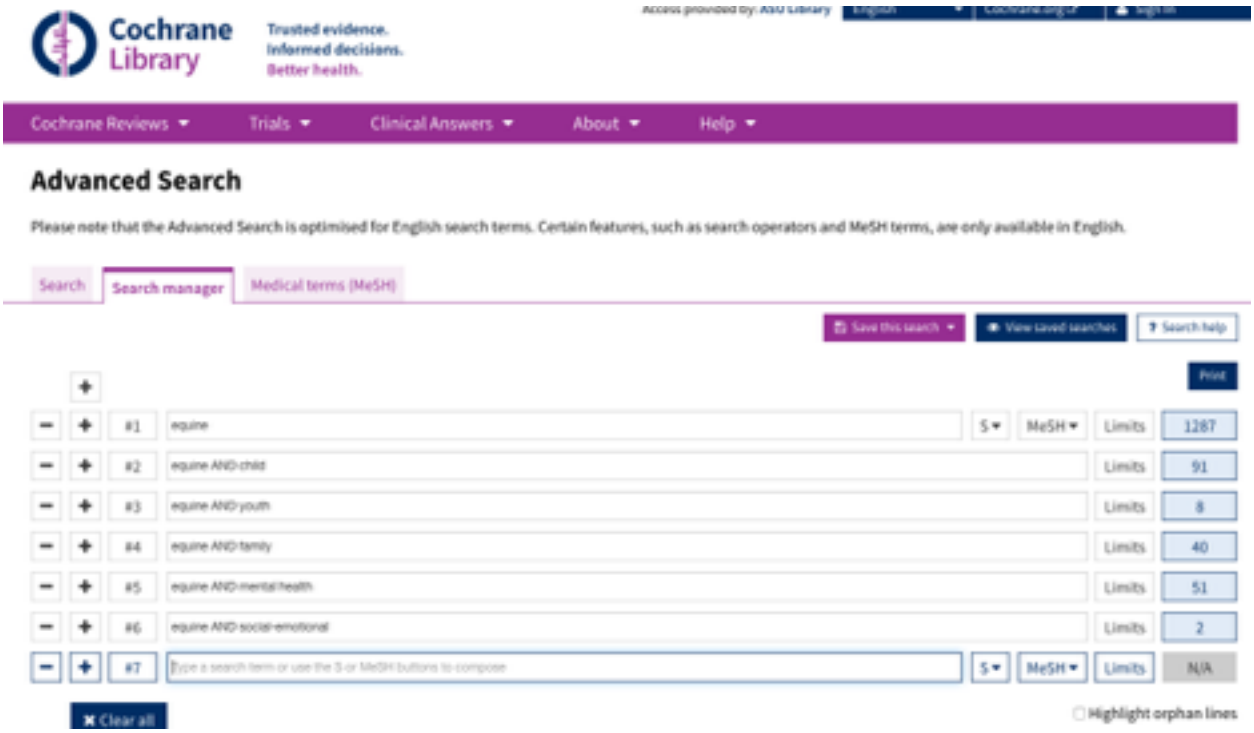
CINAHL Database Search



Appendix A

Figure 2

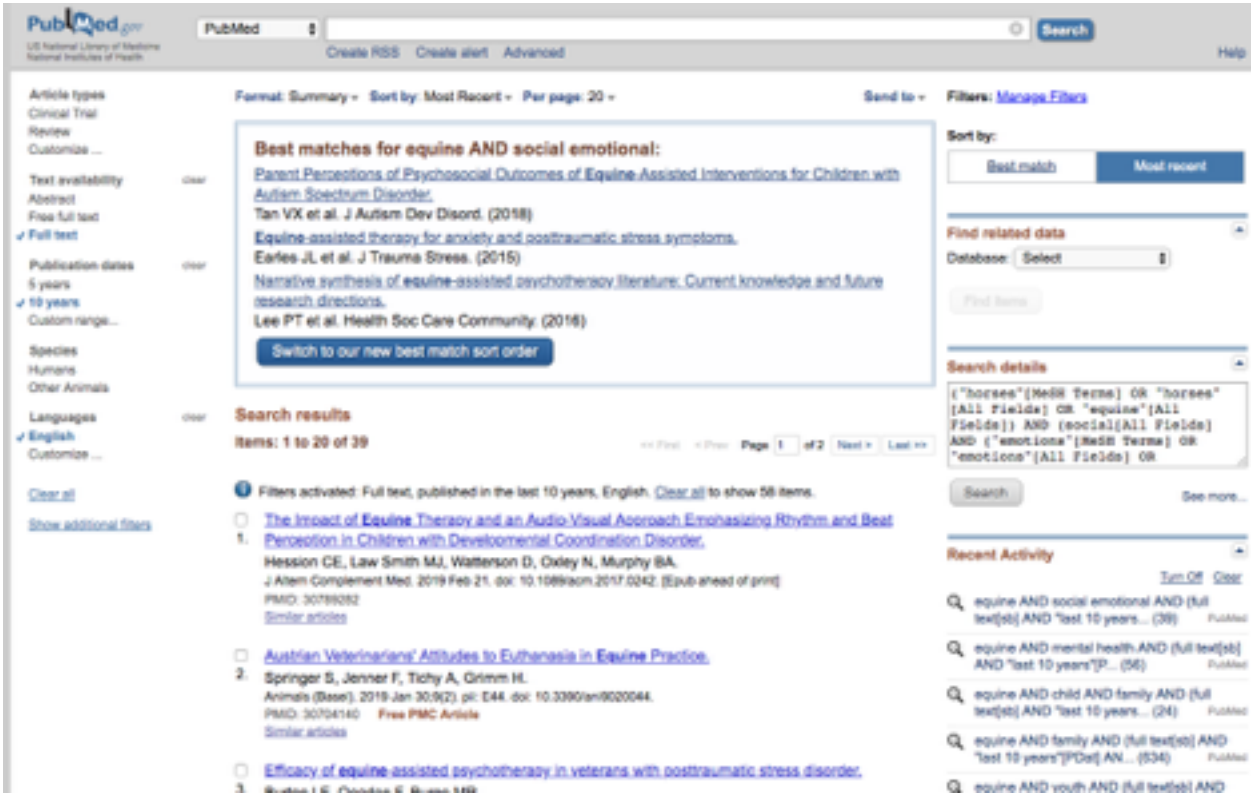
Cochrane Database Search



Appendix A

Figure 3

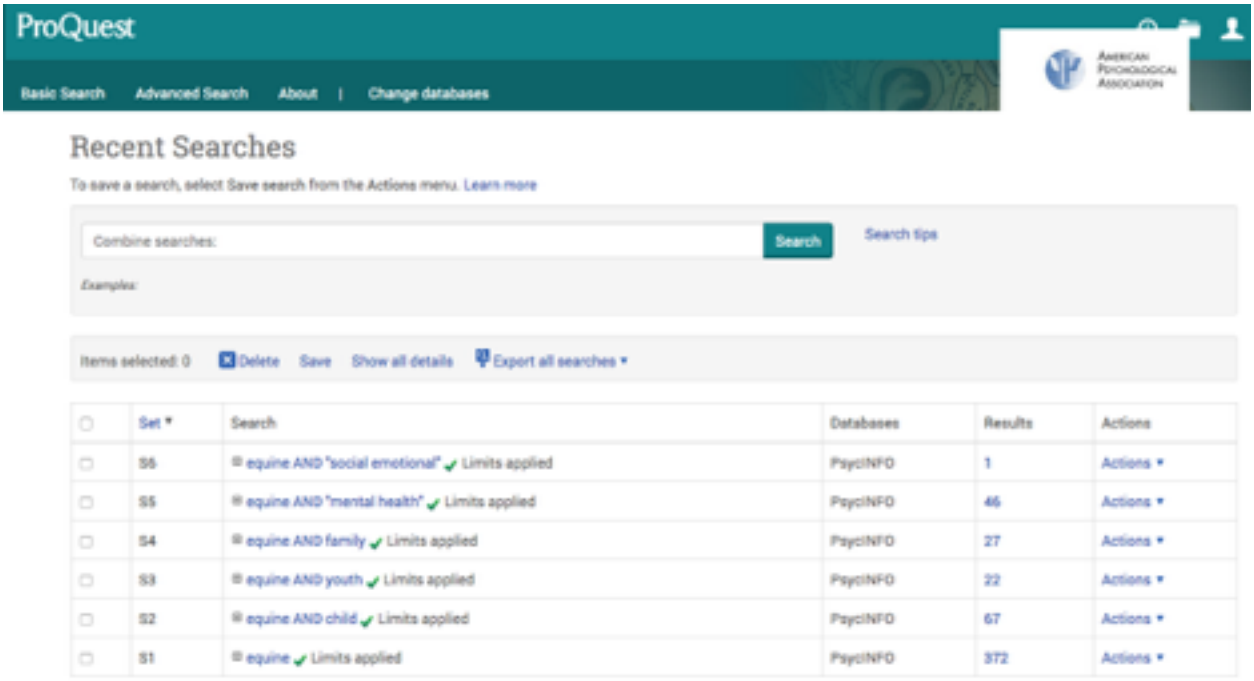
Pubmed Database Search



Appendix A

Figure 4

PsychINFO Database Search



Appendix B

Table 1

Quantitative Evaluation Table

Article, Publication, Ethics	**Framework & Program Description**	**Design, Purpose**	**Sampling/ Setting**	**Major Variables Studied**	**Data Measurement & Analysis**	**Findings**	**Use in Practice**
Authors: Alfonso, Alfonso, Llabre, & Fernandez **Publication date:** 2015 **Journal:** Explore **Country:** United States **Ethics:** Approved by University of Miami IRB **Funding:** Horses & Humans Research Foundation **Setting:** Good Hope Equestrian Training Center	**Conceptual Theories:** CBT, IDEA, TALK **Formal Program:** Project Stride **Description:** EAA + CBT **Program Delivered By:** Research Facilitators **Duration and Frequency:** Six sessions over six weeks, 2-2.5 hours each **Groundwork or Riding:** Both **Group Work or Individual:** Both **Session Themes**: CBT, problem solving, modeling, role playing, self-reflection, communication, relationships, teamwork, & emotional expression **Riding Center Certification:** ND	**Design**: RCT Pilot **Purpose**: Study aim was to determine whether a combined EAA + CBT program would help to reduce symptoms of social anxiety in young women Study also sought to determine whether program was accepted among participants and feasible to implement	**Target Population:** Young females with social anxiety **Recruited From:** Passive and active recruitment from a local university campus **Sample Size:** n=12 **Demographics** Females ages 18-29 **Inclusion Criteria:** Eligibility screen required a minimum of 4 “yes" responses to Liebowitz Social Anxiety Scale **Exclusion Criteria:** ND	**IV:** 6 week EAA + CBT intervention **DV_1**: Social anxiety **DV_2**: Acceptability	**Instruments**: Liebowitz Social Anxiety Scale, Posttest acceptability scale **Frequency of Measures**: Pretest, posttest and 6 weeks post completion **Quantitative Analysis:** Independent t test was used to examine effect of intervention **Qualitative Analysis:** N/A	**Quantitative:** Statistically significant reduction on social anxiety from baseline to posttest (p= 0.008) and baseline to 6-month follow up (p=0.003). Change scores not significantly different between posttest and follow-up High acceptability, 100% agreed or strongly agreed that information was useful and applicable and could be applied to real life, and that they would recommend intervention to friends **Qualitative:** N/A	**Level of evidence:** II **Rationale**: Experimental design which included randomization and a control group **Strengths**: Experimental design, formal program, mneumonics used. Program was well described. **Limitations:** Sample size was small and difficult to generalize to population, interventionists were researchers not clinicians, no mention of a certifying body for riding center.

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Quantitative Evaluation Table

Article, Publication, Ethics	**Framework & Program Description**	**Design, Purpose**	**Sampling/Setting**	**Major Variables Studied**	**Data Measurement & Analysis**	**Findings**	**Use in Practice**
Authors: Frederick, Hatz, & Lanning **Publication date:** 2015 **Journal:** Community Mental Health Journal **Country:** United States **Ethics:** Requirements for IRB and IACUC met **Funding:** ND **Setting:** ND	**Conceptual Theory:** Experiential reflection discussed, role theory inferred **Formal Program:** LASSO Program **Description:** EAL **Program Delivered By:** Unspecified equine professional **Duration and Frequency:** Five weeks, one session per week. **Groundwork or Riding:** Groundwork only **Group Work or Individual:** Group work **Session Themes:** Observations, relationships, communication, problem-solving, obstacles in life, achieving goals, vulnerabilities **Riding Center Certification:** Not discussed	**Design**: Experimental, longitudinal, repeated measures design **Purpose**: To determine whether EAL program has impact on levels of hope and depression in at-risk youth	**Target Population:** At-risk adolescents **Recruited From:** Charter school in central Texas **Sample Size:** n=26, treatment=14, control=12 **Demographics:** Nine males, seventeen females, eleven whites, seven blacks, two hispanics, and six "other," ages 12-18 yrs **Inclusion Criteria:** All students met at least one criteria for Texas Education System's definition of "at risk" **Exclusion Criteria:** ND	**IV:** 5-week EAL Program **DV_1**: Hope **DV_2**: Depression	**Instruments**: Adolescent Domain Specific Hope Scale & Major Depression Inventory **Frequency of Measures**: Data collected at pretest, posttest, and 4 points in-between **Quantitative analysis:** Friedman's ANOVA with Pillai's Trace at each time point, also paired samples t test with bootstrapping **Qualitative analysis:** N/A	**Quantitative:** Statistically significant change in hope and depression with Friedman's ANOVA Test-retest correlation coefficients of hope statistically significant at nearly each point in time over six points **Qualitative:** N/A	**Level of evidence:** II **Rationale:** Experimental design with randomization and a control group **Strengths**: Experimental design, formal program, delivered by equine specialists. At risk youth well-defined, targeted recruitment, contained longitudinal aspect **Limitations:** Riding center not described, no certification mentioned for riding center or equine specialists, duration of sessions unknown

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Authors: Hauge, Kvalem, Berget, Enders-Slegers & Braastad **Publication date:** 2015 **Journal:** International Journal of Adolescence and Youth **Country:** Norway **Ethics:** Approved by the Regional Committee for Medical Research Ethics (REK) **Funding:** Funded by the Norwegian University of Life Sciences and Norwegian Horse Centre **Setting:** Thirteen farms in eastern Norway	**Conceptual Theory:** Biophilia implied **Formal Program:** No **Description:** EAA **Program Delivered By:** Farmers with various back-grounds and horse experience, all were ride instructors **Duration and Frequency:** A two-hour session, once weekly for four months **Groundwork or Riding:** Both **Group Work or Individual:** Pairs of two **Session Themes:** Relational and task-specific skills. handling and communicating with horse, picking hooves, tacking haltering, catching horse, and riding **Riding Center Certification:** N/A	**Design**: RCT Wait-list crossover design **Purpose**: To determine the effect of a 4-month EAA program on perceived social support, self-esteem, and self efficacy in adolescents attending lower secondary school	**Target Population:** Healthy adolescents **Recruited From:** Ten local schools in eastern Norway **Sample Size:** n=75, treatment=42, control=33 **Demographics:** Norwegian adolescents, ages 12-15 years, 86% female and 14% male. **Inclusion Criteria:** Adolescents attending lower secondary school, farms selected based on competence of farmer, proximity to a school, and farm size **Exclusion Criteria:** None discussed but potentially excluded if no pretest questionnaire delivered (n=4)	**IV:** A four-month equine assisted activity **DV_1**: Perceived social support **DV_2**: self-esteem **DV_3**: self-efficacy **DV_4**: self-report perceptions of activities with horses	**Instruments**: Social Support Scale, Global Self Worth Scale, General Self Efficacy Scale, and "question-naires for intervention in relation to activities with horses" scale **Frequency of Measures**: Question-naires were delivered at pretest and posttest for the intervention group, and at pretest for the control group (4 months prior to intervention). **Quantitative analysis:** Paired samples t-tests were used to measure differences between groups **Qualitative analysis:** N/A	**Quantitative:** Perceived social support showed a significant difference at pretest and posttest for the intervention group compared with the control group, no significant change noted for self-esteem and general self-efficacy Significant correlation be-tween lower level of perceived social support prior to intervention and increase in skills with horse, medium-high correlations between three psychological variables Low level of perceived social support predic-ted increased development of learning skills with horses during intervention **Qualitative:** N/A	**Level of evidence:** II **Rationale:** A randomized, wait-list control design **Strengths**: Large sample size and use of control group, long duration of intervention at potentially reduced cost. **Limitations:** Program delivery not consistent, administered by farmers with varying levels of experience. Researchers not present for intervention. Limited recruitment focus, included healthy children. Inconsistent administratio n of question-naires.

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Authors: Ho, Zhou, Sheng Fung, & Jade Kua **Publication date:** 2016 **Journal:** Cogent Education **Country:** Singapore **Ethics:** Approved by SingHealth Institutional Review Board **Funding:** Sponsored by Temasek Cares, Tote Board, Lee Foundation, Far East Organization, Singapore Business Foundation, Keppel Ltd, and multiple sponsors from the community **Setting:** Singapore Equestrian Federation	**Conceptual Theory:** Habit of Mind **Formal Program:** Equine Assisted Learning (EQUAL) Program **Description:** EAL, EAP, & hippotherapy **Program Delivered By:** Psychologist, professional equestrian instructor, and volunteers **Duration and Frequency:** Once weekly 3-hour sessions over 12 weeks duration **Groundwork or Riding:** Both **Group Work or Individual:** Groups only **Session Themes:** Horse play, stable management, riding, 5 themes of Habit of Mind incorporated into sessions. **Riding Center Certification:** ND	**Design**: Wait-list control crossover study **Purpose**: To examine the effect of a 12-week EQUAL interven-tion on five outcomes of Habit of Mind in adolescents at risk for school failure	**Target Population:** Youth at risk of school failure **Recruited From:** Pre-vocational schools, from underprivileged backgrounds **Sample Size:** n=274, treatment=133, control=141 **Demographics:** Sample of 83 males and 50 females, ages 12-14 years **Inclusion Criteria:** Failure to complete national exit exam or complete primary school, enrollment in pre-vocational schools **Exclusion Criteria:** None specified.	**IV:** A 12-week EQUAL intervention **DV_1**: Persistence **DV_2**: Thinking flexibility **DV_3**: Taking responsible risks **DV_4**: Managing impulsivity **DV_5**: Empathy Comparison with grade point average scores	**Instruments**: Habit of Mind Likert scale questionnaire **Frequency of Measures**: Pretest, posttest and mid-intervention measures were obtained for five Habit of Mind outcomes **Quantitative analysis:** Linear mixed effect model was used to examine changes over time, and ANOVA with Holm-Bonferonni was used to determine statistical significance over time. **Qualitative analysis:** N/A	**Quantitative:** Significant intervention by time for all five Habits of Mind except for Managing Impulsivity in year 2014. Positive correlations found between Habits of Mind and grade point average in two of four groups receiving intervention in most outcomes of interest **Qualitative:** N/A	**Level of evidence:** II **Rationale:** Study achieved randomization with control group **Strengths**: Strong design, large sample, and targeted recruitment, intervention was well described and theory-based, program duration was 12 weeks with three measurement points **Limitations:** Limited strength of instrument used, and scoring by teachers, no power analysis performed, a complex intervention, specialists and center without certification

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Authors: Holmes, Goodwin, Redhead, & Goymour **Publication date:** 2012 **Journal:** Child Adolescent Social Work Journal **Country:** England **Ethics:** Approved by University of Southampton Psychology Ethics Committee **Funding:** ND **Setting:** Greatwood Racehorse & Rehab. Centre (GRRC)	**Conceptual Theory:** Metaphorical analysis **Formal Program:** Greatwood Racehorse & Rehab. Centre (GRRC) **Description:** EAA **Program Delivered By:** Without a trained therapist **Duration and Frequency:** Four sessions, 3 hours each **Groundwork or Riding:** Groundwork only **Group Work or Individual:** ND **Session Themes:** Safety, picking hooves, grooming, fitting collars and rugs **Riding Center Certification:** ND	**Design**: Exploratory study **Purpose**: To determine the effects of an EAA program without a trained therapist on mental health outcomes such as trait anxiety, self-esteem, and behavioral interactions	**Target Population:** Adolescents with emotional, behavioral, or learning difficulties **Recruited From:** Two local schools **Sample Size:** n=11 **Demographics:** Ten females, one male, ages 12-14 years **Inclusion Criteria:** Identified unspecifically as having emotional, behavioral, or learning difficulties **Exclusion Criteria:** ND	**IV:** Four-session EAA interven-tion **DV_1**: Trait anxiety **DV_2**: Self esteem **DV_3**: Approach or avoidance behavior	**Instruments**: Rosenberg Self Esteem Scale, Spence Children's Anxiety Scale **Frequency of Measures**: Social anxiety measured at baseline and post 2nd, 3rd, and 4th sessions, behavioral observations and horse interactions noted every 15 sec. for 2nd, 3rd, and 4th sessions, behaviors classified as avoidance or approach **Quantitative analysis:** Friedman's ANOVA to compare baseline with each collection point and change between sessions 1 & 2, and 1 & 3 Wilcoxon signed ranks to examine difference in behaviors between sessions Spearman's Rho used to correlate anxiety with behavioral observations **Qualitative analysis:** N/A	**Quantitative:** Friedman's ANOVA showed statistically significant reduction in trait anxiety from baseline to each collection point and between sessions 1 & 2, and 1 & 3. Friedman's ANOVA revealed no statistical significance in self esteem between sessions Small negative, positive correlation between anxiety and approach and avoidance behavior, respectively, not statistically significant **Qualitative:** N/A	**Level of evidence:** III **Rationale:** Control used **Strengths**: Use of inanimate control, comparison of self-report instruments and behavioral observations, formal program with detailed description of activities and horses used **Limitations:** No randomization discussed, small sample size, difficult to generalize to population, limited discussion of horsemanship professionals used for program, no certification mentioned

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Authors: Morgan **Publication date:** 2017 **Journal:** Journal of Creativity in Mental Health **Country:** United States **Ethics:** ND **Funding:** ND **Setting:** Off-campus location, ND	**Conceptual Theory:** Experiential learning **Formal Program:** Unspecified college program in behavioral sciences division **Description:** Multimodal: EAL, yoga, & mindfulness hiking **Program Delivered By:** EAGALA trained ES & MH psychotherapist **Duration and Frequency:** Semester-long program, EAL portion of 3 weeks duration, 45 minutes each **Groundwork or Riding:** Groundwork only **Group Work or Individual:** Group work only **Session Themes:** Emotions, role playing, metaphoric analysis, life's challenges, symbolism, and journal reflection **Riding Center Certification:** ND	**Design**: Quasi experimental design **Purpose**: To determine efficacy of a combined stress management course for college students, determine effectiveness of each modality, and describe qualitative experience of student participants	**Target Population:** College students **Recruited From:** College students recruited by convenience sampling from 2-year liberal arts college **Sample Size:** n=42, treatment=24, control=18 **Demographics:** Twenty six males and 16 females, twenty-nine whites, 10 blacks, 1 asian, and 2 multicultural students **Inclusion Criteria:** Enrollment in college psychology course **Exclusion Criteria:** ND	**IV:** Semester-long multimodal stress management program **DV_1**: Self-reported perception of stress **DV_2**: Symptom experience of present moment stress Experience of students was a desired outcome for qualitative aspect of study	**Instruments**: Perceived Stress Scale (PSS), Present Moment Stress Scale (PMSS), weekly participant journal entries **Frequency of Measures**: Pretest and posttest PSS measured, also PMSS measured at pretest and after each of three interventions **Quantitative analysis:** Univariate ANCOVA to compare differences between groups for PSS, repeated measures ANOVA used to determine within group differences for PMSS **Qualitative analysis:** Analysis of students' weekly journals using thematic interpretation	**Quantitative:** Posttest PSS statistically significant for experimental group compared to control group. Post-intervention PMSS measures statistically significant, also true for time and modality **Qualitative:** Three themes emerged, including psychsocial stressors, (i.e. family responsibilities, family conflict, relationship problems, and work demands) concerns about finances, and concerns about career planning and the future	**Level of evidence:** III **Rationale:** No randomization achieved **Strengths**: Adequate description of program activities and horses (and donkeys) used, instructors certified **Limitations:** Participation was included as coursework in college program, also PMSS instrument developed by principle investigator of this study, both are potentially biased, setting not described, intervention not counterbalanced for yoga session, and multimodal approach resulted in limited EAL exposure

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Authors: Pendry, Carr, Smith, & Roeter **Publication date:** 2014 **Journal:** Journal of Primary Prevention **Country:** United States **Ethics:** Approved by University Committee of Research Involving Human Subjects, monitored by IACUC **Funding:** Grant funding via Eunice Kennedy Shriver National Institute of Child Health & Human Development and private funding from Mars-Waltham **Setting:** PATH accredited center	**Conceptual Theory:** HAI, PYD Perspective, & Experiential Learning **Formal Program:** No name provided **Description:** EFL **Program Delivered By:** PATH certified instructor, various students, and counseling psychologist **Duration and Frequency:** Once weekly sessions, 90-minutes each, over an 11-week duration **Groundwork or Riding:** Both **Group Work or Individual:** Both, about eight children per group **Session Themes:** Communication, trust, boundaries, leadership, respect, confidence, overcoming challenges, self-regulation **Riding Center Certification:** PATH accredited center	**Design**: Randomized, wait-list controlled design **Purpose**: To determine effect of an 11-week EFL program on social competence and behavior in children 5th-8th grade	**Target Population:** Adolescents with low social competence, at-risk youth **Recruited From:** Ten different schools in two university towns **Sample Size:** n=131, treatment=53, control=60 **Demographics:** 41 males, 72 females, 82% white, 8% asian, 1.6% black, 8% multiracial. **Inclusion Criteria:** English competency and no serious physical or mental disability, normal children as well as those with low social competence recruited to participate **Exclusion Criteria:** ND	**IV:** Eleven-week EFL intervention **DV_1**: Social competence **DV_2**: Positive and negative behaviors Comparison with session attendance	**Instruments**: Devereaux Student Strengths Assessment, Animal Assisted Therapy, Psychosocial Session Form **Frequency of Measures**: Pretest and posttest social competence rated by parents, behaviors rated by two program facilitators and one independent researcher over 11-week duration **Quantitative analysis:** Series of one-way ANOVAs to compare pretest and posttest social competence, paired-samples t test and linear regression to examine relationship between attendance and positive behaviors on all participants (including control group) **Qualitative analysis:** N/A	**Quantitative:** Both positive behavior and negative behavior increased and decreased, respectively and significantly over duration of 11-week program Statistically significant improvement in social competence at posttest compared to pretest Higher levels of attendance associated with steeper trajectory of positive and negative behaviors **Qualitative:** N/A	**Level of evidence:** II **Rationale:** Randomization achieved, controlled design **Strengths**: Theory-based program with excellent description of activities, site and instructors held national certification, comparison of ratings by parents and facilitators, larger sample of 11-week duration **Limitations:** Potential for bias as some behaviors rated by program instructors

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Authors: Perkins **Publication date:** 2018 **Journal:** Journal of Creativity in Mental Health **Country:** United States **Ethics:** American Counseling Association Code of Ethics **Funding:** Work supported by the Gaston County Family Advisory Board **Setting:** EAGALA supported center, unspecified	**Conceptual Theory:** Experiential learning **Formal Program:** Cowboy Trails Program **Description:** EAL **Program Delivered By:** Equine specialist, ranch hand, and therapist **Duration and Frequency:** A one-hour each week for 8 weeks **Groundwork or Riding:** Groundwork only **Group Work or Individual:** Group work only **Session Themes:** Life skills included partnership, respect, boundaries, communication, emotional regulation, problem solving, teamwork, and a review session **Riding Center Certification:** EAGALA certified ES and MH professional	**Design**: Exploratory pilot study **Purpose**: To examine the impact of an 8-week EAL program on life skills of partnership, respect, boundaries, communication, emotional regulation, problem-solving, and teamwork	**Target Population:** Adolescents from group home **Recruited From:** Local foster care organization, group home residents **Sample Size:** n=7 **Demographics:** Six females and one male, six whites and one black participant **Inclusion Criteria:** Members of local foster care organization who attended regular group therapy **Exclusion Criteria:** Number of participants increased to 18 but only those completing at least 5 or 8 weekly sessions were included in study	**IV:** An 8-week EAL intervention Observational instrument: **DV_1**: engagement **DV_2**: confidence **DV_3**: respect **DV_4**: communication **DV_5**: work ethic Self-report instrument: **DV_6**: Partnership **DV_7**: Respect **DV_8**: Boundaries **DV_9**: Communication **DV_{10}**: Emotional regulation **DV_{11}**:Problem solving **DV_{12}**: Teamwork	**Instruments**: Non-specific Likert scales used for both measures **Frequency of Measures**: Data collected by self-report instrument at pretest and posttest intervals (seven life skills). Data also collected by an observer from therapy team who scored participant after each session (5 areas) **Quantitative analysis:** Paired samples t test used to compare pretest and posttest assessments, paired samples t test also used at select data points (T1 and T4; T1 and T7; T1 and T8) for observational assessment **Qualitative analysis:** N/A	**Quantitative:** Self-report instrument revealed only one significant improvement, which was emotional regulation Observational instrument at T4 showed significance in engagement, interaction with animals and others, confidence, understanding, animal respect, animal communication, determination, and communication Observational instrument at T7 showed significance in engagement, interaction with animals and others, work ethic, understanding, communication with animals, and determination. **Qualitative:** N/A	**Level of evidence:** IV **Rationale:** Not randomized controlled or blinded **Strengths**: Program well described and theory-based, targeted recruitment and use of a vulnerable population, self-report and observational findings applied **Limitations:** Small sample size, limited generalizability to public, attendance varied considerably, not all data points were examined statistically due to fluctuations in attendance, instruments not discussed or affirmed from other studies

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Authors: Dell, Chalmers, Bresette, Swain, Rankin, & Hopkins **Publication date:** 2011 **Journal:** Child Youth Care Forum **Country:** Canada **Ethics:** Approved by University of Saskatchewan Behavioural Research Ethics Board **Funding:** ND **Setting:** Keystone Equine Center & Lambton Equine Assisted Learning Centre	**Conceptual Theory:** Aboriginal Worldview, Experiential Learning, 7 Grandfather Teachings (virtues) **Formal Program:** Specific curriculum for both centers, but no formal program **Description:** EAL **Program Delivered by:** Facilitated by 2 teachers and 1 counselor, equine staff not described **Duration and Frequency:** 10 weeks, one hour per week **Groundwork or Riding:** Groundwork only **Group Work or Individual:** Groups **Session Themes:** Respecting space, harmony in relationships, getting beyond self, life force **Riding Center Certification:** ND	**Design**: Qualitative study **Purpose**: To explore the benefit of an EAL program on youths healing	**Target Population:** First Nations and Inuit youth **Recruited From:** Nimkee NupiGawagan Healing Centre (NNHC) residential substance abuse treatment center **Sample Size:** n=15, 7 male and 8 female youth **Demographics: S**ubstance abuse history, adolecscents **Inclusion Criteria:** NNHC residents **Exclusion Criteria:** Unable to obtain consent from adult	**IV:** 10-week EAL program Outcomes of interest included youths' experience with EAL program, its impact on their healing, & congruence of horse program with teachings at NNHC	**Instruments**: Interviews conducted, journal entries reviewed **Frequency of Measures**: Interviews conducted post-intervention, weekly journals reviewed **Quantitative analysis:** N/A **Qualitative analysis:** Interviews digitally recorded and transcribed, thematic analysis and codes developed	**Quantitative:** N/A **Qualitative:** Eleven themes emerged, reduced to 3 key themes. These included spiritual exchange (spending time and connecting with horses), complimentary communication (applying concepts of horse interactions to human counterparts), and authentic occurrence (overcoming barriers)	**Level of evidence:** VI **Rationale:** Descriptive measures only **Strengths**: Session themes similar to Western applications **Limitations:** Qualitative design, not generalizable beyond cohorts studied, English was second language for many participants, many were limited in writing abilities

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Appendix B

Table 2

Qualitative Evaluation Table

Article, Publication, Ethics	**Framework & Program Description**	**Design, Purpose**	**Sampling/ Setting**	**Major Variables Studied**	**Data Measurement & Analysis**	**Findings**	**Use in Practice**
Authors: Hemingway, Meek, & Hill **Publication date:** 2015 **Journal:** Society & Animals **Country:** England **Ethics:** Project informed by ethics process required by prison service **Funding:** Not discussed **Setting:** A sports field	**Conceptual Theory:** Experiential learning discussed **Formal Program:** Pareli Natural Horsemanship Program (PNH) **Description:** EFL **Program Delivered By:** PNH certified course facilitator **Duration and Frequency:** Seven sessions, 2.5 hours each, over 7 days **Groundwork or Riding:** Groundwork only **Group Work or Individual:** Teams of two participants **Session Themes:** Cooperation, mutual respect, communication, assertive body language, bonding, self-control, empathy, & mindfulness **Riding Center Certification:** PNH Center	**Design**: Qualitative Study **Purpose**: To explore and describe the impact of a seven-session intervention on behavioral responses and reflections of learning in young male offenders	**Target Population:** Incarcerated high-risk young adult offenders **Recruited From:** Recruited by convenience from a young offenders prison in England **Sample Size:** n=20 **Demographics:** All males, ages 18-21 **Inclusion Criteria:** All were incarcerated in a young offenders prison in England, at risk for reoffending, and with reported disruptive or disengaged behavior **Exclusion Criteria:** ND	**IV:** A seven-session EFL intervention Data were collected in the form of observations by researchers, recorded interviews conducted by course facilitator, and recorded interviews by an independent researcher Focus of interviews was reflection of participant experiences, knowledge, and learning	**Instruments**: Observations of body language and structured interviews used **Frequency of Measures**: Observations conducted pretest and posttest **Quantitative analysis:** N/A **Qualitative analysis:** Information was gathered by observation over two days and by conducting semi-structured interviews with participants using independent researchers and audiotaped conversations	**Quantitative:** N/A **Qualitative:** Observations of participant body language previously found to be weak, tense or ineffective progressed to body language that was later described as assertive, confident, focused, calm and gentle Themes that emerged included qualities of self, qualities of the program, being more relaxed, and increased confidence, not giving up and staying focused. Participants also reflected on feedback received from the facilitator as well as the immediate feedback that the horses provide through their emotions and reactions	**Level of evidence:** VI **Rationale:** Descriptive measures only **Strengths**: Observations of body language provide richer comparison of body language and self-reports. Targeted vulnerable population used **Limitations:** Qualitative study that cannot infer causation between intervention and participant reactions. Interviews conducted by program facilitator, a potential conflict of interest

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Appendix B

Table 2

Qualitative Evaluation Table

Article, Publication, Ethics	**Framework & Program Description**	**Design, Purpose**	**Sampling/ Setting**	**Major Variables Studied**	**Data Measurement & Analysis**	**Findings**	**Use in Practice**
Authors: Saggers & Strachan **Publication date:** 2016 **Journal:** Child & Youth Services **Country:** Australia **Ethics:** Approved by Human Research Ethics Committee of University & Public Education System **Funding:** ND **Setting:** An unspecified equestrian center	**Conceptual Theory:** CASEL & Five Core Competencies, Experiential Learning Discussed **Formal Program:** CASEL Programming **Description:** EFL **Program Delivered By:** Delivered by two EFL staff trained in PATH, assistance from two teachers and volunteers **Duration and Frequency:** Sessions 2 hours each, twice weekly for 8 weeks **Groundwork or Riding:** Both **Group Work or Individual:** Both **Session Themes:** Included self management, self awareness, decision-making, relationships, social awareness, trust, emotional regulation, communication, teamwork, social emotional learning, & relaxation **Riding Center Certification:** ND	**Design**: Qualitative, exploratory pilot study **Purpose**: To describe the impact of an 8-week EFL program on resilience, social-emotional learning, and ultimately school engagement. The project targeted student perceptions of the EFL program and what they thought would be achieved and what they felt was actually achieved	**Target Population:** Adolescents at risk for school failure **Recruited From:** Purposive sampling, referred from a Special Education Unit's (SEU) school welfare team **Sample Size:** n=11 **Demographics:** Five male and 6 female participants, ages 10-13, with low socioeconomic status **Inclusion Criteria:** Invited by SEU, determined at risk for school failure due to social-emotional and behavioral difficulties. **Exclusion Criteria:** ND	**IV:** An 8-week EFL intervention **DV_1**: Resilience **DV_2**: Social-emotional learning **DV_3**: School engagement	**Instruments**: Data gathered from two semi-structured in-depth interviews **Frequency of Measures**: Interviews conducted once before and once upon completion of program **Quantitative analysis:** N/A **Qualitative analysis:** Recorded interviews were transcribed verbatim, key experiences were identified, then in a second reading line-by-line coding and links were noted, two external researchers confirmed accuracy and reviewed line-by-line coding, comparing results finally with initial audio recording.	**Quantitative:** N/A **Qualitative:** Two main themes emerged, included horsemanship and resilience A positive influence was noted on social emotional learning with specific aspects that emerged, including gaining confidence, developing communication skills, regulating emotions, coping with teasing and bullying, learning to relax and manage stress, and attending and persevering in tasks	**Level of evidence:** VI **Rationale:** Qualitative study, no randomisation or comparison groups **Strengths**: Targeted recruitment, rich descriptive analysis provides direction for future EFL studies, program well described and delivered by certified equine professionals **Limitations:** Small sample size, difficult to generalize to population. Qualitative design, causation undetermined

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Appendix C

Table 1

Synthesis of Quantitative Data

	Alfonso	Frederick	Hauge	Ho	Holmes	Morgan	Pendry	Perkins
Level of Evidence	II	II	II	II	III	III	II	IV
Population Target	Females w/ social anxiety	At risk adolescents	Health adolescents	At-risk youth	At-risk youth	Healthy college students	At-risk youth	Adolescents from group home
Population Age Range	18-29	12-18	12-15	12-14	12-14	ND	10-14	ND
Recruitment Collaborative	No	Yes school	Yes schools	Yes schools	Yes schools	No	Yes schools	Yes foster care
Theoretical Framework	CBT, IDEA, TALK	Exp. Learning, Role theory inferred	Role theory inferred	Habit of Mind	Metaphor-ical analysis	Exp. Learning	HAI, PYD Perspective, Exp. Learning	Exp. Learning
Formal Program	Project Stride	LASSO	ND	EQUAL Program	GRRC	ND	ND	Cowboy Trails
Description	EAA + CBT	EAL	EAA	EAL, EAP & HIPPO	EAA	EAL, CBT, yoga, hiking	EFL	EAL
Delivered By	RF	Equine Professional	Farmers, all riding instructors	Psychologist, Equine instructor, volunteers	W/O trained therapist	ES & MH psycho-therapist	Instructor, students, psycholo-gist	ND
Setting	RC	ND	Farms	RC	RC	ND	RC	RC
Center, HP Certification Discussed	No	No	No	No	No	EAGALA	PATH	EAGALA
Program Duration	6 weeks	5 weeks	16 weeks	12 weeks	ND	EAL portion 3 weeks	11 weeks	8 weeks
Session Duration	2-2.5 hrs	ND	2 hours	3 hours	3 hours	45 min.	90 min.	60 min.
Total number of sessions	6	5	16	12	4	3	11	8
Groundwork or riding	Both	Ground	Both	Both	Ground	Ground	Both	Ground
Groups or Individual	Both	Groups	Both	Groups	ND	Groups	Both	Groups

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Appendix C

Table 2

Synthesis of Qualitative Data

	Dell	Hemingway	Morgan	Saggers
Level of Evidence	VI	VI	III	VI
Population Target	At risk youth	Incarcerated youth	Healthy college students	At-risk youth
Population Age Range	12-17	18-21	ND	10-13
Recruitment Collaborative	Yes Substance abuse center	Yes Young offenders prison	No	Yes school
Theoretical Framework	Aboriginal Worldview, Exp. Learning, 7 Grandfather Teachings	Exp. Learning	Exp. Learning	CASEL, Exp. Learning
Formal Program	ND	PNH Program	ND	SEL Program
Description	EAL	EFL	EAL, CBT, yoga, hiking	EFL
Delivered By	Teachers, counselor	Course Facilitator	ES & MH psychotherapist	EFL staff, teachers, & volunteers
Setting	RC	RC	ND	RC
Center, HP Certification Discussed	ND	PNH	EAGALA	PATH
Program Duration	10 weeks	7 days	EAL portion was 3 weeks	8 weeks
Session Duration	60 minutes	2.5 hours	45 min.	2 hours
Total Sessions	10	7	3	16
Groundwork or Riding	Ground	Ground	Ground	Both
Groups or Individual	Groups	Groups	Groups	Both

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Appendix C

Table 3

Synthesis of Session Themes and Outcome Domains

Articles	Alf.	Fred.	Hau.	Ho	Hol.	Mor.	Pen.	Per.	Dell	Hem.	Sag.
Session Themes:											
Commun.	X	X	X				X	X			X
Teamwork	X							X			X
Boundaries							X	X			
Prob. Solv.	X	X	X			X	X	X			X
Emot Reg.	X			X		X	X	X			X
Relationships	X	X							X	X	X
Leadership							X				
Flexibility				X							
Respect							X	X	X	X	
Empathy				X							
Reflection		X			X			X	X	X	X
Responsibility			X	X	X						
CBT	X					X					
Outcome Domains of Interest:											
Social-Emotional	X	X	X	X	X	X	X	X			X
Behavioral				X	X		X	X			X
Cognitive			X	X				X			X
Other			X			X			X	X	

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Appendix D

Figure 1

Experiential Learning Theory

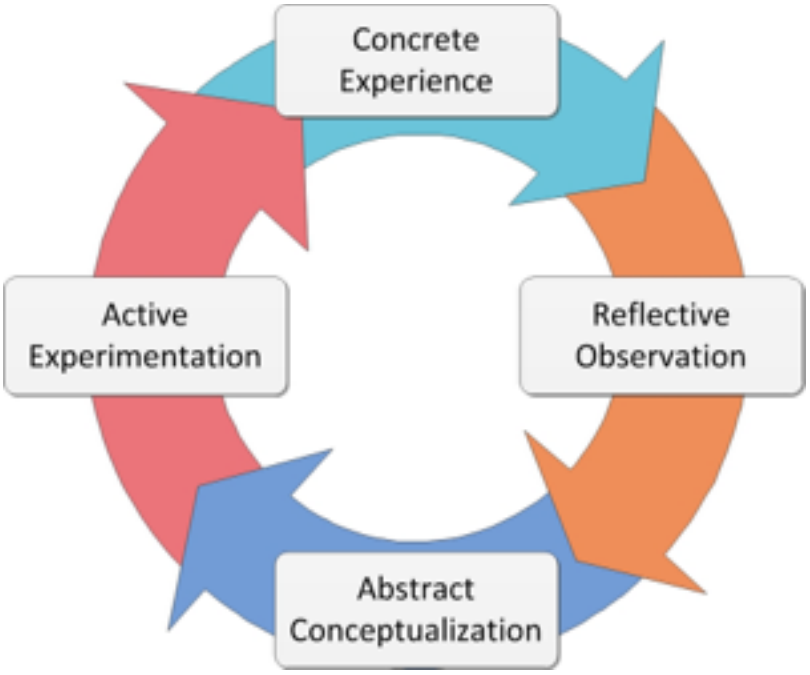


Figure 1. Experiential learning theory asserts that learning is a complex, adaptive process that engages different key brain regions to promote learning. Through the concrete experience, the learner gains sensory and motor stimulation. Reflective observation enhances memory and emotional processing. Abstract conceptualization engages the frontal cortex and higher learning. Active experimentation promotes decision-making and ultimately, behavior change. (Kolb, 2015)

Appendix D

Figure 2

Johns Hopkins Nursing Evidence Based Practice Model

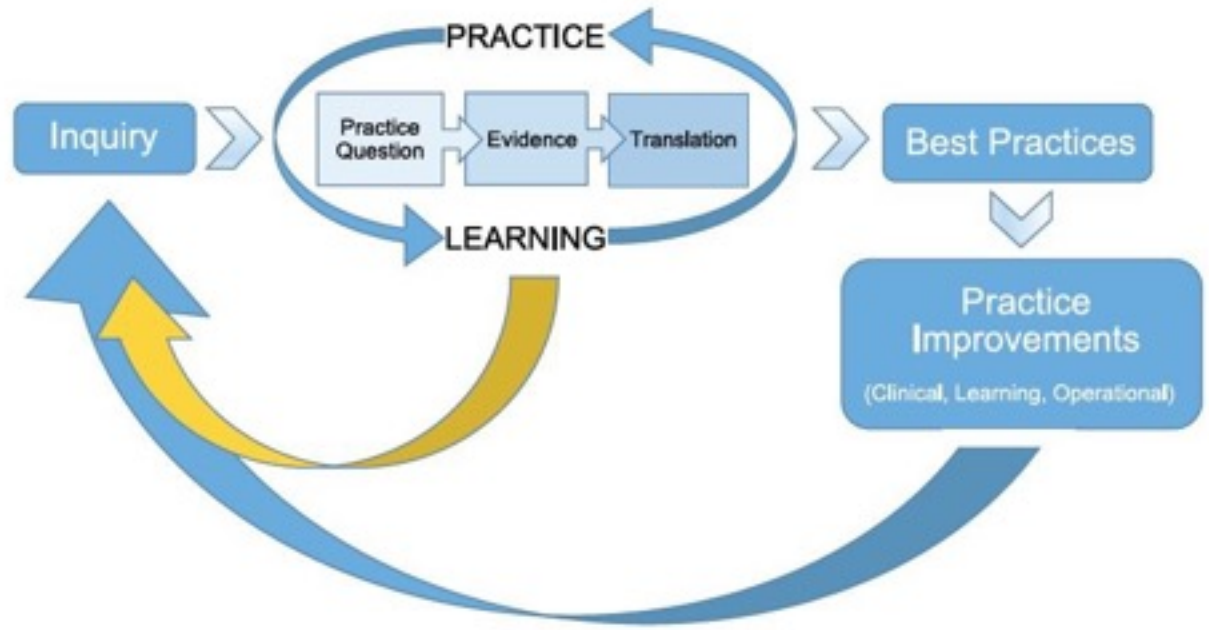


Figure 2. The most attractive element of the Johns Hopkins Nursing EBP Model is the ongoing collaborative exchanges involving practice and learning that occured prior to project implementation. This component was fundamental to program development and refinement prior to implementation at the riding center. In addition, the Model is designed for implementation in smaller settings, making it ideal for use in our therapeutic riding center.

Appendix E

Table 1

Sample Characteristics

Adult and Child Attendees	**n = 61**		**Female**	**Male**
Adults (age 18 & up)	36		20	16
Children (age 10-17)	25		13	12
Non-Primary Relatives	5		5	-
Parents Completing Surveys	**n = 20**	**% total**		
Caucasion or White Families	17	85%		
Hispanic or Latino Families	3	15%		
Avg. No. of People in Family	3.65	-		
Bachelor's Degree or Higher	15	75%		
High School Graduate or Some College	5	25%		
Child Qualifies for Reduced School Lunch	4	20%		

Appendix E

Table 2

Results for Family Satisfaction Scale

Sum Scores	**n**	**M**	**SD**	**Minimum**	**Maximum**
T_0 Family satisfaction	20	31.85	6.07	18.00	42.00
T_1 Family satisfaction	19	38.32	8.16	20.00	50.00
Z score-3.400[b]					
Asymp. Sig (2-tailed) 0.001					

Appendix E

Table 3

Results for Brief Family Assessment Measure

t scores	n	M	SD	Minimum	Maximum
T_0 General	20	49.00	11.06	30	66
T_1 General	19	41.89	9.08	28	60
Z score-2.788[b]					
Asymp. Sig (2-tailed) 0.005					
T_0 Self-Rating	20	53.10	15.85	24	76
T_1 Self-Rating	19	46.11	13.80	28	80
Z score-1.963[b]					
Asymp. Sig (2-tailed) 0.050					
T_0 Dyadic Relationship	20	51.80	12.21	34	76
T_1 Dyadic Relationship	19	47.79	10.45	32	70
Z score-2.203[b]					
Asymp. Sig (2-tailed) 0.028					

Appendix E

Table 4

Results for Devereaux Student Strengths Assessment (DESSA-mini)

Sum Scores	**n**	**M**	**SD**	**Minimum**	**Maximum**
T_0 Social emotional comp.	20	50.05	8.49	37	67
T_1 Social emotional comp.	19	54.53	9.39	41	71
Z score-2.444[b]					
Asymp. Sig (2-tailed) 0.015					

Appendix E

Table 5

Acceptability Results for Adults, Expressed as Percentage

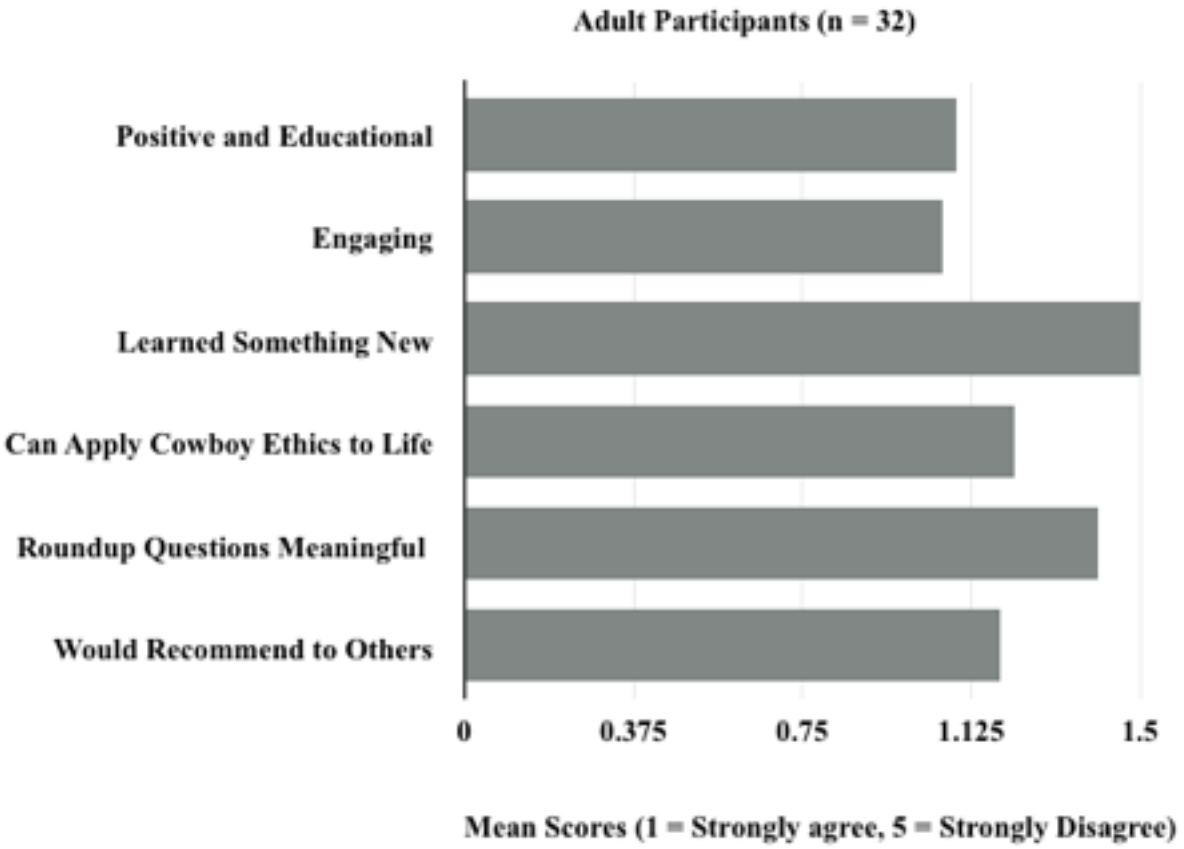
Questions 1-6	**% Adults (n = 32)**		
	A or SA	**N**	**D or SD**
Positive and Educational	100	-	-
Engaging	100	-	-
Learned Something New	87.5	12.5	-
Can Apply Cowboy Ethics to Life	100	-	-
Roundup Questions Meaningful	96.9	3.1	-
Would Recommend to Others	100	-	-

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Appendix E

Figure 1

Acceptability Results for Adults, Expressed as Mean



Appendix E

Table 6

Acceptability for Children, Expressed as Percentage

Questions 1-6	**% Children (n = 23)**		
	A or SA	**N**	**D or SD**
Positive and Educational	95.7	4.3	-
Engaging	95.7	4.3	-
Learned Something New	65.2	13	21.7
Can Apply Cowboy Ethics to Life	73.9	26.1	-
Roundup Questions Meaningful	73.9	13	13
Would Recommend to Others	78.3	21.7	-

SA = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Appendix E

Figure 2

Acceptability Results for Children, Expressed as Mean