An open trial of equine-assisted therapy for children exposed to problematic parental substance use

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Abstract
Children exposed to problematic parental substance use (PPSU) often face a number of deleterious developmental outcomes, yet these children are less likely to become known to child protection and welfare services. Although there is a growing evidence base for equine-assisted therapy (EAT) as an effective treatment modality for atypically developing children and adolescents, scant research has explored the benefit of EAT for children exposed to PPSU. The current study is the first to explore the benefit of EAT for children exposed to PPSU in Victoria, Australia. Five 12-week EAT programmes were delivered from 2012 to 2015 with a total of 41 children (mean age of 10.26 years) taking part. Children’s parents (n = 41) and schoolteachers (n = 31) completed the Strengths and Difficulties Questionnaire pre- and post-intervention. Parents reported that children’s total difficult behaviour and emotional problems decreased following the 12-week EAT programme. In addition, parents and teachers observed a significant decrease in children’s hyperactivity. The findings obtained highlight the benefit of EAT for children exposed to PPSU and thus, extends the existing evidence base for this treatment modality.

Keywords: children’s well-being, equine-assisted therapy, problematic parental substance use

Introduction
A substantial body of literature demonstrates that children and adolescents exposed to stressful and traumatic incidents such as physical abuse, sexual abuse and neglect are placed at a heightened risk of experiencing negative life outcomes (Egeland et al. 2002, Gunner & Fisher 2006, Burgon 2011). With this, children and youth who experience these forms of maltreatment usually come to the attention of child protection services and are sometimes provided therapeutic support to overcome the trauma experienced. In homes where parents engage in problematic substance use similar trauma can be inflicted, yet research reveals that children who are affected by problematic parental substance use (PPSU) are less likely to become directly involved with child safety and support services (Young et al. 2007). Although there is a vast body of literature on parenting and substance use (Dawe et al. 2008), with some studies reporting children’s perspectives and experiences (Barnard 2002, Gruenert et al. 2004), there is very little research documenting interventions with children affected by PPSU.

Evidence suggests that problematic alcohol and other drug use can impede parenting capacity (Rhodes et al. 2010) by adversely affecting
attachment (Kroll 2004), consistency of parenting (Cattapan & Grimwade 2008), attunement with, and sensitivity to children’s emotional needs and the stability of the home environment (Dawe et al. 2008, Tsantefski et al. 2013). Furthermore, the trauma associated with the exposure to inconsistent parenting and neglect early in life, known as early relational trauma (Goldfinch 2009), is linked to myriad developmental deficits in children (O’Reilly & Peterson 2015) ranging from emotional, cognitive, social and behavioural problems (Peleg-Oren & Teichman 2006). Children exposed to PPSU demonstrate maladaptive affect regulation, poorer cognitive development, attachment difficulties, low self-esteem, poor self-concept integration and lower levels of behavioural control (Kroll 2004, Cook et al. 2005). According to Goldfinch (2009), traumatised children often display challenging behaviours by exhibiting either externalising behaviours such as oppositional behaviours, aggression and defiance, or internalising behaviours like withdrawing, disengagement and non-compliance. Consequently, these problematic behaviours negatively impact their relationships with parents/carers, teachers and peers compromising their academic performance and future prospects (Dell et al. 2011). Children who experience PPSU are more likely than other children to witness family violence, to live in poverty and to experience homelessness (Velleman & Templeton 2007).

Yet, despite the gravity of problems children who experience PPSU can face (Velleman & Templeton 2007, Goldfinch 2009), this client group is less likely to be directly involved with services (Dawe et al. 2008) and hence, there are very few documented interventions with such children. However, of the small number of the evaluation studies conducted, a clear trend is evident with an emerging evidence base highlighting the positive benefits of equine-assisted interventions in supporting children exposed to PPSU (Schultz et al. 2007).

Equine-assisted therapy

Equine-assisted therapy (EAT) is increasingly recognised as a preferred treatment option for traumatised children (Yorke 2010). According to Burgon, EAT is designed to ‘provide alternative therapeutic and learning opportunities through experiences with horses alongside specialist practitioners’ (Burgon 2011, p. 165). EAT is usually comprised of activities around caring for and handling a horse and can involve aspects of therapeutic riding such as opportunities to sit on and ride the horse with a focus on developing a therapeutic bond (All et al. 1999, Lentini & Knox 2009, Lee et al. 2016). Given traumatised children can experience a variety of emotional, social, cognitive and behavioural problems, their positive participation and engagement with a therapeutic intervention can be compromised (Waite & Bourke 2013). Thus, the inclusion and innovative involvement of horses in therapy has been effective in increasing children and youths’ engagement in therapy (Waite & Bourke 2013).

Various hypotheses, all of which require further testing, have been proposed to account for how interaction with horses may produce psychological, emotional and social benefits. The first posits that EAT provides a positive context for psychological growth. The second hypothesis argues that the horse has therapeutic qualities that can lead to unique psychological changes that would not otherwise occur (Maujean et al. 2013, Kendall et al. 2014, Maujean et al. 2015). It is this final point that proponents of EAT argue horses have unique therapeutic potential. Unlike other animals typically used in animal-assisted therapy (cats and dogs), horses are not predators; instead, they are very large herd animals with an ability to intuit fear, a species wide characteristic transferable to interactions with people. The horse acts as a co-therapist with whom children learn to establish a mutually respectful, trusting relationship. Children derive therapeutic benefit through participating in handling, grooming and leading the horse, and by discussing behaviours and emotions experienced in the process. In essence, the child develops a relationship with the horse, the other children and the facilitators to address therapeutic goals such as increasing self-esteem and personal confidence, building trust, improving communication and interpersonal effectiveness, understanding boundaries and limit setting and developing group cohesion (Karol 2007, Schultz et al. 2007, Chardonnens 2011).

Studies have found that human–horse interaction is linked to significant reductions in adolescents’ cortisol activity and reactivity (Pendry et al. 2014). This evidence suggests that not only does human–horse interaction lower adolescents’ stress levels (cortisol activity) but also connecting with a horse reduces the adolescents’ stress response (cortisol reactivity) and thus ‘may constitute a protective influence against the development of psychopathology and health problems’ (Pendry et al. 2014, p. 90).

Research with atypically developing children

To date, a small number of studies have attempted to examine the positive impact of equine-assisted therapeutic programmes for clinical samples of children and adolescents. Yet, results have been mixed.
Ewing et al. (2007) examined the efficacy of an equine-facilitated therapeutic learning programme for youths with severe emotional disorders. A total of 28 children and youths aged 10–13 years participated in the 9-week Horse Power programme. The Horse Power programme described as both educational and therapeutic in nature was designed to teach cooperation, responsibility and trust as well as instilling in the child a sense of ownership and connection with the horse. Contrary to the authors’ predictions, quantitative findings revealed no significant difference in youths’ self-esteem, feelings of interpersonal empathy, internal locus of control or feelings of depression from pre- to post-test. Interestingly though, qualitative evidence provided by the special education teacher, the therapeutic riding instructor and volunteers revealed a positive change with a reduction in problematic child behaviours such as defiance, noncompliance and hyperactivity. Ewing and colleagues acknowledged that given the nature of the severe emotional disorders experienced by the children and youths, and the fact that many were low-functioning with below average IQ scores and learning disabilities, many might have experienced difficulty comprehending the test questions.

Schultz et al. (2007) conducted a pilot study using equine-assisted psychotherapy (EAP) to treat behavioural and mental health issues in children who had experienced early relational trauma including intrafamily violence, abuse and neglect and parental substance misuse. Over an 18-month period, 63 children aged 4–16 years participated in EAP and learnt how to groom, approach and handle the horse and were encouraged to use their tone of voice and body language to move the horse. The Children’s Global Assessment of Functioning (GAF) was conducted prior to and at 3-month intervals throughout the intervention. While all children demonstrated an improvement in psychological, social and school functioning, a significant greater percentage improvement in GAF was found in children who had experienced abuse and neglect and similar findings were evident for children who had at least one parent with a substance abuse problem. The authors suggested ‘this type of therapy provides opportunities for the child to identify and understand personal emotions, develop empathy, develop a sense of responsibility, learn to problem-solve’ (Schultz et al. 2007, p. 266).

Cuypers et al. (2011) investigated the effectiveness of an 8-week therapeutic horseback-riding programme in reducing difficult behaviour, motor performance and health-related quality of life in children diagnosed with attention deficit hyperactivity disorder (ADHD). Five children with ADHD aged 10–11 years took part in the study. Children’s behaviour was assessed at baseline and post-test using the child self-report, parent and teacher reports of the Strengths and Difficulties Questionnaire (SDQ). At post-test, children reported reductions in their emotional symptoms; conduct problems, hyperactivity and total difficulties. Similarly, parents reported a significant change in children’s hyperactivity and total difficult behaviours, and teachers indicated a reduction in children’s total difficult behaviours. Children’s health-related quality of life and motor performance significantly improved after the intervention.

Research with typically developing children

Hauge et al. (2014) evaluated the benefit of equine-assisted activities on perceived social support, self-esteem and self-efficacy in typically developing adolescents. Hauge and colleagues conducted a 4-month equine-assisted intervention with 80 typically developing Norwegian adolescents aged 12–15 years. Prior to the intervention, participants in both groups completed the Social Support subscale from the Resilience Scale for Adolescents, the Global self-worth subscale from the Harter’s Self-Perception Profile for Adolescents, and the short version of the General Self-Efficacy scale for adolescents. The intervention group reported a significant increase in the level of perceived social support compared to the control group. The authors posited this increase was likely due to the total experience of the intervention with the calm and friendly environment of supportive adults and peers as well as the connection with the horse, all of which provided the elements of social support to the adolescents. Contrary to the authors’ predictions, the intervention did not influence general self-efficacy or self-esteem. The authors reasoned that as a measure of general self-efficacy was used, it was ‘difficult to detect change in such a broad measure-ment’ (p. 15). Interestingly, although the authors suggested that self-esteem was related to social support, they indicated this finding was in line with the results from previous studies such as Ewing et al. (2007) and similar to the results obtained in pre-test/ post-test studies without a control group (see Cawley et al. 1994, Bachi et al. 2012). Moreover, the authors suggested as the sample of adolescents were typically developing and found to have normal levels of self-esteem before the intervention, it was unlikely the intervention would increase self-esteem.

The handful of studies examining the potential efficacy of equine-assisted therapeutic programmes so far suggest the ‘social signals from animals are less complex than from humans, and the reduced
processing load may permit a greater degree of social understanding and social interaction than would be otherwise possible’ (McNicholas & Collis 2006, p. 69). In the light of Schultz et al.’s (2007) results, the evidence base of the effectiveness of equine-assisted interventions for children who have experienced early relational trauma is growing. In a similar vein, the present study will explore the benefit of an EAT programme for children exposed to PPSU.

The current study

The over-arching aim of the present study was to explore the benefit of an equine-assisted intervention for children exposed to PPSU. While the previous studies in this area focussed on youths aged 13 and older (Ewing et al. 2007, Schultz et al. 2007, Hauge et al. 2014), the current study will be the first to explore the positive effects of EAT for younger children who had been exposed to parental substance misuse. We hypothesised, in line with the findings obtained by Schultz et al. (2007) that participation in an EAT programme would increase children’s psychological well-being. More specifically, in an attempt to extend Cuyppers et al.’s (2011) research, we predicted that children’s difficult behaviour including their emotional problems, conduct problems, hyperactivity and peer problems as reported by parent and teacher scores on the SDQ would be reduced following participation in the programme. Furthermore, in line with our prediction of a decrease in children’s difficult behaviours, we expected to find an increase in children’s prosocial behaviour upon completion of the programme.

Method

Design and procedure

This study employed a single group, pre-post open trial design (i.e. non-randomised). The time interval between pre- and post-testing was held constant at 12 weeks. The EAT programme comprised of weekly 2-hour sessions delivered for a period of 12 weeks. A qualified equine therapist implemented each therapeutic session. At baseline and post-intervention, children’s behaviours as measured by the SDQ were assessed by unblinded parents \((n = 41)\) and teachers \((n = 31)\). Parents and teachers were considered to be ‘unblinded’ as they were made aware that the child was participating in the 12-week EAT programme (Mathai et al. 2004).

Parents were asked to consent to their child’s participation prior to staff approaching children to seek their participation. Children were given a plain language statement and a consent form. Staff explained that, although their parents have provided consent for their participation, children were free to decline to participate in the research and that this would in no way affect their participation in the programme. Parental consent was also obtained prior to inviting teachers to participate in the study and seeking their consent. Ethics approval was provided by The University of Melbourne and Griffith University.

Materials and measures

Equine-assisted therapy programme

The programme consisted of one 2-hour session per week over 12 weeks. The weeks were divided into five themes: care, centredness connection, collaboration and celebration. Objectives and supporting activities were set for each week. Programme staff collected children from school mid-afternoon prior to each session and returned them to their homes at the end of the day. Each session began with food and a group discussion on how children were feeling that week. Following this, children groomed the horses and then the week’s scheduled activities commenced. The scheduled activities were combined with equine education and increased in difficulty with children engaging in ground-based horsemanship activities such as grooming in week 1 to leading the horse in week 3 and lunging the horse in week 5 to building and leading the horse through an obstacle course in week 7 and ‘painting’ the horse in week 9 to dressing up with the horse in week 11 and in week 12, children were given the opportunity to ride the horse.

A total of five therapeutic groups delivered from 2012 to 2015 were included in this study with group sizes ranging from 5 to 10 child participants. The EAT programme was staffed by an EAT trained professional and specialist child and family workers with qualifications in psychology, social work and tertiary studies in alcohol and other drug treatment.

Strengths and Difficulties Questionnaire (SDQ P 4–10 or 11–17 and T 4–10 or 11–17)

The 25-item questionnaire was developed by Goodman (2001) to assess five domains of child behaviour. In the present study, parents and teachers completed the SDQ for children aged 4–10 and 11–17 years at two time intervals: prior to the children commencing therapy and 12 weeks later at the conclusion of the programme. Of the 25 statements, five items mapped onto each of the five different aspects of child behaviour: prosocial, hyperactivity, conduct disorder, emotional sensitivity and peer problem behaviour. The conduct problems scale included statements such
as ‘often fights with other children or bullies them’. The emotional problems scale consisted of statements such as ‘often unhappy, depressed or tearful’. The hyperactivity scale comprised of statements like ‘restless, overactive, cannot stay still for long’. The peer problem scale included statements such as ‘rather solitary, tends to play alone’. The prosocial scale consisted of statements such as ‘considerate of other people’s feelings’.

At both time 1 and time 2, parents (n = 41) and children’s schoolteachers (n = 31) were instructed to read each of the 25 statements and provide a response on the basis of their child’s behaviour over the previous 6 months. Response options were presented in a 3-point Likert scale format ranging from 0 (not true) to 1 (somewhat true) to 2 (certainly true). Items 7, 11, 14, 21 and 25 were reversed scored. Summing the scores of the five items generated a total score for each subscale. A total difficulties score was calculated by summing the scores for the items in the emotional problems scale, the conduct problems scale, the hyperactivity scale and the peer problem scale.

Although the SDQ is the sole outcome measure in this study, this measure comprehensively assesses child behaviour and is known to possess robust psychometric properties. As reported by Stone et al. (2010), it has strong psychometric properties with moderate to high internal consistency for each subscale (Cronbach’s α ranged from 0.67–0.80) and good test–retest reliability over time (ranging from 0.72 to 0.83 test–retest correlations for parent-reported total difficulties). Hawes and Dadds’ (2004) appraisal of the psychometric properties of the SDQ with an Australian sample revealed parent ratings on the SDQ to be stable over a 12-month period (ranging from 0.61 to 0.77; see Hawes & Dadds 2004 for a full review).

Data analysis plan

Using the Statistical Package for Social Science (SPSS), we compared pre- and post-therapy behaviours using paired samples t-tests with parent- and teacher-reported SDQ scores. In an attempt to observe the degree of behavioural change, we calculated both Cohen’s d effect sizes (Cohen 1988), and the Reliable Change Index (RCI) in line with Jacobson and Truax’s (1991) guidelines.

Results

Sample characteristics

A total of 41 children (24 girls; 17 boys) ranging in age from 7.00 to 13.17 years (M = 10.26; SD = 1.56) took part in the 12-week EAT programme delivered by community-based child and family services in Victoria, Australia. The EAT programme was advertised in community services’ flyers and newsletters given to parents who were involved with the child and family services for drug and alcohol support. Parents/guardians nominated their child for inclusion in the programme on the criterion that their child was experiencing social problems, low self-esteem and emotional and behavioural disturbances. Eligibility was determined on the basis that children were typically developing, yet had been exposed to PPSU. Exposure was ascertained by the parents’ involvement in drug and alcohol programmes offered by the child and family services. At the time of participation, all children were living in single parent/guardian homes. (For brevity’s sake, from hereon in, parent/guardian will be referred to as ‘parent’). For those children still residing with a biological parent with a history of problematic substance use, these parents were deemed to be stable and functional and not receiving treatment at the time of the intervention.

The children’s schoolteachers were approached by the family counsellor from the child and family service and asked to participate in the study. Of the 41 teachers contacted, eight teachers did not return the pre- and post-therapy SDQs and two teachers did not return the post-therapy SDQ and thus, were excluded from the study.

Pre- and post-test total difficulties scores

We hypothesised that children’s involvement in the EAT programme would significantly increase their psychological well-being by way of reducing their difficult behaviour as reported by parents and teachers. A change (decrease) of 2.0 in SDQ scores from pre- to post-test was deemed to indicate clinical importance (Garralda et al. 2000). A preliminary check of parent-reported pre-test total difficulties indicated children’s scores ranged from 3 to 32. In comparison, parent-reported post-test total difficulties scores ranged from 1 to 31 with a decrease in the average score of 18.2 (pre-test) to 15.2 (post-test). Teacher-reported pre-test total difficulties scores for the children ranged from 2 to 29 with an average of 17.5 and post-test total difficulties scores ranged from 1 to 29 with an average of 15.4.

Our hypothesis was supported as a paired samples t-test revealed that children’s difficult behaviour decreased significantly from pre-test (M = 18.2) to post-test (M = 15.2) with parents reporting a reduction in difficult child behaviours (P = 0.008). This finding is in line with Cuypers et al.’s (2011) results...
and indicates that parents noticed a reduction in their child’s total maladaptive behaviour following their child’s involvement in the EAT programme. This result was further supported when we calculated Cohen’s effect size by dividing the difference between the pre- and post-therapy means by the standard deviation of the difference scores. The Cohen’s effect size value ($d = 0.437$) suggested that participation in the programme had a moderate positive effect (Cohen 1988) on children’s psychological well-being. According to the RCI, from pre- to post-therapy: 4 children improved, 36 were stable and 1 deteriorated.

In line with this hypothesis, a paired samples $t$-test indicated that teachers reported a reduction in difficult child behaviour from pre-test ($M = 17.5$) to post-test ($M = 15.4$), and this difference was found to be trending towards significance ($P = 0.082$). In the light of this result it is surmised that, given the sample size of teachers ($n = 31$), a lack of power might have contributed to the non-significant results obtained.

Parent-reported SDQ subscale scores

Further to our main hypothesis, it was predicted that across the five domains of child behaviour, as measured by the SDQ, participation in the equine therapy programme would lead to a reduction in children’s conduct problems, emotional problems, hyperactivity and peer problems while improving children’s prosocial behaviours. A significant reduction ($P = 0.007$) in children’s emotional problems was reported by parents from pre-test ($M = 5.4$) to post-test ($M = 4.3$). In addition, Cohen’s effect size value ($d = 0.445$) indicated a moderate effect of the EAT programme on children’s emotional problems. Using the RCI, from pre- to post-therapy: 6 children improved, 34 were stable and 1 deteriorated.

Similarly, parents reported a reduction ($P = 0.031$) in children’s hyperactive behaviour with hyperactivity decreasing from pre-test ($M = 5.2$) to post-test ($M = 4.3$). Cohen’s effect size value ($d = 0.349$) revealed a moderate positive effect of the programme. Using the RCI, from pre- to post-therapy: 3 children improved, 37 were stable and 1 deteriorated.

In contrast, children’s peer problem behaviours did decrease yet this difference was found to be trending towards significance. Furthermore, parents reported that children’s conduct problems decreased from pre-test ($M = 3.3$) to post-test ($M = 3.0$) but this difference was non-significant ($P = 0.388$). Likewise, parents reported that children’s prosocial behaviours increased from pre-test ($M = 7.5$) to post-test ($M = 7.9$), but this difference was also non-significant ($P = 0.152$) (Table 1).

Teacher-reported SDQ subscale scores

In support of our hypothesis, a paired sample $t$-test revealed that teachers reported a reduction ($P = 0.037$) in children’s hyperactivity with hyperactive behaviours decreasing from pre-test ($M = 6.0$) to post-test ($M = 5.3$). Cohen’s effect size value ($d = 0.392$) suggested a moderate positive effect of the EAT programme in reducing children’s hyperactivity. According to the RCI, from pre- to post-therapy: 1 child improved and 40 were stable.

Teachers reported a reduction in conduct problems from pre-test ($M = 3.8$) to post-test ($M = 3.2$); emotional problems from pre-test ($M = 4.0$) to post-test ($M = 3.6$); peer problem behaviours from pre-test ($M = 3.6$) to post-test ($M = 3.4$), although these were non-significant ($P = 0.283$; $P = 0.372$; $P = 0.422$ respectively). Teachers reported that children’s prosocial behaviours increased from pre-test ($M = 5.0$) to post-test ($M = 5.8$) yet this difference was non-significant ($P = 0.099$) (Table 2).

Discussion

The present practice-based study sought to determine whether participation in an EAT programme increased the psychological well-being of children exposed to PPSU. In support of our main hypothesis,

<table>
<thead>
<tr>
<th>SDQ subscales</th>
<th>Pre-test (SD)</th>
<th>Post-test (SD)</th>
<th>t(40)</th>
<th>$P$ value</th>
<th>Effect size Cohen’s $d$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduct problems</td>
<td>3.3 (2.6)</td>
<td>3.0 (2.5)</td>
<td>0.87</td>
<td>0.388</td>
<td>0.136</td>
</tr>
<tr>
<td>Emotional problems</td>
<td>5.4 (2.4)</td>
<td>4.3 (2.5)</td>
<td>2.85</td>
<td>0.007**</td>
<td>0.445</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>5.2 (3.3)</td>
<td>4.3 (2.9)</td>
<td>2.24</td>
<td>0.031*</td>
<td>0.349</td>
</tr>
<tr>
<td>Peer problems</td>
<td>4.3 (2.1)</td>
<td>3.6 (2.1)</td>
<td>1.95</td>
<td>0.058</td>
<td>0.305</td>
</tr>
<tr>
<td>Prosocial behaviour</td>
<td>7.5 (1.8)</td>
<td>7.9 (1.7)</td>
<td>1.46</td>
<td>0.152</td>
<td>−0.223</td>
</tr>
<tr>
<td>Total</td>
<td>18.2 (8.1)</td>
<td>15.2 (8.2)</td>
<td>2.80</td>
<td>0.008**</td>
<td>0.437</td>
</tr>
</tbody>
</table>

* $P < 0.05$, ** $P < 0.01$. 

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Table 1 Parent-reported mean pre- and post-intervention SDQ subscale scores, significance and effect size ($n = 41$)

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parents reported that participation in the programme had a positive effect on children’s psychological well-being. Specifically, parents reported that children’s total difficult behaviour decreased following the EAT programme. With this, parents noticed reductions in children’s problematic emotional problems such as anxiety and somatic complaints. In addition, parents observed a decrease in children’s hyperactive behaviours and attention difficulties.

Unlike parents, children’s schoolteachers did not report a decrease in children’s total difficult behaviour following the EAT programme. Although this result might be due to a lack of power, it is important to note that, like parents, teachers did observe a significant reduction in children’s hyperactive behaviour at the conclusion of the intervention. This provides further support of the positive effects of EAT for children who have been exposed to PPSU. Future research with larger samples is warranted.

The clear reductions in children’s problematic emotional behaviours and hyperactivity as reported by parents and teachers, are in line with the findings obtained by Cuypers et al. (2011) and Schultz et al. (2007) and thus suggest that interaction with horses, the equine therapists and peers might help children identify emotions and regulate their physiological arousal leading to enhanced social competence due to a reduction in stress (Pendry & Roeter 2013, Pendry et al. 2014). Moreover, as Robin and Bensel posit, interacting with animals might ‘satisfy the child’s need for physical contact and touch without fear of complications that accompany contact with human being’ (Robin & Bensel 1985, p. 14) and provide an opportunity for the child to develop self-soothing and self-regulatory behaviours and hence reduce anxiety and fear (Adams et al. 2015).

Contrary to our prediction that children’s participation in EAT would improve prosocial behaviour, it was not completely unsurprising that both parents and teachers did not notice a positive difference from pre- to post-test. Interestingly, Hauge et al. (2014) found no improvement in children’s self-esteem post-intervention and suggested this was due to their typically developing sample having high levels of self-esteem at pre-intervention. Although self-esteem and prosocial behaviour are unrelated constructs, it is plausible that a significant improvement in prosocial behaviour was unlikely as children’s pre-test scores of prosocial behaviour were relatively high.

While the illuminating results obtained in the present study add weight to the growing evidence base for EAT programmes, as previous authors have noted, it is difficult to disentangle the effects of the horse from other qualities of the experience for children (Hauge et al. 2014). For instance, it is necessary to consider that the children in our study lived in comparative poverty and were provided with a unique recreational event in an outdoor setting and this was a positive experience in itself. Any or all of these factors may have helped to increase children’s self-esteem, communication, interpersonal effectiveness, trust, boundaries, limit setting and/or a sense of belonging to a group (Frewin & Gardiner 2005, Karol 2007, Schultz et al. 2007). In addition, the positive environment of the equine-assisted programme allowed for intimate interaction with socially competent equine therapists (Pendry & Roeter 2013). The children involved in the current study were all typically developing, thus the chance for children to learn and practice adaptive coping strategies with competent social partners was increased. It is suggested that these positive interactions could serve as ‘models for subsequent interactions outside the context of intervention’ (Pendry & Roeter 2013, p. 15). Furthermore, providing children with recreational and therapeutic activities makes them more visible to service providers and creates a rare opportunity to engage parents and build a bridge between agencies and families.

**Strengths and limitations**

Most research on EAT has been conducted with adolescents (Hauge et al. 2014). Our study contributes to the field by demonstrating benefits for younger children.
children. Where some studies have used very small sample sizes, for example Cuypers et al.’s (2011) study of five children, the present study is based on a comparatively large sample of 41 children. Furthermore, this is one of few studies to report the outcomes of an EAT programme with children exposed to PPSU.

The main limitation of the present study is the lack of a randomised control group. This raises questions about the mechanism through which children’s outcomes improved. There is the possibility that participating in a recreational activity, in an outdoor setting with peers and supportive adults may account for the difference. Regardless, the within-group design allowed for examination of baseline and follow-up data, which demonstrated an improvement in children’s well-being, an important finding among a group of children at psychosocial risk. Without follow-up, it is unknown if benefits endured past programme completion. Further research utilising a randomised control group and long-term follow-up could help answer questions remaining from the current study.

A second limitation of the study is that the results are based on parents’ perception of their child’s behaviours. Although it can be argued that parents have intimate knowledge of their child and opportunity to observe their child’s behaviour, prior to, throughout and following the intervention, the parents were not blind to their child’s involvement in the programme. It is possible that parents’ expectations of the programme may have influenced their perception of their child’s behaviour, thus, potentially, over- or underestimated the effects of EAT. When designing this study, we considered the possible implications of using parental reports in the light of problematic substance use. However, a majority of the parent informants had no history of PPSU and the parents with a history of PPSU, at the time of the study, they were deemed to be stable and functioning. Furthermore, with the inclusion of the teacher informants and finding that both parents and teachers reported a reduction in children’s hyperactivity, we believe that any potential issue with the use of parental reports did not impact results.

Conclusion

The findings of the present study support the results of previous studies that highlight the positive effects of equine-assisted therapeutic programmes in promoting adaptive psychological and social outcomes for older children and adolescents. Yet, the findings of the current study are equally, if not more illuminating as this is the first study to document the positive benefits of EAT for younger children. In doing so, this study extends the knowledge and evidence base supporting the benefits of EAT and adds to the sparse literature on interventions with children exposed to PPSU.

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Ethical approval

All applicable international, national and/or institutional guidelines for the care and use of animals were followed.

Conflict of interest

None.

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