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ORIGINAL PAPER

Parent Perceptions of Psychosocial Outcomes of Equine-Assisted Interventions for Children with Autism Spectrum Disorder

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Abstract
This research explored parents' perceptions of the psychosocial outcomes of their children's experience of receiving equine-assisted interventions (EAI). Participants were the parents of six children (aged 3–14) diagnosed with autism spectrum disorder. Five semi-structured interviews were conducted and the transcript data was analysed using Interpretative phenomenological analysis. Four super-ordinate themes emerged from the analysis: (1) child's improved self-concept and enhanced emotional well-being, (2) child's improved self-regulatory ability, (3) social benefits for the child, and (4) unexpected outcomes. EAI was perceived by the parents as having several levels of psychosocial benefits for their children. These benefits may also extend to parents and family through ecopsychological and "flow on" effects associated with the children's involvement in EAI programs.

Keywords Autism spectrum disorder · Equine-assisted intervention · Equine-assisted therapy · Animal-assisted therapy · Psychosocial functioning

Introduction

Autism spectrum disorder (ASD) is a complex developmental disorder characterized by significant social and communicative deficits, as well as restricted interests and repetitive behaviours (American Psychiatric Association 2013). Largely as a result of these deficits, individuals with ASD often experience significant psychosocial difficulties that arise in childhood which often continue into adulthood, impacting their functioning in the areas of independent living, relationships and employment (Howlin et al. 2004).

A systematic review by O'Haire (2013) concluded that animal-assisted therapy (AAT) as a psychosocial intervention for ASD is an area worthy of further research. A more recent systematic review by Maujean, Pepping and Kendall (2015) concluded that there was evidence for AAT to be an effective intervention for improving, specifically, psychosocial outcomes for a wide range of populations, and further indicated for future research to explore the impacts of specific types of AAT for specific populations. Additionally, Lerner et al. (2012) argued for the importance of finding ways to produce more customized, and therefore, more optimized, psychosocial interventions. Preliminary conclusions have already been drawn regarding the conditions under which a therapy may produce positive outcomes for the target patient. In their pioneer meta-analysis on the AAT literature, Nimer and Lundahl (2007) concluded that, based on their findings, characteristics of the participant or intervention were not significant in influencing the outcomes of the intervention, yet still indicated a need to definitively explore under which conditions AAT might be most effective; for example, how different animals might influence change in different populations. In partial response to this, another systematic review on the AAT literature concluded that the effectiveness of AAT is likely limited to individuals who enjoy animals, and suggested future investigation into reasons for non-participation and possible adverse effects of AAT (Kamioka et al. 2014).

The Professional Association of Therapeutic Horsemanship International (PATH Intl.) is the global authority responsible for certifying the use and application of horses for therapeutic work (PATH 2016). According to its definitions, in order to qualify for the term 'equine-assisted

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therapy' (EAT), the program has to have specific rehabilitative goals and objectives tailored to each individual's needs, and directed by a health/human service professional. If a program does not meet these requirements, it would be defined as an equine-assisted activity (EAA), where opportunities for educational, motivational and recreational benefits are provided with the overall aim of enhancing the individual's quality of life. Positive psychosocial outcomes have been reported in children with ASD who participated in either EAT or EAA, be it equine-assisted occupational therapy (Llambias et al. 2016), hippotherapy (Ajzenman et al. 2013), therapeutic riding (Ward et al. 2013) or equine-facilitated learning (Lanning et al. 2014). Equine-assisted interventions (EAI) is the collective term used to refer to programs incorporating the role of the horse to provide rehabilitative and educational benefits to the participant (Kendall et al. 2015).

There is still a limited number of studies focusing on EAI as a credible psychosocial treatment approach for ASD, which makes it difficult at present to establish it as a mainstream form of ASD intervention (Palley et al. 2010). However, EAI has already been demonstrated to decrease levels of cortisol, commonly described as the stress hormone, in children and adolescents with disorders relating to high levels of stress, leading the authors of these studies to emphasize the importance of ASD interventions that also focus on reducing children's stress levels during sessions (Pendry et al. 2014; Yorke et al. 2013). Pendry et al. argued that their results provided a physiological indication of a causal effect of EAI on improved psychological outcomes in children experiencing clinical levels of stress-related adjustment issues, which closely aligns with the profile of ASD.

Most of the existing EAI literature has focused on physiological outcomes (Kendall et al. 2015). Furthermore, there is still limited knowledge around effective psychosocial interventions for ASD, and a paucity of EAI studies focusing specifically on psychosocial outcomes for ASD populations (Selby and Smith-Osborne 2013). Meanwhile, the literature has reported the promising potential of EAI for various populations, including ASD. Cantin and Marshall-Lucette (2011) reviewed the research on psychosocial outcomes of EAI and found that few studies exist which focus on one specific disorder, and all the studies included in their review were conducted in the United States of America. After this review, there has been only one published Australian study which evaluated the psychosocial effects of an animal-assisted intervention; the program involved a variety of farm animals (including horses) and the sample included children and adolescents with a variety of disorders (Lidgerwood and Gillingham 2012).

The present study is the first to explore parents' perceptions of the psychosocial outcomes of EAI in a group of Australian children with ASD.

Method

Procedure

After receiving approval from the university's ethics committee, advertisements were emailed to EAI organisations working with children with ASD, seeking the participation of parents of children receiving EAI in the research interviews. Parent interviews were 38 to 67 min long, and were audio-recorded. Pseudonyms were given to parents and the children mentioned in the interviews.

Participants

Participants in this qualitative research were parents of children under the age of 18 who had been diagnosed with ASD, with those children having received EAI for at least a month on a weekly basis. Focusing on a single disorder and within a child-adolescent age group allowed for a more homogenous sample.

Of the participants' 6 children, 5 had EAI programs led by a trained mental health professional and involving a mixture of both on-ground and mounted work with the horses, depending on their willingness, comfort levels and individual program goals. One child was receiving an EAI program which was entirely mounted and therefore better described as therapeutic riding.

One of the interviews involved both parents of the child (Claudia). Both parents expressed highly similar perceptions, views and opinions regarding Claudia's experience and outcomes of EAI; they were therefore treated as a single case. Another interview involved the mother of two children, both of whom were receiving EAI (Frye siblings). All the children had been formally diagnosed with differing severities of ASD and had varying degrees of adaptive functioning. Table 1 summarizes the details of the participants' children, all of whom were receiving EAI at the time of the parent interview.

Materials

This study's semi-structured interview questions were adapted from the only two qualitative EAI papers found exploring non-physical impacts of EAI for ASD samples, both unpublished. The questions were designed to explore whether, and if so, how parents perceived that EAI provided psychosocial benefits to their children, with parents asked to describe any behavioural or developmental changes they perceived in their children since receiving EAI. Parents' opinions and perspectives on different conditions in EAI, such as the qualities of the horse and approach of EAI practitioners

Table 1 Summary of details of participants' children

PAgeseudonym of child	Claudia	Shay	Aveline	Jun	Evie Frye	Jackie Frye
Participant	Father and mother	Mother	Mother	Mother	Mother	
Age	14	12	12	9	5	3
Gender	Female	Male	Female	Female	Female	Female
Level of functioning	ASD with moderate intellectual disability (IQ ≈ 40)[a] Non-verbal	ASD (Level 1)[b]	ASD with mild intellectual disability (IQ ≈ 56)[a]	ASD (Level 1/2)[c]	ASD (Level 2)	ASD (Level 1)
Age diagnosed	~2.5 years old[a]	~5.5 years old[a]	~5 years old[a]	~5.5 years old[a]	~4.5 years old[a]	3 years old
Schooling	Full-time Special Developmental School (SDS)	Part-time mainstream school	4 days in SDS-based classroom in mainstream school, 1 day in mainstream catholic school	Part-time mainstream school	Full-time mainstream primary school	Childcare
Length of EAI participation	5 years	1 year	6 years	2 years	1 year	8 months
Concurrent intervention	Speech and occupational therapy	Biofeedback, Auditory training (Samonas Sound Therapy), THRASS (teaching, handwriting, reading and spelling skills) literacy program	Speech and occupational therapy	Speech and occupational therapy, physiotherapy, Neuro-fit Systems program	Speech therapy, social skills group	Speech therapy

[a]Estimate reported by parent based on recollection

[b]Described by mother as "high-functioning."

[c]Mother did not specify; Jun was initially diagnosed with Global Developmental Delay at 15 months; no intellectual disability

in the therapeutic process, were also sought. Further questions explored to what extent parents attributed perceived changes to EAI, whether their children's EAI participation impacted the parents, and parents' overall impressions of EAI as an intervention for children with ASD.

Analysis

A qualitative approach was adopted in this study as this method allows researchers to gain in-depth understanding of each participant's unique perceptions, as well as find themes across individual narratives. Interpretive phenomenological analysis (IPA) as developed by Smith (see for example Smith et al. 2009) was utilized. Both researchers read and analysed the data.

Results

Summary of Super-ordinate and Sub-ordinate Themes

The IPA analysis yielded four super-ordinate themes and 18 sub-ordinate themes. The four super-ordinate themes were the (1) child's improved self-concept and emotional well-being, (2) child's improved self-regulatory ability, (3) social benefits for the child, and (4) unexpected outcomes. These themes are summarized in Table 2 and each is described in detail below.

Table 2 Master list of super-ordinate and sub-ordinate themes from parent interviews

Child's improved self-concept and enhanced emotional well-being
Increase in confidence and empowerment
Child seems happier
Child is less stressed and anxious
Enjoyment from participation
Fulfillment of having something "special"
Child's improved self-regulatory ability
Child is more alert and able to focus
Improved compliance and following instructions
Child regulates emotions better
Decrease in negative behaviours
Social benefits for child
Forming relationships
Learning social skills
Enhanced social engagement
Child appears more interested in socializing
Improved social interactions and conversations with child
Exposure to positive social environment
Unexpected outcomes
Parent benefits from child's participation in EAI
Feeling more relaxed
Feeling empowered and valued
Satisfaction and pride for child
Child feels more manageable
Family bonding
Multiple systems impacting child are affected
Ecopsychological benefits of EAI locations

Child's Improved Self-Concept and Emotional Well-Being

Parents' perceptions of how EAI enhanced their children's overall psychological and emotional well-being was a strong recurrence throughout four of the interviews; this theme was considerably weaker in one case (Shay), but was still present. Parents' accounts often involved descriptions of their children's sense of pride, empowerment and greater openness to challenges:

> I would say her confidence and knowing that she can handle this huge animal is of great benefit to her. [Jun]
> [Evie's] really come out of her shell, there. Like she's just smiling a lot, she's come out of her shell, more confident this year. Like she's giving things a go. [Frye siblings]

Happiness from the child's enjoyment of participating in EAI was frequently expressed. Jun's mother described how Jun's happiness from the session appeared to impact her general mood on days Jun attends EAI. 'Coming out' of themselves was emphasized by the parents of Claudia and Evie Frye, who appeared to be the most socially-timid of the group. Claudia's father related the importance of her happiness from EAI, even suggesting that this happiness formed a sort of conduit that "brought her out" of herself and made her accessible to the positive impacts of her other treatments and experiences. Evie's mother shared a similar impression:

> [Evie], especially, she's really come out of her shell, there. Like she's just smiling a lot, she's come out of her shell, more confident this year. Like she's giving things a go.

EAI was viewed by parents as augmenting their children's quality of life. The terms 'unique' and 'special' were frequently used by parents when talking about EAI. Jun's mother regarded this 'specialness' for Jun as "the biggest thing we get out of it." Further, her use of the pronoun 'we' suggested that the benefit of Jun's fulfilment extended to herself and possibly the family. Her account illustrates the magnitude of EAI's role in Jun's life:

> This has given her something that is special for her because her brother is always doing things that she wants to do, but now, she has something that he wants

> to do that is special for [Jun] so it's really good. It's given her a sense that she has her own hobby …. [Jun]

Shay's experience of EAI was quite different to the other four children. His mother reported that he was resistant to attending and sessions largely consisted of practitioners trying to engage him. According to his mother, Shay would pace around or sit under a tree a short distance from the arena where EAI sessions took place, insisting that he did not want to participate, or demanding to go home. However, on occasions when he decided to participate, his mother perceived that he enjoyed them. This pattern of behaviour was described by his mother's somewhat contradictory accounts:

> He didn't want to do it, he always complained about going and he always complains when he's there but, he seems to have a really good time once he's on the horse, and even though he says he doesn't really like riding, he likes to play the games that [practitioners] organise for him but … he complains about it all the time.
> He doesn't talk about loving the horse. It's not like he doesn't look forward to seeing the horse. But he's very um … he enjoys working with them but not riding. So he enjoys the grooming.

Shay's mother expressed not viewing his experience as a failure on the part of EAI but, rather, as due to his extremely narrow range of interests (which did not include animals), lack of motivation, general refusal behaviour towards EAI, and attachment to his indoor home environment. She remarked, "It's hard to get him engaged in most things" and later reiterated, "It was driven by me, so he was never motivated to go."

Child's Improved Self-Regulatory Ability

Most of the parents reported increased alertness, ability to take instruction, calmness, and decreased reactive behaviours. Parents related their children's improved behaviours to their increased ability to focus, which Jun's mother attributed to an enhanced neural integration facilitated by riding on the horse. Parents reported that learning to regulate internal processes during sessions generalized to other behaviours in their children.

> It definitely helped her with following instructions, with her language, listening … where she [previously] wouldn't have the patience to do that, she would have got frustrated …. Like years ago, she wouldn't have ever put the hat on, so she's definitely grown up a lot, I think, with being around the horse … [Aveline]

The children's increased willingness, as well as ability, to follow instructions was also reported.

> She hates hats, helmets, all of that. But she'll have this on because she knows she's going on the horse. That is a victory in itself. I just don't believe it. [Claudia]

The children were also seen as being calmer and more easy-going, especially during the remainder of the day when they had their EAI session.

> Certainly after the session, she's really relaxed …. She's calm and she's happy, she's easygoing so definitely I think it helps regulate … doesn't fight, so not as reactive with her brother. [Jun]

Overall improvements in the children's behaviour was confidently perceived by most of the parents. The Frye siblings' mother provided the following summary illustrating this change:

> [Evie] was a different kid last year before the intervention. This year, different kid …. Same with [Jackie]. She's only had a little bit of intervention and I can already see results.

The exceptions for these improvements were Shay, whose mother considered him as not having any "real" behavioural issues to begin with, and Claudia, whose parents' impression of changes in her overall behaviour was somewhat speculative:

> I think maybe, if we take her back [shopping] with us again, you'll see a more petite—not petite, maybe a more moderate, girl.

Social Benefits for Child

Multiple domains of social benefit for the children were reported by their parents. These included formation of relationships with the horses and with practitioners at sessions, learning of social skills, improved social motivation and quality of interactions, and immersion in what all of the parents perceived to be a positive social environment. Parents described the warm social behaviours that their children demonstrated towards the horses and related these to impressions of connection and friendship. This concept of the horse becoming a friend appears to stem from the parents' and children's perceptions of appreciation and mutuality from the horses, exemplified by the Frye sisters' mother's reasoning that the children "pick up on the vibe of the horse."

EAI also provided the opportunity for Jun, whose program was group-based, to form relationships not only with practitioners but also with other children. She began having playdates with friends she made at EAI, which her mother really valued. EAI was not viewed merely as an outlet to form relationships, but an opportunity where children can learn and practice skills with the horses important to developing social relationships:

> She's just really gentle and soft around them and, she knows where she's allowed to touch and where she shouldn't put her hands, you know, at the front of their face and all that sort of thing … learning the boundaries. [Aveline]
> He understood that he could be gentle with animals, that it works. He understood that he can make a big horse do what he wants just by being kind. [Shay]

Claudia's parents described how Claudia's strong relationship with the horse was capitalized on to develop social skills, such as when trying to dissuade her from engaging in certain behaviours. They related their explanations to her to how the horse might feel ("he gets upset"). By projecting emotions onto the social animal, EAI helped Claudia to develop understanding of emotions and practice relational skills in understanding and compromise. The Frye siblings' mother felt the social improvements in Evie, in particular, were directly resulted from EAI:

> Ever since [Evie's] been on the horse, she's able to connect with others around her there. She didn't really quite care about talking to people. But since being on the horse, she's all giggles and smiles, and she talks, she'll ask questions ….

The social atmosphere around EAI was often mentioned favourably by parents, who remarked on the positive engagement and calm, nonjudgmental attitudes of the practitioners. Parents viewed the positive social atmosphere as having an impact on their children's psychological well-being:

> That's where she's just herself, there's no anxiety there's no stress. [Evie Frye]
> Probably the most important thing was the real acceptance from the people that worked with him, more than working with the horses. They're very accepting, they're very kind, they're very nonjudgmental … made him feel very safe. [Shay]

Comparisons between EAI and other therapies were frequently and spontaneously discussed by the parents. They often emphasized the child-centredness, which, from the parents' accounts of their experiences with ASD interventions, appeared to be more possible and quite unique to EAI:

> She knows that here is a good place to be like, … you go to speech therapy or something and you're told, where you're sort of sitting there doing; where here it's more a bit more free. [Aveline]
> … so rather than have a therapist that's always saying, "No-no-no, that's not right", being positive and giving positive reinforcement …. [Jun]

Claudia's mother described her speech therapy sessions as being "too much for her." She contrasted them with EAI, stating that EAI practitioners were highly flexible if Claudia was not agreeable to the initial approach. Jun's mother also appeared to favour the child-centered approach of EAI from her remark, "Because we all learn from a positive experience."

Unexpected Outcomes

Parents also described other outcomes from EAI, especially, how their children's participation in EAI brought benefits to themselves. These came in the forms of happiness and pride from discovering another positive aspect in their children:

> I get enjoyment out of seeing her happy …. To know that she's doing something that she loves to do is great for me because, you know, it's hard for her …. [Aveline]
> We're very proud, you know … it really lifts our hearts. [Claudia]
> I'm very happy. Very happy for them, to see them good at something. [Frye siblings]
> I love horses, I love [practitioners], and just to see him functioning in another environment, was just really lovely. [Shay]

Parents also reported less difficulty managing their children's behaviour and being able to generalize skills that the children learned at EAI into other contexts. The Fryes' mother remarked that this "makes my life a little bit easier as well." Jun's mother described Jun's EAI days as "relaxing" and "nice, calm, happy" where Jun is less likely to fight with her brother. Jun's mother summarized EAI as "therapy for us as a family" and that Jun's positive experience and benefits from EAI "trickled down to the rest of us." This 'trickling down' of benefits into other areas of the child's life and functioning was similarly described by the other parents. Claudia's father made several mentions of this continuum of outcomes, suggesting that "it's all working together," "one flows into the other" and "it's a carry-on effect" that stemmed from what both of Claudia's parents perceived as her improved posture and having greater enjoyment in her life. To the parents, these "carry-on" processes were complex and far-reaching.

Even though the interviewer did not ask questions regarding the EAI location, the parents whose children's programs took place in an outdoor and natural environment commonly expressed receiving benefits from the setting, for both their children and themselves.

> I think being outside, like in this environment, I think the whole thing is just like a good thing for children, like just coming here. I, even me, coming out here I feel relaxed. [Aveline]

> The atmosphere. Because it's in this magnificent valley, it's not in some deadbeat [scoffing noise] and it's great. It's just great. [Claudia]

The Frye siblings' mother repeatedly emphasised the environment of EAI being "natural." This encapsulated the location being embedded in nature and the involvement of the horse, which she related to being part of nature as "it's a real life thing that they can make connection to." For Shay, his mother rationalized continuing to take him for EAI sessions, despite his continued resistance, as feeling that exposure to nature "helps settle people's nervous sytems" and therefore cancelled out his initial stress:

> I just wanted him to be outdoors and be in touch with some animals because he's always inside on the computer …. He's sort of not in touch with any other living creature so that's why I did it.

Discussion

The results of this research indicated that parents perceive EAI as beneficial in improving different aspects of psychosocial functioning in their children with ASD. The superordinate themes that emerged from the analysis were the parents' perceptions of their children's improved overall psychological and emotional well-being, enhanced self-regulatory skills which translated to improved behaviours, social benefits, and unexpected outcomes. Themes describing psychosocial outcomes for the children aligned with those constructs of psychosocial functioning identified by Ro and Clark (2009). The constructs defined by these authors encapsulated psychological satisfaction, community participation, executive and emotional regulation, and social motivation and skills. The outcomes described by parents in this study addressed all the above domains, suggesting a broad achievement of EAI in bolstering the overall psychosocial functioning of the children receiving it.

Increased psychological satisfaction in the children were perceived by their parents involving improved self-concept, emotional well-being and fulfillment. Whilst there is no published EAI study on an ASD sample with outcome measures relating to confidence and self-concept, similar psychological benefits were reported in children with spinal muscular atrophy, including improved confidence, self-esteem, pride, achievement and affect (Lemke et al. 2014). The children's enhanced psychological and emotional satisfaction perceived by parents in this study was previously found in two EAI studies (Kern et al. 2011; Lanning et al. 2014), but not by Jenkins and Reed (2013). Similar to the children in the present study, those in the former two received EAI for at least 3 months, whereas the program evaluated by Jenkins and Reed went for a total of 9 weeks. Length of the children's involvement in EAI may therefore contribute to intervention outcomes.

Parents described how the children's enjoyment of the horses motivated them to engage with activities and challenges set by practitioners, through which they learned the skills that translated to the range of improvements perceived by their parents. This result supports the assertion by Trotter et al. (2008) in their study on EAI for at-risk children and adolescents that, by being a rewarding stimulus, the horse motivates individuals to actively participate in their own therapeutic processes, thereby facilitating learning and behaviour change. It is therefore unsurprising that Shay's mother perceived limited positive changes as the horses had little motivating effect on him, despite his enjoyment when he finally and occasionally decided to participate. The results therefore support the conclusion by Kamioka et al. (2014) that affinity for the horse is a vital condition for EAI to elicit perceivable positive outcomes. One strongly recurring theme from the parents' accounts was the 'specialness' of the EAI experience to the children and how it enriched their lives. The psychological and emotional benefits perceived by parents may derive, in part, from the sense of 'normality' facilitated by EAI for the children and parents, who often experience limitations due to ASD. For example, Jun's mother felt it gave Jun a "sense that she has her own hobby" and the Frye siblings' mother felt EAI was where they could be "natural at something, they don't have to feel like a failure." This sense of 'normality' was similarly reported by Favali and Milton (2010) in their phenomenological study on disabled horse-riders' experiences of riding, whose participants described feelings of how riding helped them overcome the psychological constraints that came with their disabilities. Parents also frequently associated the children's improved self-concept and emotional benefits with their horses' unique presence. Their accounts described how the horses' nonjudgmental nature created, firstly, a safe context allowing their children to 'come out' of themselves and, secondly, acted as a 'bridge' allowing the children to connect with the practitioners (Bates 2002). Overall, the above findings lend support to a hypothesis presented by Kendall et al. (2014), that the horse in EAI provides a positive context that facilitates psychological and emotional benefits. In the words of the Frye siblings' mother, "It helps them reach their potential."

The development of children's self-regulatory skills have been linked to improved executive functioning, sensory processing and emotional regulation, which translate into behaviour (Russ 2014). The behavioural improvements perceived by parents in the present study comprised increased alertness, focus, compliance and reduced reactivity. Improved self-regulatory abilities and decreased negative behaviours were reported in several EAI studies (Anderson and Mentis 2016; Borgi et al. 2016; Gabriels et al. 2012; Llambias et al. 2016).

Parents perceived EAI as having social benefits for their children. Their accounts illustrated multiple levels where EAI appeared to facilitate these benefits: (1) the children's formation of trusting relationships with the horses; (2) formation of relationships with people by sharing their experiences with others at sessions; and (3) opportunities to increase their interaction with others outside of the therapeutic setting by giving them a highly motivating topic to talk about. These levels of social benefits were also described in an EAI review by Granados and Agís (2011), suggesting the phenomenon is inherent in this intervention approach. Improvements in social functioning in children with ASD have previously been reported by EAI studies (Bass et al. 2009; Ghorban et al. 2013) as well as the generalization of these improvements into other contexts (Holm et al. 2014).

Most of the parents associated their children's increases in social motivation and behaviours with their decreased feelings of stress and anxiety during EAI, which they attributed to the perceived authenticity and positivity of the horses and practitioners. Firstly, parents valued the horses' placid and nonjudgmental nature, which they felt was important in allowing the children to develop connections and friendships with them. Their perceptions have been corroborated by child-centered approaches to therapy that indicated the need for children to feel safe and not hypervigilant, or have high arousal levels, in order to be accessible during the therapeutic process (Stagnitti 2009). Taylor et al. (2009) described similar parent accounts in their EAI study, highlighting a crucial importance in the horse's ability to facilitate a non-threatening social atmosphere, particularly for individuals with ASD. Parents frequently contrasted the strong child-centeredness and positive regard in EAI to other interventions, suggesting that the parents perceived these elements as lacking in the children's relationships with other intervention practitioners.

The present study also yielded unexpected outcomes, first, the perceived positive impacts of EAI extending to parents and the family system. Much of the parents' accounts related to feelings of pride for their children, and of themselves and their children being valued during their EAI experiences. The literature on ASD interventions has noted the importance of parental empowerment and enhanced caregiver-child interactions in bolstering positive intervention outcomes (Bratton et al. 2009). Documented negative effects from the strain of having a child with ASD, such as depletion of parents' mental health and high rates of divorce, are likely to impact the child and undermine the effectiveness of interventions (Ekas et al. 2010). EAI may thereby bolster children's psychosocial outcomes through its contribution of psychological benefits to the family system. Karst and Van Hecke (2012) previously recommended that child as well as parent and family outcomes should be evaluated as outcome measures in ASD interventions. The positive effects of EAI on parent well-being and family bonding, whether intended or not, should therefore not be overlooked.

While all the parents regarded EAI as having psychosocial benefits for their children, they found it difficult to ascertain how much of the positive changes they observed in their children were clearly attributable to EAI and not to other interventions in which their children were concurrently involved. However, outcomes that most parents perceived as clearly attributable to EAI were the children's greater happiness and enjoyment, reduced stress and anxiety, and increased calmness. This distinct outcome is in accord with the results by Tabares et al. (2012), who measured decreases in the stress hormone cortisol and increases in progesterone—associated with oxytocin production and social bonding, in children with ASD after receiving EAI. Less clearly attributable outcomes were improved ability to follow instructions, compliance behaviours and social interaction. The parents' rationale was that EAI affected multiple areas related to their children's functioning, simultaneously as well as consequentially, which Claudia's father referred to as a "flow-on effect." This concept has been described in the EAI literature, whereby during EAI, the individual practices modulation and regulation of their cognitive, emotional and sensory processes, during which multiple biological and physiological systems (e.g. muscular, limbic, vestibular, ocular) are simultaneously affected, leading to educational, psychological and social benefits that translate to more adaptive behaviour patterns across different contexts (Granados and Agís 2011; Selby and Smith-Osborne 2013).

Finally, benefits from EAI relating to ecopsychology, for both child and parent, were also unexpected. Ecopsychology explores connections between the natural environment, and human health and well-being, where individuals' direct experiences of nature may lead to restorative benefits (Scull 2008). Growing rates of self-harm and mental health disorders in children across the developed world have been attributed to children's increasingly limited access to outdoor natural environments—a phenomenon which has been described as 'nature deficit disorder' (Louv 2005; Whitebread et al. 2012). The rationale behind Shay's mother's desire for him to be outdoors and in contact with animals, despite his resistance, may therefore be well-founded. Despite none of the interview questions being related to the environment, parents expressed increased relaxation and positive feelings from being in the natural setting, experiences which have frequently been reported in the ecopsychology literature (Nisbet et al. 2011). This suggests that EAI programs with natural, outdoor settings can benefit both child and parent by facilitating therapeutic psychological and affective experiences that come with being exposed to nature (Snell and Simmonds 2012). From an ecopsychological perspective, these perceived benefits may be elicited by, from parents' accounts, the valued connections formed between

child and horse, and parent and atmosphere. Such connections with nature are argued to also help to shift focus away from negative experiences and emotions, which parents' accounts indicate are plentiful in the lives of the diagnosed child and family, and instead, directs greater emphasis to enhancing relationships between people and atmosphere (Stevens 2010).

This study was not without limitations. Firstly, due to difficulties faced with participant recruitment within the timeframe required, the small sample size was likely to be insufficient to achieve saturation for emergent themes. Although prior EAI research found little moderating effect of gender (Selby and Smith-Osborne 2013), the parent of only one male child participated. It was also regretful that a single EAI modality could not be focused on due to the scarcity of participants whose children met the recruitment criteria. Combining different types of EAI in one study is a common methodological problem that should be considered when designing future EAI studies (Lee et al. 2015). Finally, the importance of parent perspectives in understanding impacts and processes of ASD interventions is already highlighted in the ASD literature (Stadnick et al. 2013). However, whilst the present research did not aim to offer statistical data, its qualitative parent-focused approach provides clinically-meaningful results supporting the effectiveness of EAI.

With regards to implications for future research, EAI studies have yet to evaluate the moderating effects of child individual differences. As the importance of tailoring interventions to meet individual needs has been highlight in systematic reviews on ASD (Seida et al. 2009), it is suggested that future EAI studies aim at identifying individual factors and determining conditions that may better inform 'goodness-of-fit' with each unique individual with ASD. Secondly, the bulk of the EAI literature surrounding ASD involves outcomes from, specifically, therapeutic riding. There is paucity of published studies evaluating outcomes of programs that involve a mix of mounted work with ground-based learning and psychotherapeutic processes. Future studies focusing on this integrated format may help develop a more rounded evaluation of EAI as a discipline. Thirdly, to more fully understand the therapeutic value of EAI, it is also important for future studies to determine the mechanisms for positive outcomes frequently reported. The present study has provided indications of possible mechanisms: the uniqueness of the horse and interaction with it, the person-centered approach of practitioners, the multi-systemic impact of EAI, and ecopsychological benefits of being exposed to nature—for those programs that take place in natural environments. Lastly, it is imperative that future studies compare the effectiveness of EAI with other interventions already established as statistically and clinically effective (what parents in this study described as "traditional therapies") (Selby and Smith-Osborne 2013). According to the four-phase model proposed by Smith et al. (2007) for validating and developing new psychosocial interventions for ASD, an essential next step in the literature is demonstrating that EAI is at least equivalent in effectiveness to an already-established intervention. The current study has contributed to addressing the first phase of this model by demonstrating "proof of concept"—that EAI as a psychosocial intervention may have therapeutic benefit for children with ASD, as perceived by their parents.

Conclusion

Despite its limitations, the present study highlights the range of parent-perceived psychosocial outcomes of EAI for children with ASD, specifically, children's enhanced psychological and emotional satisfaction, their improved self-regulatory ability which manifested into more positive behaviour patterns, and social benefits occurring at multiple levels. Unexpected themes also emerged. These were perceived psychological benefits for parents and the family system which, in turn, are likely to affect the child positively, and ecopsychological benefits from nature contact. Taken collectively, the themes reported in this study demonstrate the environment of EAI as being an enriched one, as it is socially stimulating and facilitates learning—important in the psychosocial development of children, particularly those with neurological impairments in areas of functioning like ASD. The perceived range of benefits and "flow-on" effects associated with it suggest that EAI is more than just a 'complementary' intervention but, for many children with ASD, a valuable addition to the stock of concurrent interventions. As ASD is a complex disorder that manifests differently in every individual affected by it, it is recommended that future studies examine the effectiveness of EAI alongside "traditional" approaches to expand the number of treatment options available, and better inform treatment choice and dosages to meet each individual's unique needs.

Finally, the value of the horses' and EAI practitioners' person-centeredness was consistently expressed by the parents, frequently in contrast to other intervention approaches. The horses and the person-centered practitioners working in tandem also appeared to be significant in the therapeutic process, regardless of what format the EAI program took. Parents described how the horses' perceived nonjudgmental nature and acceptance greatly contributed to creating, for the children, an atmosphere of comfort and safety. The practitioners then developed and maintained strong therapeutic alliances with the children through their non-directive child-centered approach. Whilst Jun continues to receive 'mainstream' therapies, her mother illustrated the importance of the need for greater options in terms of intervention, which was similarly expressed by all the parents in this study:

> There's so many things that works for these kids. And all the paediatrician recommended to us was occupational therapy, physio and speech, and that was it … from that point we knew that we, sort of, had to let go of 'traditional' mainstream medicine and to look for different things. So I absolutely recommend equine therapy to everyone.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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

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

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