The Impact of Animals and Nature for Children and Youth with Trauma Histories: Towards A Neurodevelopmental Theory

– Eileen Bona and Gail Courtnage

Sasha¹, a 15 year old female, diagnosed with fetal alcohol spectrum disorder (FASD), attention deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD) and reactive attachment disorder (RAD), was referred to our service because she “wasn’t engaging in therapy.” Her social worker said that she had been in and out of foster and group care all her life, and she had just lost her foster care placement. The social work agency had not been able to find a therapy to help her, and she continuously lost her living arrangements due to her addictions, stealing, AWOLing and aggressive behaviours. She loved animals, and her social worker wanted to know if we could help.

This is a story that we have heard hundreds, if not thousands, of times. There is a population of young people who have experienced serious, life-altering circumstances and who are now in need of serious, life-altering help. They have generally attended therapy with many counsellors and are now resistant to try again. In many cases, they have psychiatric teams and dedicated social workers who are doing everything to the best of their ability to get them the help they need. Still, they engage in risky behaviour, commit heinous crimes, run away from placements, and hurt themselves and those who love them.

Many of the children and youth who are referred to us from the social work sector have experienced living in several placements of foster or group care from a very young age. Often, they have suffered trauma, abuse or neglect, and are diagnosed with multiple mental health disorders including ADHD, ODD, post traumatic stress disorder (PTSD), RAD, FASD, pervasive developmental disorder

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(PDD), generalised anxiety disorder (GAD), schizophrenia, bipolar disorder, to name but a few. Along with these host of labels, they often present as low functioning. These children are said to be different neurologically. This chapter will outline a current theory of the impact of trauma on the developing brain, and attempt to provide rationale and justification for partnering with animals and nature in order to assist our neurodevelopmentally impacted children and youth.

**The Neurodevelopmental Impact of Early Childhood Trauma**

It is currently hypothesised that when children are exposed to threats to their safety, their brains’ “threat response system” is activated, and if this remains the case it results in alterations in the brain’s development which then manifests itself in changes in the child’s cognitive, emotional and behavioural functioning (Perry, 1994; Perry et al., 1995; Perry, 1997; Perry & Pollard, 1998). Specifically, Perry (2001) states that when children are exposed to fearful stimuli, they respond with either a hyperarousal or a dissociative response. If the stimuli are persistent, there is a neurobiological change to the child’s processing systems over time. If the child’s pattern of response to the threat is a hyperarousal response and the threat is persistent or intense, then the child is at risk of developing conduct disorder, PTSD and ADHD, and typically presents as hyperaroused or hyperactive. These children typically have affect regulation problems, sleep disturbances, and generalised anxiety (Kaufman, 1991; Ornitz & Pynoos, 1989; Perry, 1994) and a higher than average heart rate (Perry, 2001). If the child’s pattern is to dissociate in response to threatening stimuli, and if the stimuli are persistent or intense, then the child is at risk for dissociative symptoms such as dependence, helplessness, somatic complaints, dissociation and dissociative disorder, somatoform disorder, anxiety disorders and major depression (Perry, 2001).

Accordingly, children who have experienced traumatic events, abuse or neglect typically present
with emotional, cognitive and social deficits (Perry 2001). Perry’s research indicates that while children and youth from these backgrounds process information from the “feeling” areas of the brain, children from safe environments process information from the “thinking” part of the brain when they are challenged with abstract information, for example, listening to a lecture in school. The “safe” child can hear and think about the words of the teacher, whereas the traumatised child pays attention to her facial expressions, tone of voice and hand gestures to understand what is happening. These children are neurologically different. The traumatised child’s brain pays greater attention to the non-verbal cues of his/her environment in order for him/her to survive, whereas the “safe” child’s brain has strengthened in higher processing areas, such as understanding abstract language.

With this information, we can understand more fully why traditional therapeutic approaches such as talk therapy have been known to be ineffective with traumatised children and youth. These children require help to develop the functioning of their higher level cortical areas so that they spend less time reacting to their environments with their brainstem and midbrain functions, and more time processing information to develop healthy social, emotional and cognitive skills. For this to occur, it is imperative that their frontal and cortical brain structures are developed in ways that they can understand and internalise new verbal cognitive information (Perry, 2001). Perry claims that for these children to achieve this, they must first achieve a state of calm, which is very difficult for them. Next we articulate a model of animal and nature - assisted therapy that addresses the complexity of the issues faced by the children and youth referred.

**Theories and Research**
Prefrontal Effects of Interaction with Animals

There is much scientific research to support the neurobiological benefits of interacting with animals. A study in Japan (Aoki et al., 2012) determined that when patients with depressive disorder, who normally showed low activity in their prefrontal cortex (PFC), interacted with a dog, they had an increase in blood flow and activity in the dorsolateral region of the left hemisphere of their PFC, which is where working memory is most likely initiated. Working memory is responsible for retaining information required for complex cognitive tasks such as language comprehension, learning and reasoning. This study had a very small sample size but if in fact working with animals induces PFC activity, then it is possible that incorporating animals into the therapeutic milieu will help to activate and strengthen the PFC of our neurodevelopmentally impacted youth. The PFC is the part of the brain responsible for many of our higher cognitive processes and, as has been theorised, youth with trauma backgrounds are in need of developing these areas. But as Perry (2001) stated, to achieve this, they must be able to attain a state of “calm.”

The Biological Impact of Interacting with Animals

Many studies indicate that animals induce a state of relaxation. Friedmann, Katcher, Lynch, and Thomas (1980) were the first to publish scientific evidence for the value of animal guardianship, claiming that having a companion animal was directly related to heart health and longevity. From this groundbreaking study much research ensued, and an important finding was that animals can induce a state of relaxation for humans the moment they attract and hold our attention (Katcher, Friedmann, Beck, & Lynch, 1983). DeMello (1999) concluded that systolic and diastolic blood pressure, as well as heart rate,
decreased after a stressor if an animal was present, and it is agreed upon in the research that companion animals provide people with stress reducing social support (McNicholas and Collins, 1995; Serpell, 1996; Siegel, 1990). If being in the presence of animals provides a physiological calming effect and interacting with animals creates increased activity in the PFC, then there is good evidence to support including animals in the therapeutic process of helping children and youth with trauma backgrounds.

**Case Study**

Eleven year old Ryan has been in the foster care system the majority of his life. He was referred to the animal- and nature-assisted therapy programme because he was not engaging in traditional talk therapy, and his placement was beginning to break down due to his negative behaviours.

Ryan claimed that he liked coming to therapy because he enjoyed the animals and the peaceful setting. Many sessions were spent with animals, or walking in the pasture alongside them, with Ryan and the animals learning about each other. During a session, Ryan and I were in the chicken coop discussing how the baby chicks had been removed from their mother, because she was pecking and hurting them, and were now being raised by an “Aunt”. I took this opportunity to ask Ryan what it was like when he was very young. He quietly told me about his only memory of living with his mother. He shared how his stepfather was yelling at his mother and that it was scary for him. This was the first time Ryan had ever reportedly talked about his past, and it marked the beginning of his ability to discuss sad memories from his life. Ryan’s social worker expressed surprise at Ryan’s ability to discuss his past, something she claimed he had never been able to do in other therapeutic settings.
Nature Deficit Disorder

Louv (2005) coined the term “Nature Deficit Disorder” to highlight the fact that children and youth are spending less time outdoors and more time engaging in what he referred to as “screen magnetism”, which he defined as watching television, playing video games, and spending time on the computer. Louv states that as a result of screen magnetism and media hype, children spend less time outside in natural environments. According to his theory, parents are afraid to let their children go outside unattended due to the volume of media reports of missing children and the highlighting of heinous things that can happen to children. Louv refers to this as “fear parenting”, and goes on to state that even if children do go outside, those places are now limited due to environmentalists enforcing the protection of green spaces; for example, the strictly enforced rules pertaining to pathways and trails in natural environments so as to preserve the foliage. Louv suggested that the rise of ADHD, depression, anxiety, type II diabetes and obesity are all a result of children’s lack of natural play and disconnection from the natural world. He cited evidence of the mental, emotional, cognitive and physical benefits of being in nature, and queried what is happening to our children and to our society in our modern age. Louv’s work has inspired the “Leave no Child Inside” movement in America, whereby many states now ensure that each child receives an hour of “green space” a day where they can play naturally outdoors to enhance their health and wellness.

What about our children who already have mental health diagnoses and neurodevelopmental issues? They too, are playing outside less and engaging in “screen magnetism” more. Does this complicate their symptoms? Is there scientific evidence to support them spending more time in nature to
augment their brain’s development and decrease their clinical symptoms?

**Attention Restoration Theory**

Research indicates that being in natural settings has a positive impact on our physiology and cognitive functioning, especially for children and youth who are diagnosed with ADHD, a label applied to many hyperaroused children. Kuo & Taylor (2004) determined that spending time in nature decreased symptoms of ADHD, noted that not all children are responsive to medications, and recommended that time in the natural world may help to reduce some symptoms that they may suffer from.

One of the factors influencing these findings is the Attention Restoration Theory. This theory was developed by Kaplan & Kaplan (1989), and contends that spending time either viewing nature scenes or being immersed in nature dramatically improves our cognitive functioning. In particular, working memory and directed attention are the two cognitive skills most impacted by natural scenes, and these are the skills we need most in order to attend to classroom and work-related tasks. They are also the skills most negatively impacted in our children with ADHD. These researchers reported that just viewing nature or animal behaviour can induce a relaxing and calming effect. According to Perry (2001), this is what our children and youth with traumatic experiences require before they can begin to develop their higher processing functions.

Kuo & Taylor (2004) recommended that children with ADHD should have access to scenic views or play breaks in a natural setting to improve their mood and behaviour. As mentioned, children and youth with ADHD are in need of developing their higher cognitive functioning processes so that they can begin to process information in more abstract ways, rather than solely through their emotional-brain functioning. If spending time in nature or viewing natural phenomena has a positive impact on the
functioning of the working memory and directed attention, then it is recommendable to utilise this natural resource to help our neurodevelopmentally impacted children and youth to develop and strengthen these higher areas of functioning.

**Case Study**

Danny is a 16 year old who has been diagnosed with FASD, ADHD, and low cognitive functioning. Danny has been in foster care since he was very young due to abuse and neglect, and has showed symptoms of attachment disruption and ODD. Unable to maintain his foster care placement due to his aggressive and unpredictable behaviours, Danny then experienced several group care placements. He became involved with gangs and drugs, and was continuously challenged to maintain school attendance. His negative behaviour led people to believe that he lacked empathy and was incapable of consideration or compassion. He was referred to our animal and nature-assisted therapy programme due to a lack of engagement in other therapeutic settings, with the hope that he could be “reached”. It was winter when I started working with him, and Danny suggested going “sledding” for one of our therapeutic sessions. I wanted to build rapport with Danny as well as allow him to “just play”, hoping that I could get a sense of who he was. He wanted to try the hills at the back of the property, so we trudged through the snow that was knee deep in some areas. While walking through the snow and sledding together, Danny appeared focused and capable of discussing his life’s issues. He was engaging in the therapeutic milieu and appeared comfortable doing so. We had an enjoyable time sledding, and when it was time to return to the office I made a comment about being tired. Danny immediately insisted that I get on his sled so that he could pull me back. I was touched by his compassion, consideration and empathetic response. Had Danny and I been
in a regular office setting talking about his life, I may never have had the pleasure of experiencing his attentive ways. Danny continues to attend nature-assisted therapy, and to share details about his life as we hike or just sit and observe the herds of animals on the property. Danny appears relaxed and capable of therapeutic engagement in this setting.

— Gail Courtnage

The Dilemma of Rapport Building with Children and Youth in the Social Services Sector

Many children who were abused, neglected or moved through several placements at a young age suffer from attachment disruptions which are neurodevelopmentally based, and these children often have trouble trusting, forming positive relationships and regulating their emotions (Schuengel, Oosterman, & Sterkenburg, 2009). They often demonstrate a lower cognitive ability and may not be effective communicators. Often these children are socially and emotionally vulnerable, and experience much pain and anxiety while engaging in the therapeutic process. This is sometimes interpreted as resistance to getting help, and they are labelled as “hard to reach” rather than understood as emotionally and cognitively underdeveloped and incapable of engaging. For this percentage of our population, it is often therapeutically effective in building rapport to have animals present in therapy. It will be informative to canvass researchers’ explanations for such a trend.

The Neurochemical Basis of Attachment Theory in Animal Assisted Therapy

An astounding amount of research indicates that there may be a biological basis as to why interacting with animals can augment attachment, trust and affiliation. Engaging with animals has been evidenced to have an impact on several of our neurochemicals. For example, stroking and petting a dog has been
found to double oxytocin, decrease cortisol, increase beta endorphins and dopamine production, and decrease heart rate and blood pressure (Odendaal & Meintjes, 2003). What does this mean with regards to attachment for people with trauma backgrounds?

First of all, cortisol is a stress hormone. When children and youth who struggle with anxiety and trust issues due to negative life experiences are expected to enter into a therapeutic alliance, it can be anxiety provoking to say the least. By engaging the person with an interactive, non-threatening therapy animal, there is a neurological response upon contact that impacts both the person and the animal. Specifically found in the research with dogs (Odendaal & Meintjes 2003), the stress hormone cortisol decreases for both the human and the dog upon talking to and stroking the animal. This response can be a natural alleviation of anxiety for the client, and in the case of someone who may be hyperaroused, it can be the first step in soothing and providing some internal control over their emotional responses. When there is an increase in beta-endorphins in our brains, we either experience an absence of pain sensations or an increase in pleasurable feelings such as excitement or exhilaration (Sprouse-Blum, Smith, Sugai, & Parsa, 2010). If being in contact with an animal provides pleasurable feelings in a situation which may be perceived as stress provoking or uncomfortable, then it seems reasonable to believe that having an animal in the therapeutic setting could be valuable in helping trauma survivors cope with the difficulty of treatment. Dopamine is a chemical that stimulates us, and provides a surge of much needed energy for us to achieve important goals (Missale, Nash, Robinson, Jaber, & Caron, 1998). It is another feel-good neurochemical which is increased when we come into contact with animals, and again this fact provides support for animals in therapy with people who have had tremendously negative life experiences and encounter difficulties in relationships. It may also help people with dissociative or depressive symptoms, as it may provide feelings of motivation.
The findings for an increase in oxytocin upon contact with animals is perhaps the most important evidence to support animals in therapy for people who may have attachment disruptions resulting from trauma and abuse backgrounds. Oxytocin is said to play a role in commitment and love (Mendelson & Baggot, 2007), and although the relationship between emotion and oxytocin release is not completely understood, it is believed that oxytocin plays a role in affiliation. According to Kosfeld, Heinrichs, Zak, & Fischbacher (2005), oxytocin stimulates feelings of trust. If this, in fact, is true and contact with animals stimulates the release of oxytocin in our brains, then perhaps animals in therapy can biologically assist people with attachment disruptions to form connections and relationships through enabling feelings of trust and affiliation, which can then become a platform for therapist rapport. On another note, interacting with animals decreases heart rate and blood pressure. Would interacting with animals assist people in a hyperaroused state to become calm, and relax enough so as to drop their defensive or seemingly defiant stance in therapy?

Case Study

While working as the Children’s Mental Health Therapist in a community agency I met Sean, a 14 year old male who, along with his mother, had been victims of extreme domestic violence perpetrated by his father. His mother was able to finally leave her abusive husband, taking her three children with her. To ensure their safety, she moved to a far away location. Sean, typical of many teenaged males, was not keen on accessing counselling and talking about his feelings. My saving grace was my 8 year old golden retriever Raz, and Sean’s love of dogs. Sean and Raz developed a reciprocal friendship, with Sean providing the “must-have” affection and Raz seemingly providing a state of calm for Sean. Often, I would leave Sean responsible for Raz in the waiting area (our administrative support person kept an eye out for them) for ten
minutes, while meeting with his mother before seeing him. Raz did not play any other role in sessions with Sean other than being a companion animal and providing emotional safety. The importance of having Raz present was drilled home in one session when Sean stated that he would not talk to me if Raz was not present. While I was confident that he meant what he said was confirmed when Raz was not able to attend one day, and Sean stuck to his word and did not engage with me for the entire hour. It took many sessions with Raz present for Sean to finally feel comfortable and safe enough to open up about the abuse in his home, and his varied feelings and thoughts. I believe he would not have been able to do so without the help and support of Raz.

— Gail Courtnage.

Learning Theory

Learning Theory states that the more we find something reinforcing the more we will do it, and the more we do it, the better we become at it. Perry (2001), and Buonomano and Merzenich (1998), state that while the brain has a plasticity and can develop over the course of our lives, the areas which develop are dependent on our usage of them. Perry (2001) characterises this as brain development being essentially “use-dependent.”

Brickel (1982) claims that having an animal present in therapy provides the motivation for people to attend even though the session is anxiety provoking, elicits a fear response, and perhaps triggers the hyperarousal or dissociative responses recognised in trauma survivors. According to Brickel, if the animal’s presence allows for a person to attend therapy enough times they will learn that
they can be calm and in control of their anxiety, and this will eventually result in its extinction.

It appears that animals do provide a motivation for some people to attend a therapeutic setting, particularly children and youth, due to their natural affinity with animals. It also appears that the animals provide a sense of calming and comfort for people in the therapeutic setting, perhaps due to the neurochemical changes that occur when we interact with animals, as mentioned earlier. This exposure to the animals in what is a usually anxiety-provoking situation is very possibly influencing the emotional neurodevelopment of the therapy recipients, allowing them to control their anxiety and strengthen parts of their higher brain functions so that they may be able to learn to generalise this skill. Along these same lines, if the animal-assisted therapist provides repeated opportunities to learn and practice empathy, nurturance, healthy social skills, safe relationships and various other skills while engaging the client in something that is reinforcing for them, we theorise that the therapy recipient can experience a change in the neural structures of the brain impacting their social, emotional, cognitive, behavioural and physiological functioning.

It will be helpful to explore what it is about our relationships with animals that may be responsible for the physiological changes that apparently occur when we are in their presence.

**Biophilia Hypothesis**

The theory most often cited for this phenomena is the Biophilia Hypothesis. The term biophilia was coined by psychoanalyst Erich Fromm (1973), who defined it as the passion that we as a species have for life and living things. The biologist Edward Wilson (1984) again used this term when describing our human affinity for all living things, hypothesising that due to human evolution occurring with animals in natural settings, we are genetically predisposed and neurologically wired to pay attention to animals and
plants due to our dependence on them for survival. Wilson hypothesises that as a species we have a deeply rooted affinity for all living things, and that we are influenced cognitively and behaviourally by them. For two decades, Wilson has been articulating that animals and nature have a beneficial impact on our health and wellbeing, and his compelling arguments have elicited much of the research on the impact of animals and nature on our health. The biophilia hypothesis is often cited as being a foundational theory for the implementation of animals and plants into the therapeutic regime. If nature and all its inhabitants have a positive influence on our emotions, cognitions and behaviours, then it makes sense to include them in assisting those with severe mental health issues, developmental disabilities and trauma backgrounds.

**Animals as “Transitional Objects?”**

It has been stated in the literature that animals in therapy become “transitional objects” (Katcher, 2000; Levinson, 1984; Triebenbacher, 1998), meaning that they serve as a bridge to forming relationships with people. If the therapist is keenly aware of the sensitivity of the client’s needs and allows them to engage with the therapy animals on their own terms safely, it is possible that the client may form an alliance with the therapist through their interactions with the therapist’s animal. Does this make the animal a “transitional object” for forming a relationship to a therapist? I believe that animals are integral to the therapeutic process rather than stepping stones to therapeutic progress. They are our co-counsellors in that they are playing a vital role in the success of therapy, not just by augmenting a therapeutic relationship, but also by every other attribute they bring to therapy. As a result, they must be viewed and treated as valuable players in the therapeutic alliance, and should never be referred to as “objects”, “tools” or other terms indicative of something we “use” to do our work.
Conclusion

As indicated, many of our children and youth in the social services sector are neurologically different as a result of their life experiences. These children and youth are operating in hyperaroused or dissociative states, and are in need of assistance to develop skills to regulate their emotions and develop their higher brain functions. They often cannot comprehend, or be present enough, to process information in ways that other children can. This fact often creates a barrier to helping them and at times, as support workers, case managers and clinicians, we are at a loss as to how to reach them. Emotionally, they may appear distant or hard to reach, and behaviourally they may be harmful to themselves and others.

Research indicates that the reasons for this are organic in nature, and that these children require a different approach. As professionals trying to help them, what can we do at a practical level?

We can find out what they are passionate about, what they are interested in, what they love, and we can thereby engage them in a process that can be healing for them. Most children and youth have an innate love for animals, and many who have experienced negative life circumstances appear to trust and engage with animals far more readily than with their fellow humans.

Neurodevelopmental theories state that we need to allow for these children to “calm” in order for them to develop their higher cognitive processes, and to be able to return to functional living. Scientific research provides evidence that viewing or being immersed in nature and interacting with animals influences positive biological and neurochemical changes. These changes are said to decrease stress hormones and ADHD symptoms, increase feelings of trust, happiness and motivation, and allow opportunities for therapeutic rapport and learning.

The biophilia hypothesis, attachment, learning, attention restoration and many other foundational
theories support animal and nature-assisted therapies. There are more and more studies being conducted on the biological impact of animals and nature due to the obviously profound impact they appear to have on our overall health and wellbeing.

Due to the significant body of evidence and knowledge substantiating the positive influence of animals and nature on our emotional, cognitive and social development, it makes sense to engage our trauma-impacted children and youth with animals and nature. Of course, this is only recommended if they have an affinity for animals, are not allergic to them, or frightened by them. There are many ethical concerns inherent in animal and nature-assisted therapies, and these should be researched before any application is recommended.

Whether the children and youth who attend our programme do so due to the neurobiological effects of animals and nature, or simply because their love for animals provides their motivation to return, we don’t exactly know. However 80 per cent of our programme participants who did not successfully engage in other therapeutic mediums before coming to us stayed with us long enough to eventually attain stability in their placements, maintain their school attendance and participation, and begin to process and resolve their negative life experiences.

Whatever happened to Sasha? She’s 20 years old now, and has lived independently in her apartment for a year. She has held a CAN$32 per hour job as a cleaner for nine months, and has raised a puppy to healthy adulthood. She attributes much of her success to a mini horse named TeddyBear and her time spent with him. She claims that being able to “just be” with him provided her with a sense of peace that she hadn’t found elsewhere, and it helped her choose between her street life and healthy living. Sasha is one of many examples of youth who are struggling to get help but who just
cannot engage in traditional methods of therapy. Animal and nature-assisted therapy is life changing and valuable for many.

Notes

1. All children’s names have been changed for the purposes of this chapter.

References


*Psychological Reports, 50*(1), 71–4.


Psychiatric Press.


