

# **The Benefits of Dogs for Children with Autism Spectrum Disorder**

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### Abstract

Autism Spectrum Disorder (ASD) is a condition that primarily affects neurological development, causing decreased social aptness, diminished executive function, and abnormal sensory processing, among many other characteristic symptoms. Additional problems that often accompany ASD include anxiety disorders, depression, and attention deficit hyperactivity disorder (ADHD). Canine assisted animal therapy is one non-pharmacologic therapy option that has been researched for children with ASD to improve their social, psychological, mental, and other difficulties. Studies thus far have shown positive results in children with ASD who have dogs as pets or access to therapy dogs, including improved social functioning, decreased anxiety, overall improved behavior, and increased responsibility and task completion.

## **The Benefits of Dogs for Children with Autism Spectrum Disorder**

Autism Spectrum Disorder (ASD) is a common developmental disorder that can affect an individual physically, neurologically, and socially. In social environments, social cues can often be missed, and misperception of self and others is a common occurrence (Forgeot D'arc, 2016). Additionally, social anxiety is typical for an individual with ASD, which can further interfere with their ability to connect with others (Augustyn & von Hahn, 2020). Studies have suggested individuals with ASD can benefit from having animal assisted therapy or a pet, especially a dog, in order to reduce anxiety and improve socialization (Grigore & Bazgan, 2017). In addition, animal assisted therapy and pet therapy interventions have yielded increased adaptability, executive function, empathy, and several other benefits related to common traits of ASD (Hall et al., 2016). This literature review will examine the difficulties experienced by children with ASD and relate them to the findings of existing research using dogs, including the extent of changes and improvements seen, various indirect benefits, and potential explanations.

### **Background**

ASD is a neurological developmental disorder that is most commonly diagnosed in young children with variation in onset and severity of delays. A distinguishing clinical feature of ASD is social awareness and interaction impairment. Children with ASD can range from complete lack of interest in social interactions to interest that is not acted out in a culturally acceptable way. Individuals with ASD experience poor self-perception and an inability to understand verbal and nonverbal communication. Consequently, for those who have an interest in relationships, social deficits significantly limit their ability to effectively socialize with their peers, which may lead them to further detach from their peers out of frustration. Therefore, developing long term friendships is particularly difficult for children with ASD. Alternatively,

some children with ASD may prefer social isolation due to the lack of discomfort around peers, so they do not attempt to socialize at all (Augustyn & von Hahn, 2020). For autistic individuals, social interaction is difficult and stressful, which can lead to social withdrawal, fewer friendships, and a reduced quality of relationships they do have (Schuwerk et al., 2019).

In ASD, one factor that contributes to poor social judgment is a significantly limited ability to discern emotions portrayed on the faces of other people. Social judgments by definition require attributing traits to an individual based upon perceived behavior. Facial social judgment involves intuition that leads to an overall impression of the person before any interaction has taken place. Since individuals with autism often incorrectly analyze faces to begin with, inaccurate social judgments are likely to follow, which further contribute to clumsy social interactions with missed cues. A study sought to confirm this, theorizing that atypical social interactions seen in individuals with ASD are related to limited sensitivity to facial perceptual cues. Participants with ASD were instructed to interpret images or synthetic faces by making facial social judgments. When tasked with selecting which face appeared kinder out of sets of two pictures, the individuals with ASD consistently showed atypical social judgment (Forgeot d'Arc et al., 2016). The same study also identified that hindered social judgment in individuals with ASD is a factor in social vulnerability that is commonly seen in this population. Most individuals with ASD will experience some kind of social distress in their lifetime, especially during childhood and adolescence. Furthermore, there is an increased likelihood of bullying, victimization, and abuse in individuals with ASD. While atypical facial social judgment is something that typically developing individuals find natural, its hinderance in ASD individuals can contribute to social deficiencies as well as safety concerns (Forgeot d'Arc et al., 2016).

Another issue frequently seen in children with ASD is difficulty in the school setting. One of the causes of this is impaired executive function, which means establishing and fully completing tasks is difficult for them. This hindrance in cognition can make success in school and any form of independence very challenging (Augustyn & von Hahn, 2020). Additionally, the social communication delay of children on the autism spectrum has been linked to increased school absences. Various underlying reasons may play into school absences; however, whatever the reason, decreased regular attendance in the classroom can increase anxiety and further impede learning. Social struggles have also been associated with peer conflicts and decreased friendships. Therefore, the social aspect of school alone may create stress and difficulty thriving. For most children, the school classroom is a safe environment that combines learning with fun and friendships with peers, but unfortunately children with ASD often do not get the same experience (Becker et al., 2017).

Social delays in autism are primarily brought about by differences in cognition and can be worsened by comorbidities. For instance, autism causes challenges with both verbal and nonverbal communication and has also been correlated with hearing and visual impairment, emotional regulation problems, and difficulty with time perception. As much as 20-40% of ASD children also have intellectual disabilities. One research study identified three key distinguishing factors that individuals with ASD struggle with, including mentalization, executive function, and central coherence. Mentalization is the ability to understand others' and one's own thoughts, emotions, and intentions and how they affect actions. Secondly, executive function is the ability to plan and complete complex sets of actions independently. Lastly, central coherence is the ability to see a big picture by putting parts together in relation to a whole concept (Byström et al., 2018).

Decreased mentalization is a particularly spiraling impairment for children with autism. Any mentalization that children with ASD develop is typically through logic, as research has shown that autistic children pass mentalization tests through linguistics instead of intuitive social ability that typically developing children acquire around age four. Mentalization is developed and strengthened by interactive social experiences throughout childhood. Therefore, ASD children have a much more difficult time attaining mentalization and social intuition because their instances of socialization are qualitatively and quantitatively diminished compared to those of typically developing children. As a result, their ability to connect with and understand peers is further inhibited by nature of their social and cognitive deficit (Byström et al., 2018).

Executive function typically develops and matures as an individual grows up and has more life experiences. Mentalization plays a role in executive function development, as self-perception and organization of one's own thoughts and behaviors are important for structuring tasks and increasing in independence. While children are growing, confirmation and support from parents or caretakers is another key component of executive function development. However, children with ASD are less receptive and closed off to change, making these interactions difficult and further hindering the progression of executive function development (Byström et al., 2018).

Impaired central coherence is another difficulty that children with ASD commonly experience. A limited central coherence essentially means what is simply *connecting the dots* for the majority of society can range from difficult to impossible for individuals with ASD. This cognitive impairment can contribute to confusion and missed social cues, strain in relationships, and inaccurate perceptions of self and the environment. While typically developing children

may be able to link information to wholes and see the big picture, individuals with ASD may live in a world of unrelated details (Byström et al., 2018).

### **Common Comorbidities**

As with most conditions, typically ASD is not the only disorder individuals experience. Many children with ASD are often either misdiagnosed with attention deficit hyperactivity disorder (ADHD) or eventually diagnosed correctly with both ASD and ADHD (Augustyn & von Hahn, 2020). In addition to ADHD, anxiety disorder is another very common comorbid condition for children with ASD, with some research showing 42-55 percent prevalence of anxiety for individuals who have already been diagnosed with ASD. Depression and impaired executive function are also commonly identified in this patient population. Anxiety and depression in addition to ASD may cause noticeable diminished desire to make efforts to interact with other people or heightened sensitivity to any environmental triggers (Augustyn & von Hahn, 2020).

Given the statistics of ASD children being more likely to experience depression, anxiety, and mood problems than typically developing children, solutions and aids have been sought to decrease the severity. One study attempted to utilize canine animal assisted therapy to discern whether this intervention led to any decrease in depression, anxiety, and mood problems in children with autism. ASD children in the study participated in a twelve-week social skills training program with therapy dog interactions interwoven. The research identified incorporating dogs into the social skills training significantly reduced the children's feelings of depression, isolation, and ineffective socialization, as reported by both the teacher and the children participating (Becker et al., 2017).

### **Socialization**

In addition to psychological ailments, canine pets and therapy dogs have also been utilized for the purpose of promoting social skills in children with ASD. Given the high prevalence of ASD and significant clinical manifestation of decreased social skills that come with ASD, dogs have been one of many non-pharmacological therapy modalities studied by researchers in order to foster social practice. One study found some success in integrating a canine pet into the family of a child with ASD or implementing animal therapy. Children with ASD were observed in many studies by parents and researchers to analyze their ability to establish a bond with their canine pet. Percentages of children who were noted to have established such a bond were notably high (Carlisle, 2014).

While individuals with ASD have a difficult time connecting with others, frequent interaction with a dog, whether as a therapy animal or as a family pet, seems to help children to learn how carry on an easy social interaction. There is a sense of safety that develops as a result of a bond between a child and a dog that the child may eventually be able to increasingly find and apply in human relationships. Anxiety in social interactions can be partially attributed to and worsened by the process of initiating conversation for anyone with social anxiety and particularly for individuals with ASD. Dogs offer simplified social interaction practice with less stress on verbal communication and introductions. This can create a sense of calm and a higher likelihood for an individual with ASD to feel comfortable enough to initiate an interaction with the therapy animal or pet in the future (Grigore & Bazgan, 2017).

Research has also discovered that being accompanied by a dog increases the likelihood of other individuals initiating an approach with the dog owner. Thus, more socialization can naturally occur within society simply due to the presence of a canine companion. This can be of benefit in the case of children with autism, as being with a dog can create natural social

opportunities they themselves do not even need to initiate. Additionally, the accompanying dog can serve as a social buffer and easy topic of interest in a conversation, which may significantly reduce their anxiety and allow for more practice socializing with others (Friedmann & Krause-Parello, 2018).

A study involving interactions between children with autism and a dog offered an illustration of the ease of bonding and communicating with a dog. A dog presents its emotions in a way that is easily understood based upon its behavior, which the children were able to learn and identify independently. In this study and in society as a whole, it is more socially acceptable to examine the behaviors of a dog and even process them out loud, whereas this is not socially acceptable when interacting with other people. Thus, the ability to process in this unique way helped the children to determine cues at a more relaxed rate. Additionally, repeated patterns of cause and effect interactions, such as playing fetch or tug-of-war, offer consistent and reliable feedback for a child with ASD to learn and for them to understand the intentions behind behaviors. Therefore, this study supports introducing a dog to an ASD child for the opportunity to practice understanding the behaviors of others and making social judgments (Stevenson et al., 2015).

### **Empathy**

Another factor in a child-canine companionship is the child's growth in understanding the needs of others. Taking care of a pet requires the ability to relate to another being and perceive their needs, which can be very helpful for children with ASD who typically are less able to empathize (Carlisle, 2014). In addition to empathy, canine companions produce a unique opportunity for autistic children to grow in the areas of generosity, responsibility, and patience. These character traits are useful for a lifetime, because they can be applied to relationships with

humans, from family members to classmates and teachers, to coworkers and bosses, to significant others (Sholtis, 2016).

Caring for an animal that is dependent on its owner to meet its needs helps a child with autism to look beyond their personal situation and needs and graciously seek to provide for another. Part of understanding another being's needs leads to understanding emotions and empathizing with those emotions both verbally and nonverbally. For instance, if a dog is upset due to a thunderstorm taking place, an autistic child who has been around the dog is more likely to be able to recognize that the dog is afraid, as the needs and emotions of animals are typically easier to interpret than those of humans. With successful cue perception, the child will try to calm it down. Techniques to comfort and protect the dog are also interventions that can be observed and learned by watching other individuals interact with the dog, which provides even more opportunity for the child to develop empathetic responses (Harwood et al., 2018).

### **Hospitalization**

Another study sought to determine the benefits of animal therapy for children with autism who are hospitalized due to psychiatric concerns. The behaviors of the participating ASD children were observed when given toy interventions and compared to the behaviors associated with animal-assisted activities with a dog. The results of this study showed the children not only exhibited decreased negative behaviors, but they also had positive improvements. Social-communication behaviors were significantly increased when the therapy dog was present versus the toys. Some of these behaviors included more positive emotional facial expressions, appropriate use of gestures, increased talking with those present in the room, and increased eye contact with adults and peers in their environment. These findings are particularly important in the psychiatric hospital setting for children with ASD, because improved mood, communication,

and social behaviors are helpful in treatment implementation and engaging the children more in the treatment. Therefore, animal-assisted activities with dogs in the hospital can lead to more effective psychiatric hospitalizations and improved treatment outcomes (Germone et al., 2019).

### **Lifestyle**

Physical activity and health are an additional area of concern in children with ASD. Research studies have found that over half of school-aged children with autism do not meet the daily physical activity recommendation of 60 minutes of moderate to vigorous activity every day. Most schools have periods of time dedicated to physical education in order to supplement the recommended time. However, a physical education class in a school can be an overstimulating environment with anxiety-inducing peer interaction necessary in order to participate. Consequently, due to the stressful environment, most ASD students end up avoiding the group, and therefore the physical activity. Because physical activity is something that must be relatively consistent in order to maintain aerobic fitness and muscle strength, it has been found that many children and adults with ASD have reduced aerobic capacity and muscle strength. The reduced aerobic and muscle fitness make any attempts at physical activity more difficult, which may cause frustration and a further decreased desire to be active. Furthermore, studies have shown that deficient physical activity only continues to decline as individuals with ASD grow up and age, which may contribute to health problems (Tyler et al., 2020).

Research has shown children with ASD are more likely than typically developing children to have unhealthy lifestyle habits, including higher rates of insufficient physical activity, poor diet, sleep problems, and excess screen time. The obesity rate is doubled in children with ASD, and cases of obesity continue to rise throughout adulthood. Similarly, cardiovascular diseases, hypertension, and metabolic syndrome have increased prevalence in the ASD

population due to decreased exercise and poor diet. Regarding increased exercise, diet, and screen time, parents participating in a study about habits of ASD children reported that implementing and encouraging healthy habits for a child with ASD is very difficult due to the typical response of aggressive resistance, anxiety, withdrawal, and suicidal ideation. Another barrier the parents identified was children with ASD's lack of motivation and resistance to change, which is a common symptom in autism (Bowling et al., 2019).

In the same study, when asked about different helpful strategies to encourage healthy habits and deter or resolve anxious or aggressive behaviors, many parents spoke highly of their experiences with animals. Whichever route a family decided to take, whether a pet dog, animal therapy, visiting a neighbor's pet dog, or even volunteering at animal shelters, all participating parents reported high levels of satisfaction and success in reducing stress and conflict. Some parents stated that the animals were used as a part of positive reinforcement for their child with ASD, while others also included insights on a pet dog serving a key role in maintaining healthy routines. For instance, daily walks with the dog help establish a routine of physical activity. Another noted benefit was an increase in healthy activities with the family unit, which reportedly strengthened bonding and decreased stress. Based upon the findings of this study, the involvement of animals in the life of a child with ASD can be beneficial not just for emotional and psychological difficulties, but also for physical ones. When activity is encouraged and even enjoyed by a child with autism due to the involvement of their pet, or any other animal, this reduces their risk for obesity, cardiovascular diseases, and metabolic diseases (Bowling et al., 2019).

Children with ASD may also benefit from having responsibilities related to caring for a canine pet. Dogs have simple everyday needs, such as being fed food and water, going for a

walk, and going outside to the bathroom. A family pet dog may serve as a means of enhancing independence and executive function through a care regimen with said specific tasks to preform every day. Additionally, individuals with ASD typically feel more at ease and in control when routines are established and maintained, so the daily routine for providing these needs for the dog offers some structure. Therefore, the potential benefits of a canine pet are not limited to social companionship for a child with ASD. They may also provide an opportunity to improve in task completion and independence through daily routines (Augustyn & von Hahn, 2020).

### **Physiological Factors**

Another common trait of ASD is overstimulation or hypersensitivity to different factors in the environment, some of the most common causes including loud noises and large groups of people. It is common for children with ASD to have aberrant sensory perception, with more than 90% prevalence based upon the Diagnostic and Statistical Manual of Mental Disorders (DSM – 5), published by the American Psychiatric Association (Byström et al., 2018). Aberrant sensory perception can consist of hyper- or hypo-responsiveness to certain stimuli, or even paradoxical responses. Thus, loud noises can trigger anxiety while pain may not be fully perceived, and many tactile sensations can be either overwhelming or calming. Therapy dogs, as well as pets, have shown to be a source of comfort for individuals with ASD, particularly in times of heightened anxiety or distress. An animal can be calming and provide sensory relief that feels safe and known to the child (Harwood et al., 2018). Additionally, the texture of warm fur on dogs is a unique feature that has a particularly calming effect for children with ASD. Given significant differences in sensory perceptions and reactions and occasional sensory overloads due to excess aggravating stimuli in an environment, having a therapy dog or family pet present can

serve as a sensory anchor to calm the child down when he or she focuses on it (Augustyn & von Hahn, 2020).

A study compared the physiological arousal in children with ASD to that of typically developing (TD) children in four different conditions, including reading silently, a classroom activity with reading aloud, free play with toys, and free play with animals. The aim of the study was to determine whether animals can act as social buffers to defuse anxious arousal. The results showed increased arousal for the children with ASD compared to the other children in every condition except for the free play with animals. Skin conductance response, which involves a slight increase in electrical conductivity in response to an arousing stimuli, decreased by 43% during the free play with animals condition. Therefore, the presence of animals calmed down the children with ASD and even showed measurable anxiolytic effects, confirming the researchers' theory that animals can serve as social buffers for children with ASD (O'Haire et al., 2015).

Part of the calming and anxiolytic effects of dogs can be related to science, or more specifically, to a hormonal response. Oxytocin, often called "the cuddle hormone," is a hormone that is responsible for regulating social links through its calming effect. While oxytocin is best known for its being released when a mother breastfeeds her infant or when two people embrace, it is also released in relation to therapeutic contact with animals, particularly by petting dogs. This hormone is a key factor for bonding and attachment in any relationship, and it reduces stress. Children with autism benefit from a special physical and emotional interaction with an animal due to oxytocin release, as they are significantly less likely to have these experiences with people and significantly more likely to develop a sense of trust and security from interactions with animals, especially with repeated encounters (Byström et al., 2019).

Another hormone, cortisol, which is often considered the stress hormone, may also play a role in the effectiveness of animal therapy. When individuals interact with animals, their body responds by decreasing the amount of cortisol released. As a result, decreased heart rate and overall stress are experienced. An example of this phenomenon was found in a study that showed ASD children had notably decreased cortisol levels after a service dog was brought into their house, followed by an increase in cortisol levels after the dog was removed from the house. Thus, the physiological response that children with ASD show reduces stress and is considered to contribute to relieving anxiety when both an animal and other children are present (Becker et al., 2017).

### **Negative Behaviors**

Another topic of consideration in research is behavior. A common trait of ASD that individuals often exhibit is restricted and repetitive behaviors, which are correlated to increased anger rumination and aggression. Anger rumination is a form of maladaptive cognitive-emotional processing that tends to cycle and focus on past stressors and frustrating experiences. A study found that symptoms of social anxiety in ASD individuals predicted greater amounts of anger rumination and aggressive or otherwise disruptive behaviors. The same study sought to distinguish between the anger rumination levels and tendencies of ASD children and non-ASD children with disruptive behavior disorders, with the control being typically developing children. A Likert-style anger rumination scale (ARS) was used for an objective measurement, which included four sub-scales: anger afterthoughts, thoughts of revenge, angry memories, and understanding of causes. In addition, the reactive-proactive aggression questionnaire (RPQ) was also utilized to collect data throughout the experiment. The results analysis revealed that ASD showed significantly higher levels of anger rumination compared to the typically developing

group, but similar levels compared to the non-ASD with disruptive behavior disorders group. The researchers behind this study noted the possibility of an overlapping relationship between anger rumination, emotion dysregulation, and restricted and repetitive behaviors (RRBs) that could increase the likelihood of disruptive or aggressive behaviors in children with ASD (Ibrahim et al., 2019).

### **Friendship**

While individuals with ASD struggle with social interactions and maintaining friendships, research has shown that they perceive friendships as high in value. A study was conducted to compare the responses of ASD children to typically developing (TD) to verbal depictions of friendship transgressions. These transgressions included four scenarios: failure to provide validation, failure to give help, being unreliable, and betrayal. After each scenario was described, the children were asked to rate emotional responses, their strategies in response to each scenario, and the goals behind their strategies. While the ASD children rated sadness lower than TD children, the children with ASD averaged higher verbal aggressive strategies than the TD children. Notably, the children with ASD consistently reported betrayal as the most severe transgression. This result reinforces maintaining friendships as held in high regard by ASD children, despite impaired social awareness and interaction (Bottema-Beutel et al., 2019).

Given the value children with ASD place on friendships based on the previous study (Bottema-Beutel et al., 2019), even more weight and importance can be attributed to the companionship that a dog can offer a child with ASD. Whereas the participating children responded much more emotionally to the concept of the betrayal of a peer, dogs are known for being loyal. A pet dog or canine animal assisted therapy offer a socially safe opportunity for children with ASD to experience the friendship that they so highly value without having the fear

of rejection or betrayal (Carlisle, 2014). In the long term, a special bond between a child with ASD and a dog may help the child to understand loyalty and be less closed off to peer friendships due to the anxiety of potential betrayal, but more research is necessary to confirm this possibility.

### **Schooling**

Additionally, interaction with and the presence of dogs has been found to improve psychological well-being, as well as provide specific benefits to children with ASD in school classrooms. Therapy dogs can reduce stress, promote emotional stability related to fearful and anxious perceptions of school, and help encourage these children to keep trying things that are frustrating or difficult, such as motor skills and reading. Within school, a live dog or a stuffed animal dog have been utilized for students with ASD, who showed decreased distractibility, increased attention, and increased awareness of their environment. Numerous studies have also confirmed a calming effect and a feeling of safety and security, as well as reports of competence by the parents of children with ASD. Therapy dog involvement in schools or therapy sessions has been associated with marked increases in positive non-verbal and verbal communication and cooperation. Some researchers have attributed these changes to the dog's non-threatening claim of attention in the environment, which may create a sense of calm that allows the confidence for more interaction (Stevenson et al., 2015).

Children with ASD typically have difficulties in a school classroom, a major contributing factor being anxiety over social interaction, as well as solitary and repetitive behaviors. Therefore, one study sought to determine whether the presence of a therapy dog for ASD students could decrease anxiety and increase interactions with teachers. The logic behind this experiment was based on the idea that ASD children are more likely to be motivated to socialize

when something of the child's natural interest is introduced as a variable. In successful cases, something of interest, such as Legos, draws the child in and creates a safe atmosphere for the child to learn social skills. The experiment consisted of a child with autism interacting with a dog in the same room as their teacher, while the teacher attempted to initiate interactions between the child and the dog and between the child and the teacher. Overall findings for this experiment included apparent increased comfort and eye contact. The children also consistently exhibited less repetitive behaviors and engaged more with the teacher as they became more comfortable with the dog. At the beginning of the sessions, the children would be wary of the dog and try to keep distance between them, but by the end of the session the children not only approached and petted the dog but also initiated play. As far as socializing with the teacher, the children showed increasingly positive responses and interactions with the teacher, seeming to relax significantly, initiate interactions, and sit closer to them. The findings of this study suggest the presence of a dog may be a gateway for increased connection and interaction between ASD students and teachers, increasing the overall effectiveness and social ease of education (Stevenson et al., 2015).

### **Formal Therapy vs. Family Pet**

Another area of consideration is whether family pet dogs can offer the same benefits as formal animal therapy. An experiment was conducted that created the Lincoln Autism Pet Dog Impact Scale (LAPDIS) to evaluate the effects of children with ASD having a pet dog with several external factors considered. Three main factors on the LAPDIS scale are adaptability, social skills, and conflict management, which are typical indicators of effectiveness in formal animal therapy studies. Rigidity in behavior patterns can inhibit an autistic child's ability to adapt to environmental stressors, which limits their comfort and basic ability to participate in

various activities. Participants showed overall improved adaptability but particularly in conjunction with a healthy home environment. Social skills, the second factor on the LAPDIS scale, were found to be the most increased amongst older children who were around a dog. Additionally, social skills were overall improved for all ages for those children whose parents received formal training with dogs and children with autism, and who participated in Parents Autism Workshops and Support (PAWS) workshops. Lastly, the factors for which conflict management showed the most improvement in the presence of the pet dog were older children, higher language capacity, and a longer history of dog ownership (Hall et al., 2016).

More research is necessary to directly compare formal animal therapy to family pets as far as which intervention is more effective. The main conclusion from this study was family pets can offer the same benefits as formal animal therapy for children with ASD. Family pets come with variables, such as training, temperament, parental preparation, and home environment. Acquiring a family pet may also be more of a risk because of the long-term commitment, whereas formal therapy can be discontinued at any point. Therapy sessions are brief in comparison to the ongoing presence of a family pet but more structured and intentional. Alternatively, each child with ASD is unique, so family pets can provide a different and more constant therapeutic approach that formal therapy lacks. Ultimately, the researchers suggested that families opt for whatever decision works best with their lifestyle, as both options have exhibited positive impacts on children with ASD (Hall et al., 2016).

### **Other Animals**

Another consideration in therapeutic modalities for children with ASD is whether interacting with dogs alone offer benefits, or if relating to other types of animals is also effective. A study conducted at a small farm with multiple types of animals, including horses, cows, pigs,

chickens, and dogs, noted that young children with autism were more at ease around the animals. Animal behavior is typically easier to understand simply by watching their actions carefully, because, unlike human interactions that involve a complex overlap of verbal and nonverbal communication, animals primarily communicate nonverbally. Thus, children with autism in this study showed enhanced mentalization ability based upon their interpretations of the animals' intentions. This experiment provided a unique and safe atmosphere for the children to practice interpreting and better understanding their environment. The notable increase in social perception primarily through nonverbal cues promoted mentalization in the participating children with ASD. Furthermore, the calming presence of the animals coupled with the increased ease of understanding and interacting with them likely decreased stress for the participants (Byström et al., 2019).

Additionally, while human instinct often naturally prompts the utilization of a softer and more musical tone with animals and young children, this is another cue that is often missed by individuals with ASD. Out of curiosity of any noticeable change, the therapists who were present on the farm in this study purposefully emphasized their gentle tone and incorporated more vitality into their speech. They theorized the calming environment would serve as an optimal space for transmission of the adjusted voice behavior to the children. In cases such as this one, the transmission of behavior involves the action of mirror neurons. Mirror neurons lend to observational learning that make possible the concept of *monkey see, monkey do*. Successful transmission of a social behavior would also suggest an increased perception of social cues related to the calming nature of the animals, followed by making the appropriate adjustments for the environment. When the softer and more musical tone was utilized by the therapists, the children in the study adapted a softer tone of voice when communicating with the animals as

well. The therapists and researchers inferred that the children also likely felt more comfortable in the socially safe scenario with the animals, and thus, they were more inclined and confident to practice this new social skill (Byström et al., 2019).

### **Benefits for the Family**

While many studies have identified the plethora of benefits to a child with ASD in the acquisition of a pet dog or participation in animal therapy, it is also notable that benefits also exist for that child's family. When the families of a child with ASD acquire a pet dog with hopes of the child benefiting from the overall experience, the family members also have exhibited benefits. Parents of a child with autism have historically shown heightened stress, anxiety, depression, and social isolation when compared to the parents of typically developing children or even the parents of children with other disabilities. Consequently, the effects on the parents impact the ASD child and can hinder the effectiveness of the child's interventions and treatments. A study compared the impact on primary caretakers for children with ASD who just acquired a pet dog to the caretakers without a pet dog involved. A Parenting Stress Index was utilized to measure stress seventeen weeks before acquiring the pet dog, three to ten weeks after acquiring the dog, and twenty-five to forty weeks after acquiring the dog. Furthermore, the Parenting Stress Index was subdivided into categories, including total stress, parental distress, and difficult child. The results showed significantly decreased values in all three categories for the parents in the intervention group with a pet dog (Wright et al., 2015).

The same study assessed that caregivers and parents of a child with ASD show improved adaptability in caring for the child when an informal social buffer is present. This was found to be particularly true for family pet dogs that are constantly present rather than therapy dogs that are only present during set session time periods. Additional benefits for the family include

enhanced freedom outside of the home, decreased stress for the child, and increased effectiveness of other therapy modalities. These benefits have more support for cases in which the pet has been trained to be an assistance dog. The researchers behind this study noted that pet dogs without any special training are unique beings that are not as predictable as far as effectiveness. Some studies have collected parental feedback that seem to consistently report positive feedback and perceived benefits; however, more research is needed to confirm the correlation (Wright et al., 2015).

Overall, the study showed pet dogs are beneficial for the child with ASD, the parents, and the whole family through stress reduction and improved adaptability, which allows for more opportunities for normalcy outside the home. The acquisition of the dog is also a relatively simple task given they are easily accessible and culturally acceptable. It provides easy access to an economical intervention that is personalized toward an individual child with ASD in a unique way that formal therapy may not be able to attain. In addition, it is possible that lifestyle changes that occur due to pet dog ownership, such as physical activity, more time outdoors, alterations in routines, and changes in the family dynamic contribute to stress reduction for the child with ASD as well as the parent (Wright et al., 2015).

### **Companion Animals**

Another subcategory of dogs benefiting children with ASD is companion animals. A companion animal is intended to offer physical and psychological support for its owner, and in the case of children with autism, it allows the child to form a bond and experience some of the growth and other benefits that are associated with human relationships. Research has shown children and adolescents with ASD who live with a companion animal experience greater social skills, such as assertion, as well as strengthened friendships related to the practice of

companionship with their companion animal. Parents of children with ASD often experience higher levels of stress, marital distress, and inhibited emotional coping. Previous studies had found companion animals can benefit the parents by alleviating stress and feelings of being overwhelmed, isolated, or stigmatized. The siblings and family unit can also be negatively affected by ASD, with research showing increased strain and decreased cohesion (Carlisle et al., 2020).

One study in particular examined the parent-perceived benefits of a child with autism having a companion animal. The participating parents almost unanimously reported reduced stress due to the companion animal's presence that significantly outweighed any financial burdens of ownership. The children with ASD often referred to their companion animal as their best friend, which offered parents comfort that their child had a special connection and was not suffering from total social isolation. As the child's bond with the companion animal increased, the bond and affection of the family members also increased toward the companion animal. This shared bond could alleviate tension in a family unit due to the stress of having a child with ASD (Carlisle et al., 2020).

The most common types of companion animals are dogs and cats; thus, the benefits of each type of animal were analyzed in this study. Dog owners reported greater perceived benefits, for themselves and for their child with ASD, than cat owners. However, cat ownership may be more beneficial for families of children with ASD due to reduced noise from barking, as many individuals with ASD suffer from hypersensitivities to sound. Additionally, owners of both a dog and a cat reported the greatest perceived benefits, suggesting the possibility that owning multiple companion animals can offer additional benefits as opposed to only one companion animal (Carlisle et al., 2020).

## **Benefits for Adults with ASD**

Given the plethora of research involving the correlations between ASD children and pet dogs or animal therapy, another layer of research has included the benefits of animal therapy for adult individuals with ASD. One experiment studied the effectiveness of animal assisted therapy (AAT) for adults with ASD through a randomized trial with 27 participants receiving an AAT intervention and 26 participants serving as the control group. The main components in this research consisted of self-perceived stress, social responsiveness, and psychological symptoms, as well as self-esteem. While self-esteem was not incorporated into most of the experiments involving children with ASD, it was included in this study due to the discovery that adults with autism are highly likely to experience lower self-esteem than typical adults. Lower self-esteem has a strong negative correlation to depression and anxiety that are often present in ASD (Wijker et al., 2020).

In this adult ASD experiment, data was collected for perceived stress using a five-point Likert scale from 'never' to 'very often.' The Symptom Checklist-90-Revised Instrument (SCL-90-R), was utilized to measure psychological and physical symptoms, including the following categories: anxiety, agoraphobia, depression, somatization, cognitive-performance deficits, interpersonal sensitivity and mistrust, hostility, and difficulty sleeping. Social responsiveness was measured by the Social Responsiveness Scale for Adults (SRS-A), which evaluates social awareness, social communication, social motivation, and restricted interests and repetitive behavior. Each factor was assessed using Likert scale by the both participant and the informant present throughout the study. Lastly, the Rosenberg Self-Esteem Scale (RSES) was used to determine self-esteem (Wijker et al., 2020).

Data analysis revealed AAT with dogs compared to the control group without dogs had decreased stress, depressive symptoms, agoraphobia, and social responsive impairments. Whereas other studies identified reduced stress hormone, cortisol, for children with ASD only while the dog was present, this experiment found that the reduction of stress symptoms was still evident at the ten-week follow-up for the adults with ASD who had been in the experimental group with dogs. Further experimentation was suggested by the researchers to determine the extent of long-term benefits. Also, it was noted that gender, dog ownership, and IQ were not significantly associated with the main variable outcome measurements. Additionally, the most advanced age group, 47–60, showed a negligible increase in social responsiveness deficits. Therefore, the age of an adult with ASD does not have a significant impact on the social benefit of AAT with dogs, because the adults from 18–60 in this study showed statistically irrelevant variation (Wijker et al., 2020).

The same researchers conducted another study for insight into dog-assisted therapy for adults with ASD. The aim of the study was to determine whether animal therapy is consistently effective enough to be considered for broader clinical use. Questionnaires, interviews, and treatment reports were utilized, through which participants revealed positive appraisal of the dog-assisted therapy on the grounds of improved self-insight, joy, relaxation, and physical contact with the therapy dogs. Because of these responses, as well as the consistent satisfaction and feeling of feasibility reported by participants and therapists, the researchers concluded that AAT programs have enough evidential support to be added to ASD adult treatment options for decreasing stress and improving social skills (Wijker et al., 2019).

### **Negative Effects**

While a plethora of research exists to portray the various benefits of dogs for individuals with ASD, the negative effects of canine intervention must also be considered. One study collected data from the parents of children with autism in order to gain understanding of the unique relationship between the child and the dog. Of the eleven families who participated in the study, four of them noted that their child preferred another family pet or did not develop a bond with the canine companion. Others reported concerns about their child being around their canine companion. For instance, parents described that their child often takes out his or her aggression on the dog by kicking, yelling, jumping on, or even throwing objects at the animal. These aggressive behaviors present as dangerous and potentially deadly for the canine companion (Harwood et al., 2018).

Additionally, aggressive outbursts can create a significant wariness of the canine towards the child. A strained relationship or lack of bond altogether between the autistic child and the canine companion hinder the beneficial aspects of the animal that have commonly been found in other studies. Furthermore, one mother from this study stated that the distress of the dog from aggressive behaviors of the child only added to her stress and responsibilities rather than decreasing them. Her increased stress led her to regret their family's decision to acquire a canine companion for their child in the first place (Harwood et al., 2018).

Sensory issues are a potentially challenging factor to work around for families with a companion animal for the child with ASD. In most cases, a canine companion animal is not a trained therapy dog. Therefore, the behaviors of the dog may not be predictable or as therapeutic as anticipated. Dogs that are not trained as therapy animals may have high energy levels or excess barking, both of which having the potential to overwhelm a child with ASD and cause

them to put distance between themselves and the dog or to avoid the dog completely (Harwood et al., 2018).

Another negative aspect of companion animals for children with ASD is that these animals will inevitably die. Furthermore, the dog may assume the role of an additional family member due to the close bonds that are developed. The confusion and emotional trauma of dealing with the loss of a beloved pet, especially one that served its family well by benefiting the child with ASD and the other members of the family, can be very difficult. Some parents have reported that the loss is certainly a heavy one, but the benefits greatly outweighed the difficulty of the animal's passing. Alternatively, others found the transition much more difficult as they saw their child with ASD struggle with the loss. Undoubtedly, these experiences may contribute to second thoughts on originally acquiring the animal and hesitancy toward the idea of getting a second (Harwood et al., 2018).

### **Implications for Nursing**

Nurses have a unique role in providing patient-centered care that encompasses holistic treatment and quality of life. ASD does not have a cure or standardized treatment regimen, but that should not be the end of the conversation if holistic care is truly prioritized. For patients with ASD, it is important for nurses to be aware of the options for improving quality of life for these individuals and their families. Therefore, as more research is conducted to explore the effectiveness of the use of dogs for therapeutic benefits, nurses need to stay informed and be prepared to discuss dogs and any other nonpharmacological interventions that can potentially make their lives better.

### **Further Research**

Several missing areas exist for the research topic of the benefits of dogs for children with autism. One of these is the benefits or hardships that the canines themselves may experience from relationships or interactions with children with ASD. For example, the relationship may be mutually beneficial, beneficial to the child and neutral for the dog, or beneficial to the child and harmful for the dog. It is important to consider the impact of canine intervention on the dog itself, as more research may lead to higher rates of incorporating dogs into the lives of ASD children. Another consideration for further research is more longitudinal studies to observe the long-term effects of the involvement of dogs on the lives of children with ASD. Most of the research pool on the topic consists of short-term experimental studies and integrative reviews of said studies. Therefore, more longitudinal input and diversified data would be necessary to add scientific significance to correlations between canines and various areas of improvement in children with ASD (Harwood et al., 2018).

An additional topic with an increased need for research is the difference in beneficial effectiveness between dogs and other animals. While one study (Carlisle et al., 2020) examined the differences in dog versus cat ownership, more research is necessary to confirm that dogs offer the most benefits to children with ASD. Another study (Byström et al., 2019) gave the perspective of the benefits of children with ASD interacting with several types of farm animals. While general findings for the collection of animals were gathered from the study, more could be investigated in future studies comparing the effectiveness of the different animals.

### **Limitations**

There are several limitations to the present literary review of existing research material. One such limitation is that the experiments conducted were predominantly done without the existence of a control group with which to compare the data and findings of the experimental

factors. While the data collected is significant, it would gain more relevance and reliability with parallel data of closely analyzed behaviors of children with ASD without the intervention of canine companions or animal assisted therapy. More randomized control studies would greatly contribute to the existing body of research by providing more structure and scientific evidence of the benefits and effectiveness being studied. Another limitation within the present literary review is the presence of bias in searching databases for research materials. While both positive and negative implications of dogs for children with ASD were discussed, the bias was naturally toward discovering the benefits, which could contribute to a less accurate depiction of the current body of research.

## **Conclusion**

ASD, while fairly understood, still has much to be discovered about it. Researchers have found that fostering connections between children with ASD and dogs can yield notable correlations to improvement in multiple facets of life. Social skills, such as empathy, patience, and verbal and nonverbal cues, have demonstrated improvement from interacting with dogs, whether family pets or therapy animals visited in a formal setting (Stevenson et al., 2015). Children with ASD's exposure to dogs has also shown correlations to enhanced adaptability, executive function, and conflict and aggression management (Hall et al., 2016). Common comorbidities of ASD, including depression, anxiety, agoraphobia, and mood problems, have shown decreased severity of symptoms related to the implementation of canine assisted animal therapy (Becker et al., 2017). In addition, the many benefits of dogs are not limited to children with ASD, as even adult individuals with ASD have shown improvements in social skills and alleviated anxiety (Wijker et al., 2019). Also, other studies have shown the family members of a child with ASD who has a companion animal or AAT experience improvement in stress

management and quality of life (Wright et al., 2015). More extensive research should be conducted, as the use of dogs for children with autism is a fairly new concept. However, the body of research on the benefits of dogs for children with ASD has yielded very promising and consistent data thus far.

As the research body grows on the concept with more experimentation, assuming that the findings continue in the current trajectory of more beneficial than problematic, canine pets and therapy dogs may become a more normalized clinical option recommended to children with ASD. While a cure for ASD may not exist, it is important for the sake of individuals affected and their families to explore options for easing the difficulties and improving quality of life. Dogs, whether family pets or formal assisted therapy animals, have exhibited countless benefits for children and their families.

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