



HAL
open science

Psychosocial Well-Being in Families of Autistic Children and Effect of Service Dogs: An Exploratory Study

Nicolas Dollion, Jennifer R Babka, Kelly E Pollock, Julie A Stilley, Marine
Grandgeorge, Gretchen Carlisle

► **To cite this version:**

Nicolas Dollion, Jennifer R Babka, Kelly E Pollock, Julie A Stilley, Marine Grandgeorge, et al..
Psychosocial Well-Being in Families of Autistic Children and Effect of Service Dogs: An Exploratory
Study. *Pets*, 2025, 2 (1), pp.5. 10.3390/pets2010005 . hal-04913701

HAL Id: hal-04913701

<https://hal.science/hal-04913701v1>

Submitted on 27 Jan 2025

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

Article

Psychosocial Well-Being in Families of Autistic Children and Effect of Service Dogs: An Exploratory Study

Nicolas Dollion ^{1,*}, Jennifer R. Babka ^{2,*}, Kelly E. Pollock ³, Julie A. Stilley ³, Marine Grandgeorge ⁴ and Gretchen Carlisle ⁵

¹ Laboratoire C2S—UR6291, Université de Reims Champagne-Ardenne, F-51100 Reims, France

² Sinclair School of Nursing, University of Missouri, Columbia, MO 65211, USA

³ Emergency Medicine Department, School of Medicine, University of Missouri, Columbia, MO 65212, USA; pollockk@health.missouri.edu (K.E.P.); stilleyj@health.missouri.edu (J.A.S.)

⁴ EthoS (Éthologie Animale et Humaine)—UMR 6552, CNRS, University Rennes, Normandie University, F-35000 Rennes, France; marine.grandgeorge@univ-rennes.fr

⁵ Research Center for Human-Animal Interaction, College of Veterinary Medicine, University of Missouri, Columbia, MO 65211, USA; carlislegk@missouri.edu

* Correspondence: nicolas.dollion@univ-reims.fr (N.D.); jrb7bf@umsystem.edu (J.R.B.)

† These authors contributed equally to this work.

Abstract: Service dogs (SDs) have been shown to provide multi-faceted benefits for autistic children, with some benefits also extending to family members. The main objectives of this study were to explore the relationships between psychosocial well-being, family functioning, parent anxiety, and parent–child relationships in families of autistic children, and to investigate the effects of integration of an SD. A cross-sectional approach was used to collect data from three groups of parents of autistic children: (1) families approved for an SD but waitlisted, (2) families in the training process but not yet paired with an SD, and (3) families with a child matched with an SD. Parents completed an online questionnaire including validated tools. Children’s autism-related symptoms correlated with different aspects of family experience and quality of life, and parents’ anxiety scores were related to children’s social anxiety and difficulties associated with parenting an autistic child. Family functioning was associated with children’s autistic characteristics, parents’ anxiety, and the quality of the parent–child relationship. In families of children paired with an SD, children’s autistic symptoms were related to parental attachment with the SD. These findings underscore the need for further research on the assessment and implications of autism-related symptoms for children acquiring an SD.

Keywords: Autism Spectrum Disorder; parents; family functioning; well-being; parent–child relationship; service dogs

Academic Editor: Florence Gaunet

Received: 17 November 2024

Revised: 14 January 2025

Accepted: 23 January 2025

Published: 25 January 2025

Citation: Dollion, N.; Babka, J.R.;

Pollock, K.E.; Stilley, J.A.;

Grandgeorge, M.; Carlisle, G.

Psychosocial Well-Being in Families of Autistic Children and Effect of Service Dogs: An Exploratory Study.

Pets **2025**, *2*, 5. <https://doi.org/10.3390/pets2010005>

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition with consequences on the cognitive, social, and behavioral domains [1]. ASD is a complex disorder with heterogeneous symptoms and a broad variation of impacts, with lifelong effects among individuals with the condition. Salient characteristics of ASD involve social communication and interaction differences, and restricted and repetitive behaviors and interests. Additionally, the latest version of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) now includes the frequent presence of sensory differences in the definition of ASD [1]. Co-occurring medical, neurological, or psychiatric conditions are often present

(e.g., anxiety, ADHD, epilepsy, intellectual disability), raising additional challenges to the daily functioning and quality of life of autistic individuals [2]. It is estimated that 1 in 36 children aged eight years old in the United States has ASD [3].

The impacts of ASD permeate beyond the child and affect the quality of the child's social and familial relationships. Parents of autistic children experience higher rates of stress, depression, and anxiety compared with parents of children without ASD [4,5]. Research has shown that parents' stress levels and perceived quality of life may notably vary according to the expression of specific difficulties by their autistic children, such as problem behaviors and distractibility [6,7]. Consequently, increased levels of autism-related symptoms can be associated with higher levels of parenting stress and anxiety and disrupt cohesion among family members [8,9]. However, little is known about the dynamic of those effects within families of autistic children and the effects of intervention strategies on this dynamic.

Numerous intervention strategies have been created to enhance the development of autistic children, and non-pharmacological behavioral interventions are prioritized [10]. Established and emerging behavioral interventions include story-based interventions, music therapy, picture exchange communication systems, cognitive behavioral therapy, movement-based interventions, and human–animal interaction (HAI)-based interventions [11]. The multi-faceted effects of HAI-based interventions demonstrate them to be unique and compelling in assisting with autism-related symptoms.

1.1. Autism and Animal-Assisted Interventions

Dogs are the second most studied animal engaged in animal-assisted services (AASs), with horses being first [12]. In a review of the literature, AASs were found to engage children with dogs for an average of 16 h through weekly sessions [13]. Specifically, AASs for autistic children can integrate behavioral, occupational, and speech therapy with the goals of fostering calmness, social interactions, and relationships. AASs in autistic children have been shown to produce benefits, such as increasing child engagement, increasing verbal exchanges, and decreasing social withdrawal behaviors [14–17].

1.2. Autistic Children and Service Dogs

Animal support for ASD is not limited to AASs. Thus, research also highlights the importance of service dogs (SDs) in the daily lives of autistic children. Not all families will choose to acquire an SD for their autistic child; however, for families who desire an SD, there are a variety of pathways for seeking this support, which may include self-training of a dog, training of a dog by a private and/or professional trainer or training of a dog by an SD training organization accredited through Assistance Dogs International, including training support for the recipient of the SD. SDs are defined by the Americans with Disabilities Act (ADA) as “a dog that has been individually trained to do work or perform tasks for an individual with a disability” [18]. These dogs are provided directly to individuals with various physical and psychological disabilities, including ASD, and accompany them in their daily lives to increase their functional abilities across a variety of situations and environments. SDs can perform specific tasks tailored to the individual's needs, including, for example, providing deep pressure as a calming effect, retrieving items, and preventing a child's wandering, which can aid in managing symptoms of ASD [19,20]. SDs can help reduce autistic children's symptoms and severity, improve their well-being, communication and social skills, and decrease problem behaviors [21–25]. For autistic children, SD can also provide emotional and social support, act as social catalysts, and increase responsibility [21,26]. The bond that can develop between an autistic child and an SD may be key to those benefits. The strength of the relationship between the child and the SD predicts improvements in the autistic child's symptoms, suggesting that a stronger

bond between the child and the SD can produce a greater decrease in autistic symptoms [8].

Family Functioning

SDs have been shown to provide positive outcomes for families with autistic children, such as building homeostasis and increasing the strength and stability of the family unit [27]. Incorporating SDs in families with autistic children may improve parent's feelings of competence and security [24]. The positive impact of having an SD on the autistic children's behaviors and symptoms has been shown to have a positive impact on parents' anxiety and stress, which may lead to beneficial changes in parenting strategies [8,20,28]. SDs may also contribute to families' physical and psychological well-being, including better quality of sleep, greater independence, and increased social acknowledgment [19].

However, SDs may also represent an additional burden for families, which might be of importance to consider when balancing the benefit–burden ratio in the decision-making process of whether to acquire an SD. In this decision, individual families must self-identify whether the added physical care-taking tasks, financial costs and other added responsibilities for the parent to care for the SD would outweigh the potential benefits of adding an SD to their family for their autistic child. Financial strain, animal welfare concerns, extra management, and organization may all be elements that families should consider [19,29,30]. In some cases, heightened supervision of interactions between the child and the SD, or monitoring for the child's excessive solicitation (e.g., rough movements) by the parent may be necessary [31]. Other welfare issues for the SD may include lack of adequate sleep due to frequent interruption by the autistic child, lack of adequate relief time for urinating/defecating/leisure and possible child-directed aggression toward the SD during a tantrum [32]. Furthermore, the SD may form a primary bond with the “handler” (most frequently the parent), rather than with the autistic child, introducing potential difficulties in the development of the child/SD relationship and challenges in the parent/child/SD trio [19]. For autistic children and their families to reap the favorable benefits of introducing an animal into the home and with great attention to the welfare of the SD, a match must be made between the family and the animal's characteristics—an element that SD organizations attend to vigilantly when matching an SD with a family of an autistic child [33]. Additionally, the contribution of the relationship the parent may build with the SD to the benefits they may experience from the SD's integration into the family has not been studied yet.

Further research is needed to understand the dynamic and functioning within families of autistic children, as well as the impact of an SD for autistic children, their parents and family functioning. The main objective of this study was twofold: (1) to explore the relationship between child characteristics and difficulties, and parent and family well-being and functioning in families of autistic children, and (2) to explore the impact of SDs on overall family functioning, along with parent and child psychosocial well-being, and if the parent–SD relationship relates to those benefits. Concerning the impacts of SDs on the family function, five main hypotheses were explored. (1) Autistic children's anxiety will be higher in the waitlist group compared with the training group and paired group; (2) autistic children will experience more autistic symptoms in the waitlist group compared with the training group and paired group; (3) family functioning will be higher for the paired group compared with the waitlist group and training group; (4) parents of autistic children will bond with the SD matched with their child and this attachment will be associated with the parent's evaluation of family functioning; and (5) parents of autistic children matched with an SD will have less anxiety and this decrease in anxiety will be associated with the caregiver's evaluation of family functioning.

2. Materials and Methods

2.1. Ethics

The present study was approved by the University's Institutional Review Board (identification number: 2092887) on 25 October 2022. The study methodology was fully non-invasive and conducted in accordance with the principles of the Declaration of Helsinki, revised in 2000. All parents provided their consent before completing the survey. All participating families were recruited between November 2022 and November 2023. All data were denominated.

2.2. Sample

Participants had to meet the following eligibility criteria: (1) being a parent with an autistic child aged between 4 and 18 years; (2) approved for attribution of an SD or have a child that has already been matched with an SD from the study-affiliated SD training organization and agreed to be the primary handler of the SD; and (3) English-speaking and agreed to respond to the survey. Participants were referred by the study-affiliated organization (<https://www.retrievingfreedom.org/>, accessed on 28 October 2022), which specializes in training and matching SDs with autistic children in the USA. This organization includes an optional request in its program applications and maintains a database of beneficiaries who agree to be contacted for possible participation in research. Research team members contacted potential participants through the database. Among potential participants, three families did not respond when contacted.

The final sample included 18 parents (16 mothers and 2 fathers) of autistic children (2 girls and 16 boys). Parents were aged from 33 to 62 years (mean age 43.4 ± 6.3 years), and their autistic child was aged from 4 to 18 years (mean age 9.8 ± 3.9 years). Among these children, four did not have any reported associated disorder, while the others presented various additional diagnostics (mainly ADHD, anxiety disorder, and epilepsy). Concerning ethnicity, most parents were Caucasian ($n = 15$), with one Native American parent, one Asian, and one unspecified. Concerning education and income, nine parents referred to having a college education/degree, seven as having a graduate or professional degree, and two as having a high school degree, while twelve referred to having an annual income higher than USD 75,000, five between USD 25,000 and USD 75,000, and one lower than USD 25,000. Among these families, four did not own any pet, nine had a dog(s) (not including the SD), two had a cat(s), one had both cat(s) and dog(s), and four included other species (e.g., horse, cattle, chickens, guinea pig, goats, and ducks). Finally, concerning family sizes, five families had only one child, twelve had two children, and three had three children. Among this final sample, four were on the waitlist to receive an SD, six were in the training process but not paired with an SD, and eight were already paired and had an SD integrated into their household with a delay ranging from 10.6 months to six years (mean delay since integration of 2.8 ± 1.7 years).

2.3. Design and Recruitment

This exploratory study used a cross-sectional approach to capture data at a single point in time in three different groups of parents: (1) parents approved for an SD, but on the waitlist and that have not begun training yet [Waitlist group]; (2) parents in the training process and whose autistic child was not yet paired with an SD [Training group]; and (3) parents with an autistic child who had already been matched with an SD [Paired group]. The study-affiliated organization applies a unique and specific procedure in the attribution process of its SD, by involving beneficiaries in a gradual training process of learning to handle the SD. Once the parent/child dyad has been approved, they enter and participate in the training phase for an average of 15–17 months. Local clients train twice

a month for short periods, while clients who must travel long distances to the facility train for a few days every other month (staying in facility housing), until matched with an SD. The dyads begin with a visit to the training facility and their engagement during visits gradually increases with hands-on activities with dogs training to become an SD. This extended time allows the dyads to become comfortable with handling the dogs. It also allows the dog training staff extended time to identify SD characteristics that match the parent/child dyad well.

All data were collected through a survey on the REDCap platform, a secure web-based application for research data collection. Questionnaires in the survey included different standardized and validated instruments measuring outcomes surrounding autistic characteristics and family experiences. Participants were invited to complete the survey by sending them a web link.

Data were collected at specific time points according to the parents' designated group. For the Waitlist group, data were collected from six months up to one day before involvement in the training process. For parents in the Training group, data were collected from three up to nine months during the training process. For the Paired group, data were collected from six months up to six years since the SD pairing.

2.4. Measures/Instruments

The online survey included a demographic questionnaire (DQ) created by the investigator, the Autism Impact Measure (AIM), the Screen for Child Anxiety Related Emotional Disorders (SCARED), the Autism Family Experience Questionnaire (AFEQ), the State-Trait Anxiety Inventory for Adults (STAI), and the Child Parent Relationship Scale Short Form (CPRS-SF). Finally, participants in the Waitlist and the Training group completed an open-ended question inquiring about their expectations of incorporating an SD in their household. In contrast, participants in the Paired group completed the Monash Dog Owner Relationship Scale (MDORS) and an open-ended question inquiring about their experience of having an SD in their household.

The DQ included questions about the parents' relationship to their autistic child, their age, gender, marital status, race/ethnicity, education, income, number of children, presence of pets in their household, and access to veterinary care. Demographic information about the family's child(ren) included age, gender, race/ethnicity, diagnosed conditions, and questions regarding fear of any animals and attachment to any current animal(s) in the home.

The Autism Impact Measure (AIM) is a parent-reported instrument measuring the frequency and impact of characteristics of ASD [34,35]. The AIM was specifically developed to identify changes following an intervention. It includes 41 items based upon a five-point Likert scale: frequency responses ranging from "never" to "always", and impact responses ranging from "not at all" to "severely" [34]. Items of this scale can be grouped into five subdimensions: repetitive behavior, communication, atypical behavior, social reciprocity, and peer interaction. The Cronbach alpha (α) for the total AIM score is 0.96, 0.90 for the frequency rating, and 0.95 for the impact rating.

The Screen for Child Anxiety Related Disorders (SCARED) instrument is a 41-item instrument widely and reliably used for measuring children's anxiety [36], with $\alpha = 0.90$ [37]. The instrument includes six subscales representative of anxiety disorders, including panic/somatic, generalized anxiety, separation anxiety, social phobia, and school phobia. Outcomes are measured on a three-point Likert scale, ranging from "Not True or Hardly Ever True" to "Very True or Often True".

The Autism Family Experience Questionnaire (AFEQ) is a 48-item parent report questionnaire for the measurement of outcomes of interventions on parents and family life on four domains (i.e., dimensions): parent's experience (i.e., the experience of being a

parent of an autistic child), family life (i.e., tensions and easiness within daily family life), child development (i.e., child development, understanding and relationship difficulties), and child symptoms (i.e., emotional and behavioral difficulties) [38]. Answers are related on a five-point Likert scale ranging from “never” to “always”. The internal reliability of the total score of the AFEQ is high, with $\alpha = 0.92$. AFEQ reliability, along with specific focus on four unique domains within family functioning provided the ability to seek potential significant domain correlations with dog relationships.

The State–Trait Anxiety Inventory for adults (STAI) is a widely utilized 40-item questionnaire measuring anxiety and importantly including an indicator of caregiver distress [39]. The STAI includes two 20-item scales, one measuring state anxiety (i.e., felt at that time) and the other measuring trait anxiety (i.e., usually felt). The outcomes are measured on a four-point Likert scale, with responses ranging from “not at all” to “very much so”. Internal consistency coefficients range from 0.86 to 0.95 [39].

The Child–Parent Relationship Scale—Short Form (CPRS-SF) is a 15-item questionnaire using Likert scale responses to measure the relationship quality between parents and children [40]. Items of this scale can be grouped into conflict and closeness subscales. The CPRS-SF minimized survey burden through the limited number of items, and has been reliably utilized for both mothers and fathers. For maternal and paternal conflict, $\alpha = 0.84$ and $\alpha = 0.80$, respectively.

For parents of children who have already been matched with an SD, the Monash Dog–Owner Relationship Scale (MDORS) was completed to measure the quality of parents’ relationship with the SD [41]. The MDORS is a widely used 28-item instrument using a five-point Likert scale and includes three subscales: Dog–Owner Interaction, Perceived Emotional Closeness, and Perceived Costs. The MDORS subscales allowed the exploration of potential correlations between parents’ quality of relationship with the SD with the subscales of the AFEQ, STAI and CPRS-SF. Cronbach alphas are 0.67 for the dog–owner interaction dimension, 0.84 for the emotional closeness dimension, and 0.84 for the costs dimension.

2.5. Statistical Analyses

The normality of distribution on all collected variables has been inspected using Shapiro–Wilk tests. Due to the absence of normality for several variables considered in this study, only non-parametric statistics have been applied.

Associations between variables have been investigated using Kendall’s Tau tests. First, to explore the relationship between a child’s characteristics and difficulties, and parent and family challenges, Kendall’s Tau tests were applied to investigate the associations between a child’s characteristics (AIM scores) and anxiety (SCARED scores), and parents’ anxiety (STAI scores), parent–child quality of relationship (CPRS-SF scores) and parent and family quality of life (AFEQ scores). Second, similar tests were applied to investigate relationships between parents’ anxiety (STAI scores), and parent–child quality of relationship (CPRS-SF scores) and parent and family quality of life (AFEQ scores). Finally, Kendall’s Tau tests were applied to test for the associations between children with ASD characteristics and anxiety (AIM and SCARED scores), and between parent–child quality of relationship and parent and family quality of life (CPRS-SF and AFEQ scores). To test for differences between the three groups of participants, Kruskal–Wallis tests were applied to all collected variables.

Finally, Kendall’s Tau tests were used to explore associations between parent–dog quality of relationship (MDORS scores) and all other collected variables, only for the Paired group. All statistical analyses were performed using IBM SPSS Statistics (Version 28.0). The significance threshold was set at 0.05.

3. Results

3.1. Relations Between Child’s Characteristics and Anxiety with Parent and Family Challenges

First, concerning correlations between child’s characteristics and parents’ anxiety, no significant correlation emerged between AIM scores and STAI scores (Table 1). However, concerning the child’s and parent’s anxiety, scores on the social anxiety subscale of the SCARED instrument correlated negatively with the State anxiety of the STAI instrument and with its total score. Trait anxiety scores (STAI), while not significant, tended to correlate similarly. All correlations with other subscales and the total score of the SCARED turned out to be non-significant. Thus, while the child’s ASD characteristics did not seem to be associated with the parent’s anxiety, the child’s social anxiety was associated with parent’s anxiety.

Concerning correlations of a child’s characteristics to parent and family quality of life, the AIM total score correlated positively with the total score of the AFEQ and all sub-dimensions of the AFEQ (except parental experience, with only a tendency to correlate), and the same was observed for all subdimensions of the AIM, which all correlated with the total score of AFEQ (Table 1). Investigation of correlations between subdimensions of the AIM and subdimensions of the AFEQ revealed that the child’s repetitive behaviors correlated with Family Life, Child development, and child symptoms; the child’s communication difficulties correlated with child development and child autistic symptoms scores; the child’s atypical behaviors correlated positively with all subdimension of the AFEQ; the child’s social behavior correlated with the parent’s experience, family life, and child development; and the child’s peer interaction correlated with the parent’s experience, family life, and child development. Investigation of correlations between a child’s anxiety, and parent and family quality of life revealed that the child’s symptoms dimensions of the AFEQ correlated positively with both the panic/somatic and the general anxiety subscales of the SCARED, as well as with its total score. Thus, while the child’s characteristics of ASD seem to be related to the different aspects of the family experience and quality of life, it seems that the child’s anxiety (notably panic/somatic and general anxiety) is only related to parents’ perception of their child’s emotional and behavioral difficulties (i.e., child symptoms dimension).

Finally, the conflict scores of the CPRS-SF did not correlate with any scores of the AIM and the SCARED scales (Table 1). However, closeness scores correlated negatively with both scores on social behavior and peer interaction of the AIM and positively with scores for separation anxiety of the SCARED. Thus, parents reporting sharing a closer relationship with their child had children with fewer social behavior difficulties and higher separation anxiety.

Table 1. Correlations of AIM and SCARED scores with scores on the STAI, CPRS-SF, and the AFEQ. Significant correlations are shown in bold and using asterisks (* $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$). Tendencies for correlation are in italics.

	STAI			AFEQ				CPRS-SF			
	State	Trait	Total Score	Parent Experience	Family Life	Child Development	Child Symptoms	Total Score	Conflict	Closeness	
AIM	Repetitive Behavior	0.143 <i>(p = 0.403)</i>	0.146 <i>(p = 0.403)</i>	0.172 <i>(p = 0.324)</i>	0.308 <i>(p = 0.080)</i>	0.380 * <i>(p = 0.032)</i>	0.527 ** <i>(p = 0.003)</i>	0.511 ** <i>(p = 0.004)</i>	0.449 ** <i>(p = 0.010)</i>	0.252 <i>(p = 0.149)</i>	-0.308 <i>(p = 0.080)</i>
	Communication	-0.153 <i>(p = 0.381)</i>	-0.047 <i>(p = 0.790)</i>	-0.099 <i>(p = 0.569)</i>	0.248 <i>(p = 0.158)</i>	0.265 <i>(p = 0.135)</i>	0.615 *** <i>(p < 0.001)</i>	0.374 * <i>(p = 0.037)</i>	0.395 * <i>(p = 0.025)</i>	0.020 <i>(p = 0.909)</i>	-0.275 <i>(p = 0.118)</i>
	Atypical Behavior	<0.001 <i>(p = 1)</i>	0.081 <i>(p = 0.647)</i>	0.04 <i>(p = 0.819)</i>	0.396 * <i>(p = 0.026)</i>	0.540 ** <i>(p = 0.003)</i>	0.483 ** <i>(p = 0.007)</i>	0.387 * <i>(p = 0.033)</i>	0.539 ** <i>(p = 0.002)</i>	0.170 <i>(p = 0.339)</i>	-0.273 <i>(p = 0.126)</i>

SCARED	Social Reciprocity	0.021 (<i>p</i> = 0.908)	0.076 (<i>p</i> = 0.673)	0.048 (<i>p</i> = 0.788)	0.354 * (<i>p</i> = 0.050)	0.254 (<i>p</i> = 0.164)	0.409 * (<i>p</i> = 0.023)	0.186 (<i>p</i> = 0.311)	0.418 * (<i>p</i> = 0.019)	0.062 (<i>p</i> = 0.729)	-0.410 * (<i>p</i> = 0.023)
	Peer Interaction	0.007 (<i>p</i> = 0.696)	0.096 (<i>p</i> = 0.592)	0.054 (<i>p</i> = 0.760)	0.385 * (<i>p</i> = 0.032)	0.383 * (<i>p</i> = 0.034)	0.480 ** (<i>p</i> = 0.007)	0.206 (<i>p</i> = 0.260)	0.434 ** (<i>p</i> = 0.014)	-0.082 (<i>p</i> = 0.646)	-0.357 * (<i>p</i> = 0.046)
	Total Score	-0.026 (<i>p</i> = 0.879)	0.013 (<i>p</i> = 0.939)	0.026 (<i>p</i> = 0.879)	0.319 (<i>p</i> = 0.068)	0.350 * (<i>p</i> = 0.047)	0.603 *** (<i>p</i> < 0.001)	0.487 ** (<i>p</i> = 0.006)	0.498 ** (<i>p</i> = 0.004)	0.145 (<i>p</i> = 0.404)	-0.266 (<i>p</i> = 0.128)
	Panic/Somatic	0.142 (<i>p</i> = 0.422)	0.163 (<i>p</i> = 0.359)	0.128 (<i>p</i> = 0.468)	0.246 (<i>p</i> = 0.168)	0.180 (<i>p</i> = 0.317)	0.249 (<i>p</i> = 0.117)	0.444 * (<i>p</i> = 0.015)	0.256 (<i>p</i> = 0.147)	0.081 (<i>p</i> = 0.646)	-0.027 (<i>p</i> = 0.878)
	General anxiety	0.041 (<i>p</i> = 0.819)	-0.054 (<i>p</i> = 0.760)	-0.013 (<i>p</i> = 0.939)	-0.014 (<i>p</i> = 0.939)	0.125 (<i>p</i> = 0.489)	0.061 (<i>p</i> = 0.731)	0.401 * (<i>p</i> = 0.027)	0.067 (<i>p</i> = 0.703)	0.122 (<i>p</i> = 0.492)	0.321 (<i>p</i> = 0.072)
	Separation anxiety	0.102 (<i>p</i> = 0.566)	0.054 (<i>p</i> = 0.760)	0.061 (<i>p</i> = 0.731)	0.171 (<i>p</i> = 0.338)	0.292 (<i>p</i> = 0.106)	-0.150 (<i>p</i> = 0.400)	0.049 (<i>p</i> = 0.786)	0.034 (<i>p</i> = 0.849)	-0.007 (<i>p</i> = 0.969)	0.432 * (<i>p</i> = 0.016)
	Social anxiety	0.473 * (<i>p</i> = 0.051)	0.455 (<i>p</i> = 0.056)	0.385 * (<i>p</i> = 0.029)	0.205 (<i>p</i> = 0.250)	0.306 (<i>p</i> = 0.090)	0.041 (<i>p</i> = 0.818)	0.290 (<i>p</i> = 0.112)	0.115 (<i>p</i> = 0.516)	0.265 (<i>p</i> = 0.135)	0.123 (<i>p</i> = 0.490)
	School Avoidance	-0.044 (<i>p</i> = 0.813)	-0.088 (<i>p</i> = 0.637)	-0.095 (<i>p</i> = 0.609)	0.030 (<i>p</i> = 0.875)	0.120 (<i>p</i> = 0.526)	-0.118 (<i>p</i> = 0.528)	0.175 (<i>p</i> = 0.359)	-0.058 (<i>p</i> = 0.753)	0.139 (<i>p</i> = 0.454)	0.340 (<i>p</i> = 0.070)
	Total Score	0.168 (<i>p</i> = 0.341)	0.141 (<i>p</i> = 0.423)	0.127 (<i>p</i> = 0.470)	0.169 (<i>p</i> = 0.340)	0.281 (<i>p</i> = 0.116)	0.108 (<i>p</i> = 0.542)	0.411 * (<i>p</i> = 0.023)	0.167 (<i>p</i> = 0.341)	0.114 (<i>p</i> = 0.517)	0.236 (<i>p</i> = 0.181)

3.2. Relations of Parents' Anxiety with Parent–Child Quality of Relationship and Family Quality of Life

STAI State scores correlated positively with both the parent experience and the family life dimensions of the AFEQ (respectively, $\tau = 0.396, p = 0.025, \tau = 0.374, p = 0.035$), as well as with the AFEQ total scores ($\tau = 0.351, p = 0.044$). Similarly, STAI Trait scores correlated positively with both the parent experience and the family life dimensions of the AFEQ (respectively, $\tau = 0.503, p = 0.004, \tau = 0.490, p = 0.006$), and with the AFEQ total scores ($\tau = 0.444, p = 0.011$). Finally, total STAI scores correlated positively with the same dimensions of the AFEQ (respectively, $\tau = 0.407, \tau = 0.399$, and $\tau = 0.375$, all $p < 0.05$). All other correlations were not significant (τ from 0.159 to 0.291, all $p > 0.05$). Thus, as difficulties related to parenting a child with ASD and family life increase, so does parents' anxiety.

Investigation of relations between STAI scores and CPRS-SF scores revealed that conflict scores of the CPRS-SF correlated positively with both the State and the Trait dimension of the STAI (respectively, $\tau = 0.380, p = 0.030, \tau = 0.380, p = 0.030$), as well as with the STAI total scores ($\tau = 0.417, p = 0.017$). However, closeness scores of the CPRS-SF did not correlate with any score from the STAI (τ from -0.248 to -0.315, all $p > 0.05$). Thus, as the parent–child conflict increased, so did parents' anxiety.

3.3. Relations Between Child's Characteristics and Anxiety, and Between Parent–Child Quality of Relationship and Family Quality of Life

No significant correlation emerged between any of the AIM scores and scores from the SCARED (r ranging from <0.001 to 0.312, all $p > 0.05$). Thus, autistic children's anxiety was not related to their characteristics of ASD.

Conflict Scores of the CPRS-SF correlated positively with scores on the family life dimension of the AFEQ ($\tau = 0.374, p = 0.035$) and tended to positively correlate with scores on the child symptoms dimension ($\tau = 0.332, p = 0.064$). In contrast, closeness scores of the CPRS-SF correlated negatively with scores on the child development dimension and with the total score of the AFEQ (respectively, $\tau = -0.498, p = 0.005, \tau = -0.420, p = 0.016$). All other correlations were non-significant (τ from 0.107 to 0.262, all $p > 0.05$). Thus, as parent–child conflicts increased, so did difficulties with family life with an autistic child. Conversely, as parent–child closeness increased, the difficulties related to the general family life and their child development and relationship decreased.

3.4. Comparisons Between the Waitlist, Training, and Paired Groups

Comparisons between the three groups of participants (i.e., waitlist, training, and paired groups) on all collected variables using Kruskal–Wallis tests did not reveal any significant difference ($\chi^2(2, n = 18)$ from 0.008 to 3.38, all $p > 0.05$).

3.5. Effects of the Relationship Between the Autistic Child and the SD

AIM total scores correlated positively with the MDORS total scores ($r = 0.762, p = 0.028$), and there was a similar trend with the emotional closeness of the MDORS (Table 2). Scores on the Atypical behavior of the AIM tended to correlate positively with the MDORS total scores. The emotional closeness scores of the MDORS also correlated significantly with the child symptoms subscale of the AFEQ. No other significant correlation was observed among scores on the MDORS, and scores on the AIM and scores on the AFEQ. No significant correlation was observed among any scores on the MDORS, and any of the scores on the SCARED, STAI, and CPRS-SF. Thus, parents of children with more ASD characteristics, as well as emotional and behavioral difficulties, reported sharing stronger relationships, particularly in terms of emotional closeness, with their SD.

Table 2. Correlations between MDORS scores with scores on the AIM and SCARED (A) and with scores on the AFEQ, STAI, and CPRS-SF (B). Significant correlations are shown in bold and using asterisks (* $p \leq 0.05$). Tendencies for correlation are in italics.

(A)		AIM					SCARED						
		Repetitive Behavior	Communication	Atypical Behavior	Social Reciprocity	Peer Interaction	Total Score	Panic/Somatic	General Anxiety	Separation Anxiety	Social Anxiety	School Avoidance	Total Score
MDORS	Interaction	-0.154 <i>(p = 0.608)</i>	0.038 <i>(p = 0.899)</i>	0.080 <i>(p = 0.793)</i>	-0.154 <i>(p = 0.608)</i>	0.113 <i>(p = 0.702)</i>	-0.038 <i>(p = 0.899)</i>	-0.308 <i>(p = 0.305)</i>	-0.346 <i>(p = 0.248)</i>	-0.265 <i>(p = 0.373)</i>	-0.320 <i>(p = 0.295)</i>	-0.118 <i>(p = 0.698)</i>	-0.189 <i>(p = 0.524)</i>
	Emotional Closeness	0.370 <i>(p = 0.209)</i>	0.327 <i>(p = 0.262)</i>	0.462 <i>(p = 0.124)</i>	0.222 <i>(p = 0.451)</i>	0.182 <i>(p = 0.533)</i>	0.546 <i>(p = 0.061)</i>	0.074 <i>(p = 0.802)</i>	0.370 <i>(p = 0.209)</i>	0.109 <i>(p = 0.708)</i>	0.231 <i>(p = 0.442)</i>	0.189 <i>(p = 0.527)</i>	0.255 <i>(p = 0.383)</i>
	Costs	0.369 <i>(p = 0.234)</i>	0.081 <i>(p = 0.793)</i>	<0.0001 <i>(p = 1)</i>	0.287 <i>(p = 0.355)</i>	0.081 <i>(p = 0.793)</i>	0.081 <i>(p = 0.793)</i>	0.287 <i>(p = 0.355)</i>	0.123 <i>(p = 0.692)</i>	0.081 <i>(p = 0.793)</i>	0.341 <i>(p = 0.281)</i>	0.042 <i>(p = 0.894)</i>	0.081 <i>(p = 0.793)</i>
	Total Score	0.400 <i>(p = 0.170)</i>	0.500 <i>(p = 0.083)</i>	0.567 <i>(p = 0.056)</i>	0.400 <i>(p = 0.170)</i>	0.357 <i>(p = 0.216)</i>	0.571 * 0.048	0.036 <i>(p = 0.901)</i>	0.182 <i>(p = 0.533)</i>	0.071 <i>(p = 0.805)</i>	0.113 <i>(p = 0.702)</i>	0.074 <i>(p = 0.802)</i>	0.214 <i>(p = 0.458)</i>
(B)		AFEQ					STAI			CPRS-SF			
		Parent	Family life	Child development	Child symptoms	Total score	State	Trait	Total score	Conflict	Closeness		
MDORS	Interaction	-0.385 <i>(p = 0.200)</i>	-0.539 <i>(p = 0.073)</i>	-0.231 <i>(p = 0.442)</i>	-0.250 <i>(p = 0.425)</i>	-0.416 <i>(p = 0.161)</i>	-0.308 <i>(p = 0.305)</i>	-0.308 <i>(p = 0.305)</i>	-0.340 <i>(p = 0.252)</i>	-0.340 <i>(p = 0.252)</i>	0.080 <i>(p = 0.793)</i>		
	Emotional Closeness	-0.074 <i>(p = 0.802)</i>	-0.074 <i>(p = 0.802)</i>	0.370 <i>(p = 0.209)</i>	0.642 * <i>(p = 0.037)</i>	0.109 <i>(p = 0.708)</i>	-0.296 <i>(p = 0.315)</i>	-0.296 <i>(p = 0.315)</i>	-0.255 <i>(p = 0.383)</i>	-0.255 <i>(p = 0.383)</i>	<0.001 <i>(p = 1)</i>		
	Costs	0.205 <i>(p = 0.509)</i>	0.369 <i>(p = 0.234)</i>	0.123 <i>(p = 0.692)</i>	0.133 <i>(p = 0.681)</i>	0.242 <i>(p = 0.431)</i>	0.451 <i>(p = 0.146)</i>	0.369 <i>(p = 0.234)</i>	0.483 <i>(p = 0.115)</i>	0.403 <i>(p = 0.189)</i>	<0.001 <i>(p = 1)</i>		
	Total Score	-0.036 <i>(p = 0.901)</i>	-0.182 <i>(p = 0.533)</i>	0.400 <i>(p = 0.170)</i>	0.433 <i>(p = 0.154)</i>	0.143 <i>(p = 0.621)</i>	-0.400 <i>(p = 0.170)</i>	-0.327 <i>(p = 0.262)</i>	-0.357 <i>(p = 0.216)</i>	-0.352 <i>(p = 0.216)</i>	-0.038 <i>(p = 0.899)</i>		

4. Discussion

The present study had two main objectives. First, we wanted to further the understanding of the dynamic between child characteristics of ASD and difficulties with parents and family well-being and functioning. Second, we explored the effects of SDs on autistic children, their parents, and their families and the contribution of the relationship parents established with the SD to those effects.

4.1. Exploration of the Dynamic Within Families of Autistic Children

4.1.1. Parental Anxiety

Interestingly, we observed that more ASD characteristics (i.e., impact and frequency) were not related to parental anxiety. This result might seem surprising in light of previous literature reporting associations between ASD symptoms and parents' stress/anxiety [6–8]. However, it is important to note that in the present study, the AIM was used to measure ASD characteristics, while previous studies relied on other scales. The AIM is an instrument specifically developed to measure and detect changes over time in core characteristics of ASD, while scales used in previous studies may be more general, including broader elements going beyond the core characteristics of ASD, such as anxiety [34]. This may, at least in part, explain this discrepancy. Additionally, we may not exclude that the presence of protective factors and available resources to parents may have influenced the relationship between children's ASD characteristics and parental anxiety [42].

Although the impact and the frequency of ASD characteristics were not associated with parental anxiety, we observed that higher child anxiety was associated with higher parental anxiety. The link between a child's anxiety and a parent's anxiety could be explained by the fact that high levels of anxiety in autistic children may lead to an increase in the expression of problematic and/or atypical behaviors, which in turn may be a source of stress and anxiety for parents. Indeed, autistic children frequently exhibit atypical manifestations of anxiety, diverging from the typical behaviors observed in neurotypical peers [43]. Additionally, they also have poorer emotional regulation skills, which can lead to difficulties in handling/controlling their emotions, including stress and anxiety, as well as in using effective coping strategies [44]. This hypothesis would explain the positive correlation between a child's anxiety and parents' reports of their child having behavioral and emotional difficulties (i.e., child symptoms dimension of the AFEQ) observed in the present study.

Additionally, it is worth noting that when we investigated individual scores on the STAI, 11 parents out of 18 had scores over the clinical cut-off of both the State and Trait subscales, which is in line with previous studies reporting higher levels of stress in parents of autistic children [4,5]. Our research revealed that parental anxiety correlated positively with the parent experience and family life dimensions of the AFEQ, as well as with parent–child conflict. This indicates that as challenges associated with parenting an autistic child and family life increased, parents' anxiety increased as well. We may posit that family functioning difficulties and parent–child conflict may contribute to parental anxiety. However, it may also be possible that more parent–child conflict may generate more stress in parents, which may, in turn, affect family functioning.

4.1.2. Parent–Child Closeness

Considering parent–child closeness, we observed that children's social and interaction difficulties were related to lower parent–child closeness, while children's social anxiety was related to more parent–child closeness. The complex nature of social interaction difficulties inherent in ASD influences the development and maintenance of close relationships between autistic children and their parents. Challenges in comprehending social cues, initiating and reciprocating social interactions, and demonstrating empathy may all lead to issues fostering interpersonal bonds and affect the establishment of a secure attachment [45]. Consequently, difficulties in social interactions and establishing relationships may affect the parent–child relationship and closeness [46].

On the contrary, when children experience social anxiety, they may tend to place greater reliance on their parents and close family and friends, perceiving them as a secure foundation. They may also be less inclined to develop new relationships, which may

prompt the establishment of tighter relationships with their parents. Interestingly, a previous study found that social anxiety in children was associated with parental socialization of emotion (i.e., parental responses to their child's negative emotions) [47], meaning that parents of autistic children with higher social anxiety exhibit more emotion-focused socialization responses to their child's emotional manifestation (e.g., encouragement of emotional expression and emotion processing), which may indicate that the parents are more aware of their emotional responses, and less likely to respond punitively. However, parents of children with low social anxiety may not prioritize exhibiting emotion-focused responses, as they may have higher expectations of their children's behavior. We can hypothesize that parents who exhibit emotion-focused socialization responses may establish a stronger rapport with their autistic child experiencing social anxiety, thereby contributing to a stronger bond.

4.1.3. Family Functioning

Previous studies have shown that having an autistic child may affect family cohesion [9]. Indeed, the characteristics of autistic children can have an impact on their siblings, who may experience feelings of frustration or isolation, particularly if they perceive unequal attention. The length of time since diagnosis and severity of characteristics are linked to caregiver strain, and caring for an autistic child can impose numerous additional responsibilities and constraints, as well as a significant financial burden on families. This can overwhelm the entire family, adding to their frequent social isolation [48,49]. Concerning these previous demonstrations, we observed that higher degrees of a child's ASD characteristics (i.e., frequency and intensity) were related to stronger alteration of the family functioning.

Additionally, the quality of the relationship between parents and their autistic child was associated with family functioning. More specifically, we observed that parents who reported their child had greater development and interaction skills, and a better quality of family life also reported closer relationships with their autistic child. In contrast, more family functioning issues and greater difficulties related to ASD characteristics were associated with more conflicts in the parent-child relationship. Two non-mutually exclusive hypotheses may be proposed to explain this result; either the quality of the child-parent relationship has an effect on the family functioning, or the reverse, but both may be true.

Finally, we observed that parents' anxiety was positively related to family life and parental experience, as well as to parent-child conflict. Previous studies have reported an association between parental stress and family cohesion/functioning [50]. It may be hypothesized that the presence of family functioning difficulties and conflicts between parents and their children may both contribute to an increase in parental anxiety. However, it may also be possible that more parent-child conflict may generate more stress in parents, and both may, in turn, affect the family functioning.

More generally, these results highlight the presence of complex relations between children's characteristics of ASD and anxiety, and their parent's well-being and the family functioning, which further the importance of considering things with a more systemic perspective [8]. Considering the findings observed in the present study, we may posit that a child's characteristics of ASD and anxiety may affect the parent-child relationship and the family functioning. These effects, in turn, may affect parents' stress and anxiety, which may, in turn, affect the parent-child relationship and the family functioning.

4.2. *Effects of Service Dogs and the Importance of the Parent-Service Dog Relationship*

Numerous previous studies have demonstrated that integration of an SD can lead to various benefits for autistic children (e.g., stress, problematic behaviors, symptoms of ASD, communication, and interaction), their parents (notably their stress and their

parenting strategies), as well as the family functioning [8,22,24,27,28,51]. Surprisingly, in the present study, we did not observe differences in any of the collected variables (i.e., child's characteristics of ASD and anxiety, parent's anxiety, parent and family challenges, parent-child relationship) when comparing parents from the waitlist, the training, and the paired groups. Similarly, while the integration of an SD could potentially constitute an additional burden and source of anxiety for parents of autistic children, we did not observe any increase in anxiety scores in these parents, nor any deterioration in family functioning. Firstly, these effects can be explained by the fact that the benefits for the autistic child and his/her development can be a source of benefits and improvements in the parents' quality of life [8]. A second explanation is that the SD becomes an integral member of the family system and can therefore contribute to a change in its dynamics [52]. Finally, we cannot rule out the fact that the simple presence of the dog may contribute to an improvement in stress and well-being, which has notably been shown on a physiological level (i.e., cortisol, oxytocin), and could also participate in these contributions for the parents and other family members [53–55].

However, in families of autistic children paired with their SD, we observed interesting associations with the parent-SD quality of relationship. Indeed, parents of children with higher levels of ASD characteristics reported having a stronger relationship with the SD and similarly for the child's behavioral and emotional difficulties, as evidenced by the child symptoms dimension of the AFEQ. A potential interpretation of this result is that parents of children with greater difficulties may need more emotional support, and thus, they may develop stronger relationships with the SD to benefit from their support. Although the main objective of these dogs is not to assist the parents, the fact that parents seek support from the SD is not problematic per se. However, in such a scenario, it would be of importance to remain vigilant to ensure that the SD does not develop a privileged relationship with the parent, to the detriment of the development of a qualitative relationship with the child, since, as demonstrated in previous studies, the quality of the child-dog relationship is at the heart of the benefits for the child with ASD [8].

An alternative explanation could be that autistic children who experience greater difficulties may encounter greater challenges in developing a strong bond with the SD. As a result, the SD may develop a stronger relationship with the parents, who are its primary handlers. This hypothesis aligns well with a previous study exploring caregivers' bonds with SDs, in which caregivers of autistic children who experience more familial difficulties tend to have a higher emotional closeness with the SD [56]. Similarly, Bibbo et al. [57] found that caregivers who reported psychosocial difficulties caring for children with chronic illnesses reported a higher emotional closeness with the SD. We may posit that in the absence of a strong bond with the child, the SD may seek companionship and develop a stronger relationship with its primary handler, since it is the individual providing care and sharing more interactions and activities with it.

Parents of autistic children who integrate an SD are keen to encourage the establishment of the child-dog relationship and to promote the autonomy of the dyad, to optimize the benefits for their child. Another alternative explanation for this result would be that children with stronger characteristics of ASD may be more limited in their independence and autonomy with the SD (e.g., to provide care and initiate and maintain shared activities). In such a scenario, it may be necessary for the parent to support and assist the child-SD dyad in their interaction and handle activities their child does not perform. Therefore, parents may develop a stronger bond with the SD through increased quality time and participation in shared activities.

4.3. Limitations

Several limitations should be considered when interpreting these findings. The small sample size, notably in the waitlist group, and the application of a cross-sectional design, may have limited the statistical power and our ability to obtain significant results. It also limited our ability to apply more robust statistics, such as regression analyses. It is also important to point out that correlational analyses, to which we were limited, only allow measures of the intensity of relationships between variables. They do not allow establishment of a causal relationship between variables. In addition to increasing statistical power, replicating this study in a larger sample would allow the inclusion of a wider variety of autistic children profiles and family profiles, thus contributing to a more representative sample. This small sample size also limited our ability to explore the impact of specific parameters, such as the presence or absence of a pet dog in the household. However, considering the impact of a pet dog or other pet species when investigating the impact of SDs would be of great value for future studies (i.e., whether the integration of an SD brings greater benefits to the child and his/her family when a pet dog is already present, whether the integration of an SD brings greater benefits than the integration of a pet dog, etc.).

Regarding data collection, this study only collected data on the parent who served as the primary handler of the SD. Collecting data on the second parent and siblings could be interesting to consider the entire family micro-system. Additionally, this study relied on data collected through questionnaires to primary caregivers of autistic children, leaving an opportunity for subjectivity and biased responses. Including more objective data measurements, such as physiological measurements or behavioral coding, should be considered for future studies. Furthermore, some research has revealed discrepancies between children's self-reported assessments and their parents' proxy reports [58,59]. As such, it would be valuable to consider including the MONASH questionnaire for children with ASD to provide the child's perspective regarding their relationship with the SD.

The study-affiliated organization's placement in the Midwest region of the USA may impose certain limitations. Indeed, this region predominantly consists of rural and suburban areas where families likely possess the required space and resources to accommodate an SD (e.g., garden, calm neighborhood, low traffic, easy access to green spaces). Thus, the generalizability of the present results to families of autistic children paired with an SD living in urban areas can be questioned. In addition, only one service dog provider was included in the present study. We may, therefore, question whether this element also limits the generalizability of the present results. This last concern is further reinforced by the fact that the study-affiliated organization applies a rather unique method in the handover of its SD (i.e., direct involvement of autistic children and parents with an SD over a prolonged training process). Future studies should aim for multicentric data collection (i.e., several assistance dog organizations) to be more representative of the diversity of SD organizations' methods and practices.

5. Conclusions

This cross-sectional study aimed to provide new insights into the dynamics that occur within families of autistic children, and the impact of SD on family functioning and child psychosocial well-being. Although this study did not find significant differences among all variables between the three groups of participants (i.e., waitlist, training, and paired), interesting results were gleaned when examining the groups as a whole.

While children's ASD characteristics did not seem to be associated with parents' anxiety, other relevant factors, such as children's social anxiety, difficulties related to parenting an autistic child, and parent-child conflict, were found to be linked to parents' anxiety. Interestingly, closer parent-child relationships were related to higher children's social

anxiety, while the child's social and interaction difficulties appeared to be related to weaker parent–child relationships. In addition, we also observed that family functioning was associated with the children's ASD characteristics, the parent's anxiety, and the quality of the parent–child relationship. These results reiterate the importance of maintaining a systemic approach when considering ASD characteristics in children and their broader repercussions. Regarding SDs, no difference was observed between families on the wait-list for an SD, in the training process, or already matched with the SD. Interestingly, in families already matched with the SD, parents of children exhibiting more ASD characteristics reported sharing stronger relationships with their SD. This last result further highlights the importance of acknowledging and refining the match of an SD not only with the autistic child, but also with the parent, as the primary handler of the SD. Further research addressing the constraints of the present study is warranted.

Author Contributions: Conceptualization, G.C.; methodology, G.C., J.A.S., K.E.P., M.G. and N.D.; formal analysis, N.D.; investigation, G.C.; data curation, K.E.P.; writing—original draft preparation, N.D. and J.R.B.; writing—review and editing, N.D., J.R.B., K.E.P., J.A.S., M.G. and G.C.; supervision, G.C.; project administration, G.C. and J.R.B.; funding acquisition, G.C., J.A.S., K.E.P., M.G. and N.D.; All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by The Human Animal Bond Research Institute, grant number HAB22-002.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the University of Missouri (protocol code 2092887 approved on 25 October 2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: Data available upon request, with permission for the purposes of peer review.

Acknowledgments: We acknowledge the contribution of participants who generously contributed their time. We also acknowledge the administration and staff of Retrieving Freedom for their tireless support and access to their database of potential participants.

Conflicts of Interest: The authors declare no conflicts of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

References

1. American Psychological Association: Diagnosing and Managing Autism Spectrum Disorder. Available online: <https://www.apa.org/topics/autism-spectrum-disorder/diagnosing> (accessed on 3 June 2024).
2. Masi, A.; DeMayo, M.M.; Glozier, N.; Guastella, A.J. An overview of autism spectrum disorder, heterogeneity and treatment options. *Neurosci. Bull.* **2017**, *33*, 183–193.
3. Maenner, M. Prevalence and characteristics of Autism Spectrum Disorder among children aged 8 years—Autism and developmental disabilities monitoring network, 11 Sites, United States, 2012. *MMWR Surveill. Summ.* **2023**, *72*, 1279–1279.
4. Ashworth, M.; Palikara, O.; Van Herwegen, J. Comparing parental stress of children with neurodevelopmental disorders: The case of Williams syndrome, Down syndrome and autism spectrum disorders. *J. Appl. Res. Intellect. Disabil.* **2019**, *32*, 1047–1057.
5. Boonen, H.; van Esch, L.; Lambrechts, G.; Maljaars, J.; Zink, I.; Van Leeuwen, K.; Noens, I. Mothers' Parenting Behaviors in Families of School-Aged Children with Autism Spectrum Disorder: An Observational and Questionnaire Study. *J. Autism Dev. Disord.* **2015**, *45*, 3580–3593.

6. Giovagnoli, G.; Postorino, V.; Fatta, L.M.; Sanges, V.; De Peppo, L.; Vassena, L.; Rose, P.D.; Vicari, S.; Mazzone, L. Behavioral and emotional profile and parental stress in preschool children with autism spectrum disorder. *Res. Dev. Disabil.* **2015**, *45–46*, 411–421.
7. Pastor-Cerezuela, G.; Fernández-Andrés, M.I.; Tárraga-Mínguez, R.; Navarro-Peña, J.M. Parental stress and ASD. *Focus. Autism Other Dev. Disabil.* **2016**, *31*, 300–311.
8. Dollion, N.; Poirier, M.; Auffret, F.; François, N.; Plusquellec, P.; Grandgeorge, M.; Handi'Chiens; Fondation, M. Effects of service dogs on children with ASD's symptoms and parents' well-being: On the importance of considering those effects with a more systemic perspective. *PLoS ONE* **2024**, *19*, e0295702.
9. Higgins, D.J.; Bailey, S.R.; Pearce, J.C. Factors associated with functioning style and coping strategies of families with a child with an autism spectrum disorder. *Autism* **2005**, *9*, 125–137.
10. Sharma, S.R.; Gonda, X.; Tarazi, F.I. Autism Spectrum Disorder: Classification, diagnosis and therapy. *Pharmacol. Ther.* **2018**, *190*, 91–104.
11. Will, M.N.; Currans, K.; Smith, J.; Weber, S.; Duncan, A.; Burton, J.; Kroeger-Geoppinger, K.; Miller, V.; Stone, M.; Mays, L.; et al. Evidenced-based interventions for children with autism spectrum disorder. *Curr. Probl. Pediatr. Adolesc. Health Care* **2018**, *48*, 234–249.
12. Hediger, K.; Wagner, J.; Künzi, P.; Haefeli, A.; Theis, F.; Grob, C.; Pauli, E.; Gerger, H. Effectiveness of animal-assisted interventions for children and adults with post-traumatic stress disorder symptoms: A systematic review and meta-analysis. *Eur. J. Psychotraumatol.* **2021**, *12*, 1879713–1879713.
13. Nieforth, L.O.; Schwichtenberg, A.J.; O'Haire, M.E. Animal-assisted interventions for autism spectrum disorder: A systematic review of the literature from 2016 to 2020. *Rev. J. Autism Dev. Disord.* **2023**, *10*, 255–280.
14. Martin, F.; Farnum, J. Animal-assisted therapy for children with pervasive developmental disorders. *West. J. Nurs. Res.* **2002**, *24*, 657–670.
15. O'Haire, M.E.; McKenzie, S.J.; Beck, A.M.; Slaughter, V. Animals may act as social buffers: Skin conductance arousal in children with autism spectrum disorder in a social context. *Dev. Psychobiol.* **2015**, *57*, 584–595.
16. Sams, M.J.; Fortney, E.V.; Willenbring, S. Occupational therapy incorporating animals for children with autism: A pilot investigation. *Am. J. Occup. Ther.* **2006**, *60*, 268–274.
17. Solomon, O. Doing, Being and Becoming: The sociality of children with autism in activities with therapy dogs and other people. *Camb. J. Anthropol.* **2012**, *30*, 109–126.
18. ADA.gov U.S. Department of Justice Civil Rights Division. ADA Requirements: Service Animals. Available online: <https://www.ada.gov/topics/service-animals/> (accessed on 28 February 2020).
19. Burrows, K.E.; Adams, C.L.; Spiers, J. Sentinels of Safety: Service dogs ensure safety and enhance freedom and well-being for families with autistic children. *Qual. Health Res.* **2008**, *18*, 1642–1649.
20. Tseng, A. Brief Report: Above and beyond safety: Psychosocial and biobehavioral impact of autism-assistance dogs on autistic children and their families. *J. Autism Dev. Disord.* **2023**, *53*, 468–483.
21. Berry, A.; Borgi, M.; Francia, N.; Alleva, E.; Cirulli, F. Use of assistance and therapy dogs for children with autism spectrum disorders: A critical review of the current evidence. *J. Altern. Complement. Med.* **2013**, *19*, 73–80.
22. Dollion, N.; Grandgeorge, M. L'animal de compagnie dans la vie des enfants au développement typique et atypique et de leur famille. *Rev. Int. L'éduc. Fam.* **2022**, *50*, 157–184.
23. Hellings, D.; Joosten, A.; Hatfield, M.; Netto, J. Benefits and challenges of assistance dogs for families of children on the autism spectrum: Mothers' perspectives. *Qual. Health Res.* **2022**, *32*, 1648–1656.
24. Lindsay, S.; Thiyagarajah, K. The impact of service dogs on children, youth and their families: A systematic review. *Disabil. Health J.* **2021**, *14*, 101012.
25. Sprod, E.; Norwood, M.F. What effect does participating in an assistance dog program have on the quality of life of children with Autism Spectrum Disorders and their caregivers? A systematic review of current literature. *J. Soc. Incl.* **2017**, *8*, 27–41.
26. Hart, L.A.; Hart, B.L.; Bergin, B.L. Socializing effects of service dogs for people with disabilities. *Anthrozoös* **1987**, *1*, 41–44.
27. Leighton, S.C.; Rodriguez, K.E.; Nieforth, L.O.; O'Haire, M.E. Service dogs for autistic children and family system functioning: A constant comparative analysis. *Front. Psychiatry* **2023**, *14*, 1210095.
28. Fecteau, S.-M.; Boivin, L.; Trudel, M.; Corbett, B.A.; Harrell, F.E.; Viau, R.; Champagne, N.; Picard, F. Parenting stress and salivary cortisol in parents of children with autism spectrum disorder: Longitudinal variations in the context of a service dog's presence in the family. *Biol. Psychol.* **2017**, *123*, 187–195.

29. Carlisle, G.K. Pet dog ownership decisions for parents of children with autism spectrum disorder. *J. Pediatr. Nurs.* **2014**, *29*, 114–123.
30. Harwood, C.; Kaczmarek, E.; Drake, D. Parental perceptions of the nature of the relationship children with autism spectrum disorders share with their canine companion. *J. Autism Dev. Disord.* **2018**, *49*, 248–259.
31. Appleby, R.; Wright, S.; Williams, L.; Stanley, M. Australian parents' experiences of owning an autism assistance dog. *Health Soc. Care Community* **2022**, *30*, e4113–e4121.
32. Burrows, K.E.; Adams, C.L.; Millman, S.T. Factors affecting behavior and welfare of service dogs for children with autism spectrum disorder. *J. Appl. Anim. Welf. Sci.* **2008**, *11*, 42–62.
33. Carlisle, G.K.; Johnson, R.A.; Mazurek, M.; Bibbo, J.L.; Tocco, F.; Cameron, G.T. Companion animals in families of children with autism spectrum disorder: Lessons learned from caregivers. *J. Fam. Soc. Work.* **2017**, *21*, 294–312.
34. Kanne, S.M.; Mazurek, M.O.; Sikora, D.; Bellando, J.; Branum-Martin, L.; Handen, B.; Katz, T.; Freedman, B.; Powell, M.P.; Warren, Z. The Autism Impact Measure (AIM): Initial development of a new tool for treatment outcome measurement. *J. Autism Dev. Disord.* **2013**, *44*, 168–179.
35. Mazurek, M.O.; Carlson, C.; Baker-Ericzén, M.; Butter, E.; Norris, M.; Kanne, S. Construct validity of the Autism Impact Measure (AIM). *J. Autism Dev. Disord.* **2020**, *50*, 2307–2319.
36. Birmaher, B.; Khetarpal, S.; Brent, D.; Cully, M.; Balach, L.; Kaufman, J.; Neer, S.M. The Screen for Child Anxiety Related Emotional Disorders (SCARED): Scale construction and psychometric characteristics. *J. Am. Acad. Child. Adolesc. Psychiatry* **1997**, *36*, 545–553.
37. Birmaher, B.; Brent, D.A.; Chiappetta, L.; Bridge, J.; Monga, S.; Baugher, M. Psychometric Properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED): A replication study. *J. Am. Acad. Child. Adolesc. Psychiatry* **1999**, *38*, 1230–1236.
38. Leadbitter, K.; Aldred, C.; McConachie, H.; Le Couteur, A.; Kapadia, D.; Charman, T.; Macdonald, W.; Salomone, E.; Emsley, R.; Green, J.; et al. The Autism Family Experience Questionnaire (AFEQ): An ecologically-valid, parent-nominated measure of family experience, quality of life and prioritised outcomes for early intervention. *J. Autism Dev. Disord.* **2018**, *48*, 1052–1062.
39. Spielberger, C.D.; Gorsuch, R.L.; Lushene, R.; Vagg, P.R.; Jacobs, G.A. State-Trait Anxiety Inventory Self Evaluation Questionnaire, Form Y (STAI). *Br. Psychol. Soc.* **2003**. DOI 10.53841/bpctest.2003.stai
40. Driscoll, K.; Pianta, R.C. Mothers' and fathers' perceptions of conflict and closeness in parent-child relationships during early childhood. *J. Early Child. Infant. Psychol.* **2011**, *7*, 1–24.
41. Dwyer, F.; Bennett, P.C.; Coleman, G.J. Development of the Monash dog owner relationship scale (MDORS). *Anthrozoös* **2006**, *19*, 243–256.
42. Abidin, R.R. The determinants of parenting behavior. *J. Clin. Child. Psychol.* **1992**, *21*, 407–412.
43. Adams, D.; Clark, M.; Simpson, K. The relationship between child anxiety and the quality of life of children, and parents of children, on the autism spectrum. *J. Autism Dev. Disord.* **2019**, *50*, 1756–1769.
44. Cibralic, S.; Kohlhoff, J.; Wallace, N.; McMahan, C.; Eapen, V. A systematic review of emotion regulation in children with Autism Spectrum Disorder. *Res. Autism Spectr. Disord.* **2019**, *68*, 101422.
45. Teague, S.J.; Newman, L.K.; Tonge, B.J.; Gray, K.M. Attachment and child behaviour and emotional problems in autism spectrum disorder with intellectual disability. *J. Appl. Res. Intellect. Disabil.* **2019**, *33*, 475–487.
46. Knott, F.; Dunlop, A.-W.; Mackay, T. Living with ASD. *Autism* **2006**, *10*, 609–617.
47. Jordan, R.; Kalvin, C.B.; Ibrahim, K.; Sukhodolsky, D.G. Parent emotion socialization in children with Autism Spectrum Disorder and co-occurring anxiety. *Res. Child. Adolesc. Psychopathol.* **2021**, *49*, 125–137.
48. Desquenne Godfrey, G.; Downes, N.; Cappe, E. A systematic review of family functioning in families of children on the autism spectrum. *J. Autism Dev. Disord.* **2023**, *54*, 1036–1057.
49. Nighat, A.; Ahmer, Z.; Ovais, M.; Athar, F.B.; Baig, L.A. Caregiver strain and its predictors among parents of autistic children: A cross-sectional study. *J. Child. Adolesc. Ment. Health* **2022**, *34*, 70–82.
50. Pisula, E.; Porebowicz-Dörsmann, A. Family functioning, parenting stress and quality of life in mothers and fathers of Polish children with high functioning autism or Asperger syndrome. *PLoS ONE* **2017**, *12*, e0186536.
51. Viau, R.; Arseneault-Lapierre, G.; Fecteau, S.; Champagne, N.; Walker, C.-D.; Lupien, S. Effect of service dogs on salivary cortisol secretion in autistic children. *Psychoneuroendocrinology* **2010**, *35*, 1187–1193.
52. McConnell, A.R.; Paige Lloyd, E.; Humphrey, B.T. We are family: Viewing pets as family members improves wellbeing. *Anthrozoös* **2019**, *32*, 459–470.
53. Handlin, L.; Hydbring-Sandberg, E.; Nilsson, A.; Ejdebäck, M.; Jansson, A.; Uvnäs-Moberg, K. Short-term interaction between dogs and their owners: Effects on oxytocin, cortisol, insulin and heart rate—An exploratory study. *Anthrozoös* **2011**, *24*, 301–315.

54. Odendaal, J.S.J.; Meintjes, R.A. Neurophysiological correlates of affiliative behaviour between humans and dogs. *Vet. J.* **2003**, *165*, 296–301.
55. Petersson, M.; Uvnäs-Moberg, K.; Nilsson, A.; Gustafson, L.-L.; Hydbring-Sandberg, E.; Handlin, L. Oxytocin and cortisol levels in dog owners and their dogs are associated with behavioral patterns: An exploratory study. *Front. Psychol.* **2017**, *8*, 1796.
56. Rodriguez, K.E.; Rispoli, M.; Kelleher, B.L.; MacLean, E.L.; O’Haire, M.E. The effects of service dogs for children with autism spectrum disorder and their caregivers: A cross-sectional study. *Front. Psychiatry* **2024**, *15*, 1355970.
57. Bibbo, J.; Rodriguez, K.E.; O’Haire, M.E. Impact of Service Dogs on Family Members’ Psychosocial Functioning. *Am. J. Occup. Ther. Off. Publ. Am. Occup. Ther. Assoc.* **2019**, *73*, 7303205120p1–7303205120p11.
58. Clark, B.G.; Magill-Evans, J.E.; Koning, C.J. Youth with Autism Spectrum Disorders. *Focus. Autism Other Dev. Disabil.* **2014**, *30*, 57–64.
59. Ikeda, E.; Hinckson, E.; Krägeloh, C. Assessment of quality of life in children and youth with Autism Spectrum Disorder: A critical review. *Qual. Life Res.* **2013**, *23*, 1069–1085.

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.