

1 **Abstract**

2 Previous studies have examined the specific benefits of therapy and assistance
3 dogs on children with autism, but until recently only anecdotes existed concerning the
4 benefits of pet dogs. We conducted structured interviews with 40 parents of children
5 with an autism spectrum disorder (ASD) to investigate the perceived impact of pet
6 dogs. Half the sample (20) owned a pet dog and half the sample was looking to
7 acquire one. Restrictions associated with dog ownership were underestimated, whilst
8 enjoyment, fun and improvements in communication and social interaction were
9 overestimated by the non-owners, indicating important areas where expectations are
10 unlikely to be met. These areas represent important factors to consider when deciding
11 whether to acquire a pet dog in families living with ASD, and as such is of interest to
12 a broad audience including clinicians, veterinarians and parents.

13

14 **Keywords:**

15 Autism; children; families; dogs; animal-assisted intervention

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1 Autism spectrum disorder (ASD) is a heterogeneous condition defined by the
2 DSM-5 as a person experiencing persistent difficulties in social interaction in a range
3 of contexts and as showing restricted, repetitive behaviours. These problems must
4 have been evident in early childhood, cause significant impairment in functioning and
5 not be explainable by intellectual disorders or developmental delays (DSM-5, APA
6 2013). From the time of diagnosis of autism spectrum disorder (ASD), parents are
7 advised on a range of treatment programmes (see Autism Speaks, 2010), including
8 early behavioural interventions (e.g., the Early Start Denver Model and Lovaas
9 Model), through to family based approaches and biomedical interventions (e.g.,
10 medications, diets, supplements, alternative and complementary therapies). The role
11 of dogs in animal assisted intervention (AAI) and its subcategories of animal assisted
12 therapy (AAT) and animal assisted activities (AAA) in the remediation of ASD
13 behaviours are of increasing interest. Many studies report positive effects when using
14 dogs as therapy for children with ASD (e.g., Burrows & Adams, 2005; Prothmann,
15 Ettrich, & Prothmann, 2009; Soloman, 2010). However, there has been limited
16 exploration of the impact of un-trained pet dogs (i.e., dog companions), as opposed to
17 therapy dogs, who have received specific and extensive training, in the homes of
18 those living with a child with ASD. Pet dogs may prove an important avenue to
19 investigate in order to meet the needs of many families living with ASD in a timelier
20 and cost effective manner than that possible with trained assistance dogs. Given the
21 increasing interest of the value of dogs in ASD treatments, and the surmounting
22 concern for the need to develop effective treatments which have a strong scientific
23 evidence base (e.g., Hamburg & Collins, 2010; Simpson, de Boer-Ott, Griswold et al.,
24 2005), this paper reports parental perceptions (their expectations and the reality) on
25 the value of pet dogs as an effective therapy for ASD. We first provide a brief review

1 of the literature on structured AAI (e.g., using trained animals) and then explain how
2 these benefits may be achieved through companion pet dogs.

3 There is increasing awareness that animals might benefit children with ASD,
4 with a variety of animal species having received attention including dogs, dolphins,
5 horses and guinea pigs (e.g., see reviews by Endenburg & van Lith, 2011; Melson,
6 2003). A review of the use of AAI recently concluded that there is preliminary
7 support for the value of AAI in ASD treatment programmes (resulting in increased
8 interaction and communication, and decreased problem behaviours, autistic severity
9 and stress; O’Haire, 2013). However, it should be noted that the application of these
10 studies into practice are constrained by the lack of high quality studies, which are
11 plagued with methodological weaknesses and limited replications (O’Haire, 2013).

12 Nonetheless, despite criticisms of AAI research there is surmounting interest
13 and evidence to suggest that dogs in particular may be valuable in therapy sessions
14 (for a review see Berry, Borgi, Francia, Alleva, & Cirulli, 2012). Although the
15 theoretical basis behind the effects of dogs in treatment programmes is unclear (e.g.,
16 see review by Mills & Hall, 2014), possible explanations could be extrapolated from
17 separate evidence bases which suggest that dogs have the potential to improve
18 communication (Lima, Silva, Amaral, de Sousa, 2012; Wells, 2004), reduce stress
19 (Barker Knisely, McCain, & Best, 2005; Odendaal & Meintjes, 2003), reduce
20 depression (Souter & Miller, 2007) and improve health (Nimer & Lundahl, 2007;
21 Wells, 2009). It is possible that a combination of some, or all (and indeed additional)
22 factors, may benefit those living with a disability and potentially prime the individual
23 for therapy (Silva, Correia, Lima, Magalhães, & de Sousa, 2011). More specifically,
24 there are reported benefits of therapy and assistance dogs to children with ASD. These
25 advantages include increased child safety, increased outdoor access, heightened

1 communication and social interaction with other people, and improved family
2 behaviours (Burgoyne, Dowling, Fitzgerald et al. 2014; Burrows, Adams, & Spiers,
3 2008; Redefer & Goodman, 1989; Silva et al., 2011). It is noteworthy that many of
4 these benefits might also be accrued from pet dogs without specialist training, and this
5 beginning to be reflected in recent literatures.

6 A paper by Grandgeorge, Tordjman, Lazartigues et al. (2012) reported that
7 children with ASD who acquired a pet (cat, dog or small furry animal) improved on
8 the prosocial behaviours of 'offering to share' and 'offering comfort', as measured by
9 parental responses to the Autism Diagnostic Interview-Revised. Another recent paper
10 also reported an increase in social behaviours, as well as a reduction in restrictive
11 behaviour patterns, when children with ASD interacted with a companion animal,
12 (Byström & Lundqvist Persson 2015). These conclusions were drawn from qualitative
13 interviews with the parents. However, both of these papers simply specified 'pet', as
14 opposed to a 'pet dog'. If we are to define the circumstances under which animal
15 companionship is most effective to children with ASD it is important that we
16 specifically identify the animal used in the study and document the extent of the
17 effectiveness of the intervention. One recent paper highlights the benefits of pet *dog*
18 acquisition to parents of children with ASD (Wright, Hall, Hames et al., 2015).
19 Parents who acquired a pet dog showed significant reductions in parenting stress after
20 acquiring the dog in comparison to a control group of parents who did not acquire a
21 pet dog. This paper highlights the potential of exploring the role of dogs, specifically,
22 on improving quality of life for children with ASD, as well as their parents.

23 Combined, these papers (Byström & Lundqvist Persson, 2015; Grandgeorge et
24 al., 2012; Wright et al., 2015) begin to show some evidence that the benefits
25 associated with acquiring a trained assistance dog can be evidenced from acquiring a

1 pet. However, to date only one (known) study has considered potential drawbacks
2 with pet dogs as an effective ASD intervention. When evaluating the feasibility of a
3 new intervention it is important that we document both potential positive and negative
4 effects. Through conducting interviews with parents with children with ASD Carlisle
5 (2014) identified that parents believed that pet dog ownership improved child
6 interactions and bonding experiences, but identified time and costs constraints as the
7 negative aspects of dog ownership (Carlisle, 2014).

8 It is clear that further scientific reports are required to establish whether, and
9 how, pet dogs may benefit those living with ASD. Additionally, it is important to
10 establish whether parents considering acquiring a dog have realistic expectations of
11 what benefits this may bring. Not only will this aid parents in the decision making
12 process of acquiring a dog, but it will also help healthy relationships develop between
13 the dog and family members, so that frustrations are minimised with regard to the
14 benefits of dog ownership living up to the expectations. By qualitatively exploring
15 perceptions of dog ownership in parents of a child with ASD, who do and who do not
16 own a pet dog, this project addresses a number of concerns, including; the
17 predominance of case-study reports in human-animal interaction studies (O’Haire,
18 2013); the lack of a control comparison group (O’Haire, 2013) and the application of
19 laboratory based results to treatment in the home environment (Mandell, Stahmer,
20 Shin, Xie et al., 2013). Additionally, by adopting qualitative techniques we respect the
21 importance of the individual nature of ASD (e.g., Kohane, McMurry, Weber,
22 McFadden et al., 2012; Mukaddes & Fateh, 2010) and appreciate that what helps in
23 one case might not be helpful in another.

24 The study aimed to provide an initial exploration into the perceptions of dog
25 ownership in parents with children with ASD. To achieve this aim we first identified

1 the perceived impacts of dog ownership in dog-owning families with a child with
2 ASD. Secondly, we compared the perceptions of dog owners with the expectations of
3 other families with a child with ASD, who were looking to get a pet dog but had not
4 yet obtained one. The research objectives were: (1) To undertake structured
5 interviews with families with a child with ASD, half with a dog and half looking to
6 get a dog. (2) To identify the themes that reflected the breadth of perceived and
7 expected impacts of dog ownership. (3) To assess differences in emphasis between
8 the two populations.

9 **Methods**

10 The research process was approved by the University of Lincoln's ethics
11 committee. Fully informed, written consent was obtained from all participants prior to
12 the interviews.

13 **Sample.** Forty parents of children diagnosed with ASD were recruited; 20
14 were pet dog owners and 20 non dog owners, who were considering getting a pet dog.
15 This convenience sample from the UK population was recruited on a voluntary basis,
16 via Dogs for the Disabled's PAWS (Parents Autism Workshops and Support) network
17 (Dogs for the Disabled, 2013). The PAWS program involves a series of three
18 workshops that educate parents about dog behaviour, welfare, and training, whilst
19 advising on the suitability of, and integration of pet dogs into families with children
20 with ASD. In addition postings on websites and social networks related to Dogs for
21 the Disabled and the National Autistic Society (NAS), and word of mouth were used
22 to increase the number of participants.

23 Demographic data relating to the child, dog and family were collected. In
24 families where more than one child was diagnosed with ASD (n=4 dog owners)
25 parents were asked to select the child whose ASD symptoms were considered to be

1 more severe. Where more than one dog was owned (n=4), parents were asked to
2 respond with regards to the dog that they believed had the closest relationship with the
3 child with ASD.

4

5 **Interviews**

6 **Item Generation.** The interview questions were initially compiled following a
7 review of the existing literature and then circulated to the project advisory group for
8 additional input and discussion. The project advisory group was made up of twelve
9 members, including autism professionals, psychology professionals, veterinary
10 professionals, assistance dog professionals, academics and parents of children with
11 ASD who own a family pet dog. Feedback from the group resulted in an interview
12 schedule addressing specific areas associated with dog ownership in families with
13 children with autism. The areas included potential benefits and difficulties for both
14 the child and the family with respect to owning a pet dog. Twenty four areas
15 (hereafter ‘items’, Figure 1) were targeted as a result: covering child behaviour,
16 impact on the family, child-parent issues, child-sibling issues. In addition, four
17 general items were added to gather views on overall perceptions (Figure 1).

18 **Interview Process.** Participants undertook structured interviews via the
19 telephone with the primary researcher (HW). All interviews with the dog-owning and
20 non-dog owning group followed the same format. Questions were open-ended and
21 parents were allowed to elaborate on their answers so as to encourage greater
22 qualitative information. An interview-to-redundancy technique (Sandelowski, 1995)
23 was used to determine the final sample size (recruitment continued until no additional
24 qualitatively different responses could be identified from the ongoing interviews, to

1 ensure redundancy). Interviews were audio taped and transcribed by a professional
2 audio typist.

3 **Data Analysis.** Data were extracted from the transcriptions and entered into a
4 spreadsheet as follows: Each discussion element from the parent (when they were
5 reporting a perceived impact of the dog) was entered onto a separate line as a single
6 data point from the transcription using an interpretative approach (e.g., when a parent
7 was asked if the dog had a calming effect, and the parent replied: “he (child) strokes
8 the dog which calms him down,” this was recorded as a single data point: child
9 stroking dog calms child). Only responses reporting effects (either positive or
10 negative) were included as data points (i.e., if parents did not respond to an item, or
11 reported ‘no-effect’, or similar, then no data point was recorded for that response).
12 Data was analysed using a mixed method approach combining qualitative and
13 quantitative techniques. Data points were qualitatively analysed for common themes
14 in responses across the two groups. To quantitatively assess for differences in
15 expectations versus reality of dog ownership we conducted statistical tests on the
16 number of respondents reporting items within themes. Specific items (n=24) and
17 general items (n=4) were analysed separately as detailed below:

18 **Specific items.** Following familiarisation of the data set, two researchers (HW
19 & AH) independently developed mutually exclusive themes that represented the entire
20 data set. This was followed by an iterative process of categorising the data into
21 proposed themes, discussing discrepancies and amending themes, until there was a
22 consensus between the researchers. For a small number of items where agreement
23 could not be achieved, (e.g., items were difficult to interpret), data points were
24 removed from additional analysis. The development of the response themes was
25 conducted independently of the original items (i.e., the final themes did not consider

1 the structure or content of the original questions asked of the parents). For each
2 theme, the total number of data points, number of participants responding (and
3 number from dog owning and non-dog owning group) were counted. A participant
4 was counted as responding if they reported positive effects or negative effects in
5 relation to the item. A descriptive account of responses for each item was also
6 compiled by the two researchers.

7 **General items.** Within each general item (n=4), data points were coded
8 independently by the two researchers, according to the specific response themes
9 identified previously. Within the proposed themes, each participant's response was
10 coded as either 'yes' or 'no' (i.e., yes if they thought the dog has/would have an
11 impact on that theme, or no if they did not or did not mention it). After initial coding,
12 inter-rater reliability for each theme was calculated using Cohen's Kappa.
13 Discrepancies were discussed and an agreement was reached on descriptive titles for
14 the themes and numbers of yes/ no responses within them. The number of
15 participants responding to each theme was compared between the dog-owning and
16 non-dog owning groups. Chi squared tests were used to identify significant
17 differences ($p < .05$) in number of participants responding between the dog-owning
18 and non-dog owning groups. Fisher's Exact tests replaced Chi squares tests where the
19 assumption related to expected values (i.e. <5) was not met.

20

21 **Results**

22 **Sample.** The final number of participants, as determined by interview to
23 redundancy technique, was n=20 dog owners. No new information was gathered after
24 participant number 15 in the dog owning group. No new information was gained after
25 participant number 14 in the non-dog owning group but recruitment continued to

1 n=20 to match numbers in the dog owning group. Interview length ranged from 9.88-
2 45.00 minutes (21.75 ± 7.83 ; Mean \pm SD). There was no significant difference in length
3 of interview between groups $t(38) = -0.457, p = .638$.

4 Thirty participants (75%) were recruited through the PAWS network (n=12
5 dog owners, n=18 non-dog owners). The remaining ten participants (25%) (8= dog
6 owners, 2= non-dog owners) were recruited via other sources (four through Dogs for
7 the Disabled advertisements, three through National Autistic Society advertisements,
8 and three through other sources). There were significantly more recruits from PAWS
9 in the non-dog owner group ($\chi^2 = 4.800, df = 1, p = .028$). Of those recruited through
10 the PAWS network 23 were on the waiting list, so had not attended any of the
11 program at the time of interview (n=7 dog owners, n=16 non-dog owners). Over both
12 groups (dog owners and non-dog owners) seven participants had taken part in PAWS
13 workshops. Five of these participants had only attended one workshop, which forms
14 a basic introduction to PAWS (n=3 dog owners, n=1 non-dog owner). Two
15 participants had attended three workshops, where they would have gained more
16 detailed information on the potential benefits of acquiring a dog. However, the ratio
17 of participants who attended three workshops was split evenly between the dog owner
18 and non-dog owner groups (n=1 dog owner, n=1 non-dog owner).

19

20 **Demographics.** Thirty-eight (95%) interview participants (parent and main
21 carer for the child) were women, two (5%) were men. Thirty-three (82.5%) were a
22 two parent family, five (12.5%) were a one parent family, and two (5%) were from a
23 family with three adults living in the home.

24 Children's ages ranged from 3-15 years (8.75 ± 3.47). There was no significant
25 difference in child age between groups $t(38) = 0.452, p = .654$. Participants were

1 recruited to take part in the study if their child had a confirmed diagnosis of autism
2 spectrum disorder. Because of the heterogeneous nature of ASD we did not include a
3 strict exclusion criterion for participation, in order to obtain a sample that reflected the
4 disparity of characteristics of families in the general population. The stipulations for
5 participation was that the child had had received a clinical diagnosis of ASD through
6 Children and Adolescent Mental Health Services (CAMHS), ASD diagnosis was
7 confirmed verbally by the parents. Eighteen (45%) were described as having a
8 diagnosis of autism, 15 (37.5%) Asperger's/High Functioning Autism, and seven
9 (17.5%) were on the spectrum (ASD). There was no significant difference in
10 diagnoses between groups (Likelihood ratio $\chi^2 = 2.291$, $df = 2$, $p = .318$). Thirty
11 (75%) were boys (16= dog owners, 14= non-dog owners), ten (25%) were girls (4=
12 dog owners , 6= non-dog owners). There was no significant difference in child
13 gender between groups ($\chi^2 = 0.533$, $df = 1$, $p = 0.465$). Five children (12.5%) were an
14 only child (3= dog owners , 2 = non-dog owners), 27 (65.5%) had one sibling (12=
15 dog owners, 15= non-dog owners), six (15%) had two siblings (5= dog owners , 2=
16 non-dog owners), and one (2.5%) had three siblings (non-dog owner). There was no
17 significant difference in number of siblings between groups (Likelihood ratio $\chi^2 =$
18 3.250, $df = 3$, $p = .355$).

19 Among the dog owners, dog ages ranged from 10-60 months (15.16±18.15
20 months). Eleven dogs were male and nine were female. Four were crossbreeds and 16
21 were purebred from nine different breeds (five Labrador Retrievers, two German
22 Shepherd Dogs, two Golden Retrievers, one Cairn Terrier, one Cocker Spaniel, one
23 Bullmastiff, one English Bull Terrier, one Bichon Frise and one Tibetan Terrier).
24 Seventeen (85%) were acquired from breeders, and three (15%) from rescue homes.

1 The length of time the dog had been with the family at the time of interview ranged
2 from 5-58 months (4.8 years), (24.80±16.43).

3

4 **Results of the Thematic Analysis**

5 **Results from analysis of responses to specific items.** The total number of
6 data points was 968, of which 893 were coded into themes following agreement by
7 the two researchers. The remaining 75 (7.7%) data points were removed because they
8 were either difficult to interpret or irrelevant, (e.g., “he (child) has learnt to growl
9 when he (child) is angry,” difficult to interpret “dog needs to go out of the house,”
10 difficult to interpret; #600 “we have always had a dog,” irrelevant); “he (child) has
11 been on horse camp and loved the horses,” irrelevant).

12 Eleven themes were identified from the twenty-four specific items:
13 Quantitative summaries of the themes and the number of parents that reported effects
14 from each group (non-dog owners & dog owners) are contained in Table 1.
15 Qualitative (content descriptions) for the 11 themes are reported below:

16

17 **1. Family Effects.** This was the largest theme, accounting for 30% of all references
18 made by parents. A high proportion of non-dog owners and dog owners made a
19 similar number of specific references to positive and negative family effects (Table
20 1).

21 **Non-dog owners:** Non-dog owners expected the dog to *enhance and unite the*
22 *family*, taking the focus off the child with ASD (e.g., “the dog may be a new focus for
23 the family”) and that the dog would improve communication within the family,
24 providing something to talk about (e.g., “the dog would be a common interest for the
25 family to talk about”). Increases in positive interaction between the child with ASD
26 and their siblings (e.g: “a dog may take the pressure off her (child with ASD) brother

1 as she (child with ASD) has something else to interact with”). Responses also
2 described how the dog would *allow better inclusion of the child in the family*,
3 providing a connection between the child and other family members, increasing
4 interaction and time spent with the child (e.g., “having the dog will make him (child)
5 participate in more family activities”). It was anticipated that this inclusion would
6 allow an *increase in amount or range of family activities* either directly involving the
7 dog, such as playing with the dog, walking the dog, or activities involving family
8 members when the dog was just present but not directly taking part (e.g., “I would
9 expect there will be more outdoor activities for us as a family focused around the
10 dog”). Parents expecting *a range of benefits for other family members* besides the
11 child with ASD, such as: outdoor access for the family and a healthier lifestyle; social
12 benefits for all family members as they got out and about with the dog; and stress
13 relief for other family members, either through increased exercise, or through
14 companionship with the dog (e.g., “I (parent) would stroke dog to relieve stress if I
15 felt stressed about him (child)”).

16 *Negative expectations* included that the dog was anticipated to be a potential
17 source of conflict between siblings (e.g., “he (child with ASD) may get possessive
18 and not let sister near the pet”) and between family members in relation to
19 responsibility for general care of the dog (e.g., “there may be potential disagreements
20 between the family and her (child with ASD), for example over kennelling dog while
21 going away”). Additionally, there were concerns over work time and cost involved in
22 dog ownership because of cleaning, feeding, walking (e.g., “it will be more work for
23 the family, feeding and walking the dog etc.”) as well as restrictions to outings, travel
24 and holidays and extra consideration when the family go away (e.g., “there may be
25 restrictions on travelling as we will need to consider the dog”).

1 **Dog Owners:** Responses from dog owners suggested that the expectations of
2 dog ownership on family effects are likely to be met in the sample population. For
3 instance, dog owners indicated that the dog did help *enhance and unite the family* (
4 “he (dog) unites the family, everyone is on the same level”), serve as a talking point (
5 “all the family will talk about him (dog), which they are interested in talking about”)
6 and improve sibling interaction (“he [dog] has helped our older son have a better
7 relationship and to communicate with his brother [child with ASD]). Statements
8 suggested that dog ownership did *allow better inclusion of the child in the family*, as
9 expected (e.g., : “the dog has given a reason for him (child) to want to spend time
10 with me [parent]”) and this did *increase in the amount or range of family activities*
11 (e.g., “we are doing more things together as a family”). Expectations on *a range of*
12 *benefits for other family members* were evidenced in dog owner group (e.g., “there is
13 a social aspect for me [parent], I get to know more people by having the dog”).

14 *Negative expectations* appear to be justified, in terms of: (a) conflict (e.g., “she
15 (child with ASD) can be competitive with her sibling over the dog”; “there can be
16 tension between parents, we argue over the dog”), (b) work / time costs (e.g., “it is
17 quite stressful having a dog, consideration of walking, payment for feeding and
18 training. We have enough on our plate without that worry”) and (c) travel (“there is
19 the extra consideration of someone to look after dog if we are going away”).

20 **2. Child social and emotional skills / sense of self.** The second largest theme
21 accounted for 23% of references made by parents, with a similar number of specific
22 references from non-dog owners and dog owners.

23 **Non-Dog Owners:** Parents anticipated that the *dog would be a companion or*
24 *friend for the child*, providing a non-judgemental companion that the child could rely
25 on or relate to (e.g., “a dog would provide companionship for him (child) who feels

1 isolated at the moment”). It was hoped that the dog would aid the child to become
2 more independent from family members (e.g., “a dog may help him (child) to become
3 more independent as he is currently very dependent on me (parent)”).

4 Parents expected the *dog would give confidence to the child* (e.g., “having a
5 dog may help develop my son’s self-esteem and confidence”) and the child would
6 show *affection and empathy* for the dog (“she [child] is affectionate with dogs where
7 she may not be with us [parents]”). It was further expected that the *child would benefit*
8 *from enjoyment, fun and increased happiness* in areas of daily life involving the dog
9 (e.g., “he [child] will enjoy the dog”) and *give the child a reason or way to socially*
10 *engage with others*, (e.g., “the dog is a safe thing to engage with people about”).
11 Parents were anticipating that the dog would help their child to *learn about*
12 *responsibility*; through considering the needs of the dog (e.g., “something that is her
13 [child’s] responsibility that she has to consider the needs of”)

14 Reference to *negative effects* on child social and emotion skills were rare, but
15 one non-dog owner parent was concerned that the child would not accept the dog.

16 **Dog Owners:** Parental opinions highlight that the *dog provides a companion*
17 *or friend for the child*, (e.g., “he (child) shows affection for the dog, fussing, playing,
18 feeding her (dog)” as well as promoting independence (e.g., participant #19, “he
19 (child) has become more independent during morning routines, he does more for
20 himself”), as hoped by the non-dog owning group. Comments indicated that the *dog*
21 *does give confidence to the child* (e.g., “he [child] seems to be more confident with
22 the dog around”), indeed, three parents reported their child’s fear of dogs had
23 improved since having a dog. Evidence suggests that the expectation that dog
24 ownership may improve the child’s empathy may be met (e.g., “he [child] has
25 developed some empathy for the dog which he does not have with people”). Other

1 expectations are also met, including; that the *child would benefit from enjoyment, fun*
2 *and increased happiness* (e.g., “he seems happier now we have a dog”); that the dog
3 *gives the child a reason or way to socially engage with others* (e.g., “he [child] likes
4 the dog to be there at school so he can talk about dog to other children”); and that the
5 dog helps their child *learn about responsibility* (“he [child] thinks about dog’s
6 needs”).

7 *Negative effects* of dog ownership on their child’s social and emotions skills
8 were reported by five dog owners (parents reported that the child did not like the dog
9 or aspects of the dog’s behaviour, such as barking or being boisterous).

10 In summary, the expectations of the positive effects of dog ownership on
11 children with ASD social and emotional skills appear to be met. However, non-dog
12 owners should consider the potential impacts of the negative effects of barking and
13 excitable behaviour from the dog.

14 **3. Child calmness & effects on child’s anxiety based behaviours.** The third largest
15 theme accounted for 14% of references made by parents. All non-dog owners made
16 reference to effects included in this theme, and 80% of dog owners did (Table 1). A
17 greater number of specific references were made by non-dog owners than dog owners.

18 *Non-Dog Owners:* Parents anticipated a *general calming/anxiety reducing*
19 *effect* when the child was close to the dog or stroking the dog (e.g., “there is a general
20 calming effect when he is with the dog”) and this would be evident in different
21 contexts, such as sleeping, eating, travelling, going to school, and arriving home from
22 school (e.g., “dog may calm him [child] when on public transport”). Such calming
23 effects were expected to reduce *tantrums/meltdowns or repetitive behaviours* (e.g.,
24 “dog may be a distraction, in that it will be more fun to play with the dog so prevent
25 repetitive behaviours [in the child]”). The dog was also viewed as a potential

1 distraction technique to prevent such problematic behaviours (e.g., “we may be able
2 to use the dog as distraction when he [child] is at low level escalation”), as well as a
3 means to *actively interrupt and stop tantrums/meltdowns/repetitive behaviours* once
4 they started (e.g., “we could interrupt repetitive behaviours? by introducing a game
5 with dog”) and *speed up recovery following tantrums* (e.g., “a dog may help calm the
6 child following tantrums”).

7 ***Dog Owners:*** Reports indicate that the expectation of dog ownership on child
8 calmness and anxiety and not unreasonable, with evidence for: *general*
9 *calming/anxiety reducing effects* (e.g., “calming effect on him [child] if the dog is
10 calm”; “calms her [child] when out walking”); a reduction in *tantrums/meltdowns or*
11 *repetitive behaviours* (e.g., “she [child] is less likely to have a tantrum when dog is
12 around”); a viable technique for *actively stopping tantrums/meltdowns/repetitive*
13 *behaviours* (e.g., “if he [child] is about to have a tantrum, sitting with him [dog]
14 prevents it”; “we can interrupt bad moods by suggesting he goes to play with the
15 dog”); and for *speeding up recovery following tantrums* (e.g., “her [child] tantrum
16 will finish much quicker if the dog is around”).

17 **4. Child activity (physical activity/exercise/motor skills).** The fourth largest theme
18 accounted for 11% of references made by parents, with similar number of specific
19 references from non-dog owners and dog owners.

20 ***Non-dog owners:*** Parents expected the dog would *increase children's*
21 *activities* inside and outside the home by providing purpose and motivation to engage
22 in activities (e.g., “the dog may be a reason to exercise, she [child] will walk for miles
23 if she has a dog”). An increased range of physical activity was expected to lead to
24 *general improvement in the child's motor skills and stamina* (e.g., “she [child] may
25 improve her motor skills through interactions with a dog”) and increase their *child's*

1 *level of exercise* (e.g., “he [child] will do more exercise because of the dog, he will be
2 healthier”).

3 **Dog Owners:** the expectations of dog ownership on child activity were
4 reflected in observed benefits made by dog owners, with evidence for an *increase in*
5 *children's activities* (e.g., “the dog provides a reason to do activity”), *general*
6 *improvements in the child's motor skills and stamina* (e.g., “playing fetch games
7 appears to have improved his [child’s] motor skills”) and increases in the *child’s level*
8 *of exercise* (e.g., “the dogs are reason why he [child] gets a high amount of exercise”).

9 **5. Child co-operation with others.** This theme accounted for 8% of references made
10 by parents. Proportionately more references were made by non-dog owners than dog
11 owners.

12 **Non-Dog Owners:** Parents were expecting that the *dog would be used as a*
13 *role model* for the child. For instance, the parent could show, how through grooming
14 the dog that self-care routines are important for the child, or the dog ‘behaving itself’
15 was used as a comparison for the child behaving (e.g., “the dog could be used as a
16 role model for self-care, such as grooming the dog to improve his [child’s] dislike of
17 this”; “may help him [child] accept being strapped in car; seeing dog strapped in
18 too”). Parents expected that *dog would be used as a reward for the child* in various
19 situations, for example, in co-operating with parent requests, compliance with daily
20 routines and activities (e.g., “the reward for her [child] focusing on a task could be
21 taking the dog out for a walk”). Additionally, it was hoped that the child would be
22 *more co-operative just because the child was around the dog* (e.g. “we hope it would
23 help him (child) be more responsive to people”).

24 **Dog Owners:** In general dog owning parents made no specific reference to the
25 *use of the dog as a role model*. However, this may just be differences in the way they

1 described the use of the dog in this context, since dog owning parents did describe the
2 *dog as a reason for the child to co-operate* and did report how they would *use the dog*
3 *as a reward* (e.g., “we use the dog as a reward for him [child] doing things such as
4 bath time, it helps him concentrate on that activity”) and indicated that their child is
5 *more co-operative just because the dog was around* (e.g., “he [child] is more
6 compliant with requests from parent if dog is there”). One parent reported that the dog
7 had a negative effect on child co-operation, but did not expand on this point.

8 In summary, dog ownership appears to improve child co-operation in most the
9 areas expected, however, the use of the dog as a role model and potential negative
10 effects on co-operation should be considered in greater detail before acquiring a dog.

11 **6. Child attention, concentration & focus (on activities and on dog).** This theme
12 accounted for 5% of references made by parents. More references were made by non-
13 dog owners than dog owners.

14 ***Non-Dog Owners:*** Parents expected that children would *concentrate better on*
15 *activities (not involving the dog) just because the dog was around* (e.g., “dog would
16 help him [child] to focus better in activities”); that the dog would focus the child (e.g.,
17 “he [child] will concentrate on what dog is doing rather than negative thoughts of
18 what he has experienced that day”) as well as sustain attention if the activity directly
19 involved the dog (e.g., “a dog might help increase his [child’s] attention as he will
20 have to be watching the dog”). Two parents were concerned that the dog would be a
21 distraction for the child, and therefore reduce concentration.

22 ***Dog Owners:*** The positive effects of dog ownership on child attention,
23 concentration and focus expected by the non-dog owners were observed in the dog
24 owners group (e.g., “she [dog] helps her [child] focus just by being there and calming
25 her” and “she [child] will concentrate better on any tasks that involve the dog”; “she

1 [child] focuses on the dog as she walks”). No observed negative effects of dog
2 ownership on child attention were specifically made, indicating that the non-dog
3 owners may overly-concerned with the likelihood of this.

4 **7. Language skills (expression of verbal and non-verbal skills).** This theme
5 accounted for 3% of references made by parents in the interviews. Proportionately
6 more references were made by non-dog owners than dog owners.

7 *Non-Dog Owners:* Parents were anticipating that through interacting with the
8 dog, children would show an *improvement in verbal and/or non-verbal skills as the*
9 dog would be a reason or motivation to practice these skills (e.g., “a dog may
10 encourage him [child] to use speech more”).

11 *Dog Owners:* Improvement in languages skills were observed in the dog
12 owning group (e.g., “his [child’s] communication has improved through talking to the
13 dog a lot”), indicating that expectations of dog ownership on language skills may be
14 realistic. No negative effects were reported.

15 **8. Interaction with local community (bringing community to family).** This theme
16 accounted for 2% of references made by parents, with most referencing positive
17 effects.

18 *Non-Dog Owners:* Parents anticipated that the presence of a dog would allow
19 them to engage more with the community (e.g., “the dogs would help break down
20 barriers with people in the community”). Negative effects were forecast in terms of
21 conflict with neighbours (e.g., “I would expect a potential conflict with friends who
22 own dogs but have very different views”).

23 *Dog Owners:* Parents reported that dog ownership did improve community
24 engagement (e.g., “he [child] is better known in local community because of having

1 the dog”). Concerns over neighbour conflict appear to be justifiably recognised (e.g.,
2 “our next door neighbour said “your dog must leave our cat alone”).

3 **9. Child safety:** This theme accounted for 1% of references made by parents, with
4 more references made by non-dog owners than dog owners. All referenced positive
5 effects.

6 *Non-Dog Owners:* Parents hoped that the dog would improve safety for their
7 child when engaging in activities, particularly outside of the home (e.g., walking), as
8 the child would remain close to the dog (e.g., “the dog may provide safety on walks,
9 as she [child] is a runner”).

10 *Dog Owners:* Improvements in child safety can be evidenced through dog-
11 ownership (e.g., “the dog remains physically very close to him (child) when out;
12 safety aspect as he [child] will speak to and go off with any strangers”).

13 **10. Dog specific issues.** This theme accounted for <1% of references made by
14 parents in the dog owners group only. The items directly related to training and
15 behaviour problems with the dog, including the dog showing aggression towards
16 people or dogs, repetitive behaviours, and nervous or boisterous behaviour (e.g., “our
17 dog is quite aggressive to other dogs so he [child] cannot take him [dog] out alone”).
18 These problems were not anticipated by the non-dog owners group highlighting a key
19 area for non-dog owners to be educated in before considering dog ownership.

20 **11. Sensory elements for child.** This theme accounted for <1% of references made
21 by parents, all comments concerned positive effects.

22 *Non-Dog Owners:* A few parents expected the child to benefit from the
23 sensory aspect of having a dog, (e.g., “the dog may help her [child] explore her senses
24 a little more”).

1 **Dog Owners:** Evidence that a dog may help overcome sensory difficulties was
2 observed (e.g., “my son has become a little more tolerant of sensory things, for
3 example, licking from dog”).

4

5 **Results from analysis of responses to general items**

6 Inter-rater reliability for responses to themes within the general items was
7 good (Kappa > 0.89, $p < 0.001$). The number of responses in each theme from dog
8 owners and non-dog owners are summarised in Tables 2-5. Qualitative summaries of
9 the themes within items are described below:

10 **Best thing about having a dog, from parent’s perspective.** There was no
11 significant difference (chi-square or Fisher’s exact test $p > 0.05$) between dog owners
12 and non-dog owners in their opinion of what they believed to be (or would be) the
13 best thing about having a dog (from their perspective). Within both groups
14 unconditional love, companionship and affection for family members
15 (RELATIONSHIPS) was most commonly reported.

16 Other themes reported by both groups included increased enjoyment and fun
17 for the child members (ENJOYMENT & FUN); increased in parent and/ or child
18 physical activity and outdoor access (ACTIVITY); the dog as a focus for enhanced
19 family cohesion (FAMILY FOCUS); and improved quality of life for the child,
20 enhances the family and effects on the child (OTHER).

21 Themes reported by the non-dog owners group only included increased
22 behaviour and other skills in their child (BEHAVIOUR/SKILLS) and increased calm
23 for the family (CALMING). Themes reported by the dog owners group only included
24 seeing their child communicate with the dog and allowing the parent to meet people

1 (COMMUNICATION/SOCIAL INTERACTION) and the security of having a dog in
2 the house (SECURITY).

3 ***Best thing about having a dog, from child's perspective.*** When parents were
4 asked what they believed to be (or would be) the best thing about having a dog, (from
5 their child's perspective) companionship for the child was the most commonly
6 mentioned best thing from the child's perspective, by both the dog owners and non-
7 dog owners. Common themes between groups were: someone to love unconditionally,
8 a friend, playmate, companion (COMPANIONSHIP); motivate child, increased
9 physical activity and exercise (ACTIVITY); someone to laugh with, enjoy, have fun
10 with (ENJOYMENT & FUN); boost child's immune system, safety, continuity
11 (always had a dog), a focus, sensory feedback and responsibility (OTHER). In the
12 non-dog owners group only 'opening the child's world' (COMMUNICATION/SI)
13 was included. Enjoyment and fun was reported significantly more by non-dog owners
14 than dog owners ($\chi^2 = 4.80$, $df = 1$, $p = .028$). No other differences were statically
15 significantly different.

16 ***Negative factors about having a dog.*** When parents were asked what they
17 believed to be (or would be) the 'bad things' (negative factors) about having a dog the
18 themes were: Time, commitment and work involved in owning a dog (MORE TO
19 DO); managing dog behaviour, training, cleaning up after them (DOG SPECIFIC);
20 restrictions with travelling, visiting people and days out (RESTRICTIONS); concerns
21 about the dog-child relationship including child not accepting the dog and risk of the
22 dog biting (DOG-CHILD DIFFICULTIES); cost associated with dog ownership
23 (COST); concerns about how the child would cope with the death of the dog (DEATH
24 OF DOG); dog a source of conflict between family members (NEGATIVE FAMILY
25 RELATIONSHIPS). Restrictions and 'more to do' were the most commonly reported

1 theme by the dog owners, with restrictions being reported significantly more by dog
2 owners than non-dog owners ($\chi^2 = 6.14, df = 1, p = .013$). The non-dog owners most
3 commonly reported 'dog specific' factors, although not significantly more than the
4 dog owners. Dog-child difficulties and negative family relationships were more
5 frequently reported by non-dog owners. No other differences were statically
6 significantly different.

7 *Most important effects of having a dog on the child.* When parents were
8 asked what they believed to be (or would be) the three most important effects on their
9 child the responses were: increased activity, outdoor activity and motivation to do
10 things (ACTIVITY); improvement in behaviour, independence and self-care skills
11 (BEHAVIOUR/SKILLS); calming effect, decreased anxiety and increased confidence
12 (CALMING); improved communication, social skills and interaction with people
13 (COMMUNICATION/SI); a common focus for the family (FOCUS); fun and
14 enjoyment for the child (ENJOYMENT & FUN); companionship, unconditional love
15 and friend for the child (COMPANIONSHIP); teaching child about responsibility
16 (RESPONSIBILITY); aids routine (ROUTINE); increased child safety (SAFETY).
17 The effect mentioned most by dog owners was companionship, whereas for non-dog
18 owners it was calming. Non-dog owners expected significantly more positive effects
19 on child communication and social interaction than were reported by dog owners (χ^2
20 = 4.64, $df = 1, p = 0.003$). No other differences were statically significantly different

21 **Discussion**

22 This exploratory, qualitative study provides an insight into the perceptions of
23 dog ownership in the homes of children with ASD. The evidence suggests that pet
24 dogs can improve the lives of children with ASD, their parents and wider family. In
25 general, the expectations of non-dog owners were matched by the perceived benefits

1 reported by dog owners. Discrepancies in expectations (from non-dog owners) versus
2 reality (from dog owners) are highlighted in this discussion to indicate possible effects
3 to consider when informing parents about acquiring a pet dog. We recognise that it is
4 not possible to match our dog owner and non-dog owner groups on every potential
5 individual variable that may affect their responses to the interview questions.
6 However, we highlight that both groups showed no significant difference in the
7 severity of child diagnoses of ASD, and that an equal number of parents in both
8 groups had attended more than one PAWS workshop (one in each group).

9 A predominant focus in responses across both groups of parents related to the
10 positive effects of dog ownership on the family. Non-dog owners anticipated that a
11 dog would enhance the family unit by improving cohesion, family activities and
12 socialising. Such improvements were identified by dog owners, indicating that these
13 expectations are potentially realistic. The benefits of dogs on the child's emotional
14 and social skills were similar between the two groups. Reports from dog owners
15 indicated that the dog improved the child's confidence and enjoyment of activities, as
16 well as promoting engagement, and these were comparable with the effects expected
17 from dog ownership by the non-dog owners group. However, potential negative
18 effects of the dogs behaviours (e.g., barking and over-activity) on the child's
19 behaviours were overlooked by the non-dog owning group. Effects of a dog on child
20 calmness were observed in both groups responses, but were predominant in the non-
21 dog owning group. Nonetheless, comments from the dog owners group indicate that
22 pet dogs can calm the child. Parents reported both anticipated (non-dog owners) and
23 observed (dog owners) improvements in child activity with the acquisition of a dog.
24 This is compatible with observations from a neuro-typical population which suggest

1 that dog owners are more likely to take regular exercise (Levine, Allen, Braun et al.,
2 2013).

3 Parental reports indicate that dog ownership may benefit child co-operation,
4 attention /concentration and languages skills; however such improvements appear to
5 be anticipated more frequently by non-dog owners than dog owners. Both positive
6 and negative effects of dog ownership on the local community were observed in both
7 groups. This supports suggestions that dogs can improve social interactions
8 (McNicholas & Collis, 2000) but also indicates an important potential negative to
9 consider. Although negative comments from the wider community were rarely made
10 by our participant sample, neighbour concerns over the dog chasing their cats were
11 documented. Therefore, when acquiring a pet dog parents may wish to consider
12 attending obedience training classes with their dogs to minimise the risk of these
13 frustrations developing. A small number of parents indicated that dog ownership can
14 improve child safety; comments made on this topic were slightly more predominant in
15 the non-dog owning group.

16 An important area that appeared to be overlooked by non-dog owners was dog
17 specific issues, such as behavioural problems, including aggression. Those providing
18 advice (e.g., clinicians, veterinarians, family friends) to families thinking of acquiring
19 a dog should encourage potential owners to consider such issues as well as suggest
20 appropriate sources of support to enable the prevention of problem development (i.e.,
21 suitably qualified animal training and behaviour providers). Should behaviour
22 problems develop it is important that parents acknowledge these early and seek
23 appropriate professional support to treat and manage these for the welfare of the
24 family and dog. The impact of dog behaviour problems on the family and child should
25 not be underestimated. Furthermore, there are potential welfare implications for the

1 dog, and it should be recognised that if animal welfare is compromised as a result of
2 unsuitable placement, of or lack of understanding about dogs and their needs, then
3 this might lead to difficulties and safety concerns. .

4 Generally a greater number of references were made within the themes by the
5 non-dog owners. This might be because of extended speculation in this group. It is
6 also possible that the non-dog owners population had a greater representation of
7 parents seeking ASD interventions (as opposed to simply having a family pet dog by
8 coincidence). This speculation is consistent with the significantly higher number of
9 parents recruited via the PAWS network in this group. It is worth noting that most had
10 not attended any of the PAWS workshops, which suggests their expectations might
11 not have not been discussed with professionals. Further instances of over estimation
12 of effects of dog ownership are seen in the response to the general item on ‘most
13 important effects on child’; whereas 60% of non-dog owners referenced effects on the
14 child’s communication and social interaction (compared to 15% of dog owners).
15 These opinions may be derived from the small evidence base, which suggests that
16 dogs provide a mechanism for children with autism to interact socially (Berry et al.,
17 2012), and that the acquisition of family pets (dogs, cats or small furry animals)
18 between the ages of 4-5 years has greater potential to increase some pro-social
19 behaviours in children with ASD, when compared to pets having always been present
20 (Grandgeorge et al., 2012).

21 Responses to the general items concerning the best thing about getting a dog
22 from the parent and child perspective were similar between groups. The greatest
23 number of parents responded with references to family relationships and
24 companionship for the child, although non-dog owners seemed to place more
25 emphasis on enjoyment and fun than dog owners. Responses to the item about

1 negative aspects of dog ownership indicate that non-dog owners anticipate the same
2 impacts as dog owners report. However, non dog owners seem to under estimate the
3 extent to which dog ownership can impact upon restrictions on travel and visiting
4 other people, as well as issues surrounding greater time commitments. Non-dog
5 owners anticipate more negative child-dog interactions and negative family
6 interactions, than are reported by the parents who have a dog. Whilst this could reflect
7 genuine concerns that do not materialise, the study population would likely be biased
8 toward families with successful dog relationships.

9 To date only one (known) study has reported parent's qualitative perceptions
10 on the effects of pet dogs on the lives of those living with ASD. Carlisle (2014)
11 focused on the decision making process involved in getting a dog, and provided
12 descriptive information of how children interact with and benefit from the dogs.
13 However, the study did not consider whether the reality of dog ownership lives up to
14 the expectations, and fails to consider the wider impacts of pet dog ownership on the
15 family and child, which is important because much of the information available (e.g.,
16 on the internet), advocates the benefits of dogs for children with ASD without proper
17 evaluation of the impact on the whole family system. There is a risk that families
18 searching for ways to improve their child's ASD symptoms or overall quality of life
19 might only view positive case examples and acquire dogs without careful
20 consideration or receiving appropriate professional advice. Given the individual
21 nature of ASD, what might be beneficial for some children / families might not be for
22 others, indeed, there is the risk that getting a pet dog could result in additional
23 problems. This paper serves an important reference point for both families
24 considering dog ownership and mental health practitioners.

1 To evaluate the potential of pet dogs (as opposed to animal therapy /
2 assistance dogs) we compared perceptions on pet dog ownership with published
3 results found with assistance dogs. The biggest area of discussion for parents in both
4 groups focussed around effects on the whole family. Parents described improvement
5 in family relationships, better inclusion of the ASD child, increased family activities
6 and outdoor access, as well as individual benefits for family members other than the
7 child with ASD. All of these effects have also been described by parents who have an
8 autism assistance dog for their child (Burrows et al., 2008). Both non-dog owners and
9 dog owner's recognised important negative effects of pet dogs (see also Carlisle,
10 2014). These negative effects have not been raised by parents who have an autism
11 assistance dog for their child; in fact they have described how travel and vacations
12 became easier because of being able to take the dog (Burrows et al., 2008). It is
13 important to consider that under current regulations pet dogs will not have the same
14 public access rights of dogs trained with registered assistance animal charities.
15 Positive effects on child social and emotional skills were also referenced frequently
16 by parents in both groups. These effects are consistent with those reported when dogs
17 are used in a therapy setting (Martin & Farnum, 2002; Silva et al, 2011) which
18 describe how dogs provide opportunities for the child to socially engage, develop
19 relationships, and express affection toward others. A much stronger emphasis on
20 improved child safety inside and outside of the home, increased social integration into
21 the community of the family and the opportunity for community education is
22 described by parents with assistance dogs (Burrows et al., 2008). Although these were
23 mentioned by pet dog owners, they were infrequent.

24 Future studies should consider the effects of the dog-owner relationship (e.g.,
25 strength of attachment, levels of and commitment to dog training) on parental

1 perceptions. Additionally, where negative effects or risks have been identified in this
2 study, particularly by the non-dog owners, they relate to reports from a population
3 that were carefully considering getting a pet dog. Additional risks, particularly those
4 related to child and dog safety, might exist when the acquisition of pet dogs is less
5 considered. Furthermore, the results of this small scale qualitative study focus on
6 identifying perceived impacts of dog ownership in families with children with ASD,
7 rather than considering potential covariates that may impact upon the quality of the
8 experience of dog ownership. Having identified key areas which may be of
9 importance to investigations in this area, future research should consider the role of
10 individual differences. One important factor which should be considered in future
11 studies, and which was not recorded here, was previous experience with dog
12 ownership in both the dog-owning and non-dog owning group. It is possible that
13 previous experiences play an important role in shaping parental perceptions on the
14 value of dog ownership.

15 In conclusion, this study provides a solid foundation for future systematic and
16 targeted analyses of the benefits of pet dogs for children with ASD and their families,
17 and highlights potential areas where expectations appear unrealistic. The study
18 provides essential information for practising professionals who can offer advice on
19 acquiring a pet dog to parents with a child with ASD. Overall, the perceived benefits
20 reported by parents looking to get a dog were similar to those that already owned a
21 dog, suggesting that their expectations were met. However, parents without a dog
22 seem to anticipate more positive changes in child behaviour and fewer restrictions on
23 the family, suggesting that expectations in these specific areas might not be met.
24 Parents should be carefully counselled about their expectation in these areas by

1 professionals working in this field in order to promote dog welfare and positive
2 human-dog relationships

3

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3

1 **Table 1. Thematic Analysis from Specific Items Recorded in Figure 1**

	All responses		Positive effects		Negative effects	
	n (%)	n(%)	n (%)	n(%)	n (%)	n(%)
	Non-Dog Owners ^a	Dog Owners ^b	Non-Dog Owners ^a	Dog Owners	Non-Dog Owners	Dog Owners ^b
1. Family effects	20(100)	19(95)	20(100)	18(90)	14(70)	15(75)
2. Child social skills	20(100)	20(100)	20(100)	20(100)	1(5)	3(15)
3. Child calming	20(100)	16(80)	20(100)	15(75)	1(5)	1(5)
4. Child Activity	19(95)	18(90)	19(95)	18(90)	0(0)	0(0)
5. Child co-operation	20(100)	13(65)	20(100)	12(60)	0(0)	1(5)
6. Child attention	17(85)	13(65)	17(85)	13(65)	2(10)	0(0)
7. Child language	13(65)	9(45)	13(65)	9(45)	0(0)	0(0)
8 .Local community	11(55)	6(30)	9(45)	4(20)	2(10)	2(10)
9. Child safety	6(30)	3(15)	6(30)	3(15)	0(0)	0(0)
10. Dog specific	0(0)	3(15)	0(0)	0(0)	0(0)	3(15)
11. Child sensory	3(15)	3(15)	3(15)	3(15)	0(0)	0(0)

2 ^a Number of Non Dog Owners making reference to themes

3 ^b Number of Dog Owners making reference to themes

4

1 **Table 2. Number (n) and Percentage (%) of Non-Dog-Owners (NDO) and Dog-**
 2 **Owners (DO) Reporting to Themes on: Best Things on Owning a Dog from a**
 3 **Parent’s Perspective**

Theme	n (%)Non-Dog Owner	n (%) Dog Owners
Activity	4 (20%)	4 (20%)
Behaviour/Skills (of child)	2 (10%)	2 (10%)
Calming	2 (10%)	2 (10%)
Communication/social Interaction	0 (0%)	2 (10%)
Enjoyment & Fun	6 (30%)	4 (20%)
Family Focus	2 (10%)	2 (10%)
Parent emotional gain	1 (5%)	2 (10%)
Security	0 (0%)	3 (15%)
Relationships	7 (35%)	11 (55%)
Other	2 (10%)	1 (5%)

4

1 **Table 3. Number (n) and percentage (%) of Non-Dog-Owners and Dog-Owners**
 2 **Reporting to Themes on Best Things on Owning a Dog from a Child’s**
 3 **Perspective**

Theme	n (%)	n (%) Dog owners
	Non-dog owners	
Companionship	15 (75%)	14 (70%)
Activity	2 (10%)	2 (10%)
Enjoyment & Fun	8 (40%)*	2 (10%)
Communication/Social interaction	2 (10%)	0 (0%)
Other	2 (10%)	2 (10%)

4 *indicates significant difference between non-dog owners and dog owners (Chi-
 5 squared, p<0.05).
 6
 7

1 **Table 4. Number (n) and Percentage (%) of Non-Dog-Owners and Dog-Owners**
 2 **Reporting to Themes on Perceived Bad Things (Negative Factors) About Owning**
 3 **a Dog**

Theme	n (%) Non-dog owners	n (%) Dog owners
More to do	9 (45%)	9 (45%)
Dog specific (e.g., dirt, noise)	11 (55%)	8 (40%)
Restrictions	2 (10%)	9 (45%)*
Dog/child difficulties	8 (40%)	3 (15%)
Cost	4 (20%)	3 (15%)
Death of dog	1 (5%)	1 (5%)
Negative family relationships	3 (15%)	0 (0%)

4 *indicates significant difference between non-dog owners and dog owners (Chi-
 5 squared, $p < 0.05$).

6

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2 **Table 5. Number (n) and Percentage (%) of Non-Dog-Owners and Dog-Owners**
3 **Reporting to Themes on the Three Most Important Effects of Dog Ownership on**
4 **the Child**

Theme	n (%) Non-dog owners	n (%) Dog owners
Activity	5 (25%)	7 (35%)
Behaviour/skills	5 (25%)	3 (15%)
Calming	12 (60%)	9 (45%)
Communication/social interaction	12 (60%)*	3 (15%)
Focus	3 (15%)	3 (15%)
Enjoyment & fun	3 (15%)	3 (15%)
Companionship	8 (40%)	12 (60%)
Responsibility	3 (15%)	5 (25%)
Routine	0 (0%)	1 (5%)
Safety	2 (10%)	2 (10%)

5 *indicates significant difference between non-dog owners and dog owners (Chi-
6 squared, $p < 0.05$)

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Figure 1. Questions (items) used in the semi-structured interviews

Specific items: How do you think having a pet dog has/would influence:

- 1) Calming effects
- 2) Child activity
- 3) Child attention/concentration
- 4) Child focus/consistency
- 5) Child responsiveness/co-operation
- 6) Child eating
- 7) Child repetitive behaviours
- 8) Child self-care
- 9) Child sleep
- 10) Child tantrums/meltdowns
- 11) Child toileting
- 12) Child communication with family members
- 13) Child communication and language ability
- 14) Family daily routine
- 15) Normal daily tasks (e.g., trips to the local shops)
- 16) Outdoor access (ability to get out)
- 17) Relationship – family as a whole
- 18) Child relationship with parents
- 19) Child relationship with siblings
- 20) Child shared activities with parent
- 21) Child shared activities with siblings
- 22) Child social skills
- 23) Family travel
- 24) Other/general effects (anything not covered in above)

General items:

- 1) From your perspective (parent), what is/would be the best thing about having a dog?
- 2) From your child's perspective what do you think is/would be the best thing about having a pet dog?
- 3) Can you think of any bad things (negative factors) about having in dog so far as your child or family is concerned?
- 4) From your perspective, what are the three most important effects that the dog has/would have on your child?

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