

**Childhood Experiences with Family Pets and Psychosocial Functioning
in Early Adulthood**

by

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in

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Abstract

The purpose of this research was to investigate the association between childhood experiences with family pets and psychosocial functioning in early adulthood. The Exposure to Pet Aggression Scale (EPAS) was developed to provide a multidimensional measure of exposure to pet aggression in childhood. In Study 1, the psychometric properties of new and modified scales were evaluated and found to be appropriate for use in the main study. In Study 2, university students ($n = 318$) completed measures to assess bonding with childhood pets, exposure to pet aggression in childhood, and current psychosocial functioning (empathy, interpersonal aggression, anxiety, depression). A series of ANCOVA analyses was conducted, with measures of child maltreatment included as covariates. Results revealed that participants who had stronger bonds with childhood pets had significantly higher empathy scores than those with lower bonds; exposure to pet aggression was not significantly associated with empathy. A significant interaction was observed between pet bonding and exposure to pet aggression for the anxiety and depression dependent variables. Among participants who were exposed to pet aggression, those with medium-level bonds had higher depression and anxiety scores compared to those with low-level bonds. Among participants who were not exposed to pet aggression, those with medium-level bonds had lower depression and anxiety scores compared to those with low-level bonds. The results for participants with high-level bonds were unexpected. Experiences with childhood pets were not significantly associated with interpersonal aggression. The results of this study may have implications for mental health intervention and child protection.

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Table of Contents

Abstract	ii
Acknowledgements	iii
Table of contents	iv
List of tables	vi
List of figures	vii
List of appendices	viii
Introduction	1
Prevalence and demographics of pet ownership	1
Benefits of pet ownership	3
Pets as attachment figures for children	8
Pets and mental health	13
Social functioning	14
Aggression and antisocial behaviour	19
Stress and anxiety	23
Depression	27
Summary of research on pets and mental health	31
Exposure to animal cruelty in childhood	35
Exposure to animal cruelty and mental health	37
Multidimensional nature of children's experiences with pets	42
Purpose	44
Study 1	44
Empathy	45
Bonding with childhood pets	48
Exposure to family violence in childhood	49
Exposure to pet aggression in childhood	50
Purpose	52
Method	53
Participants.....	53
Measures	54
Procedure	60
Results	61
Pet ownership history	61
Empathy	63
Bonding with childhood pets	63
Exposure to family violence in childhood	64
Exposure to pet aggression in childhood	65
Discussion	69
Study 2	74
Method	76
Participants	76
Measures	76

Procedure.....	82
Results	83
Data cleaning	84
Pet ownership history	88
Bonding with childhood pets	90
Exposure to pet aggression in childhood	91
Pet ownership and psychosocial functioning	96
Pet bonding and exposure to pet aggression	96
Discussion	102
Bonding with childhood pets	103
Exposure to pet aggression in childhood	105
Pet ownership and psychosocial functioning	109
Pet bonding and exposure to pet aggression	110
Empathy	111
Depression and anxiety	115
Interpersonal aggression	123
Limitations and directions for future research	126
Conclusions	134
References	136
Tables	168
Figures	177
Appendices	183

List of Tables

Table 1. Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Empathy Measures in Study 1

Table 2. Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Measures of Pet Bonding in Study 1

Table 3. Descriptive Statistics and Bivariate Correlations Among Measures of Family Violence in Study 1

Table 4. Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Measures of Exposure to Pet Aggression in Study 1

Table 5. Comparison of Childhood Pet Owners and Non-owners on Measures of Current Psychosocial Functioning

Table 6. Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Measures of Family Violence in Study 2

Table 7. Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Childhood Pet Measures for Study 2

Table 8. Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Dependent Variables for Study 2

Table 9. Proportion of Participants in Each BDI Depression Cut Score Range According to EPAS-F Score Range

List of Figures

Figure 1. Distribution of Exposure to Pet Aggression Scale (EPAS) scores for the favourite childhood pet

Figure 2. Mean pet bonding scores for the three favourite childhood pets for each pet type

Figure 3. Mean empathy scores according to level of exposure to pet aggression and level of pet bonding

Figure 4. Mean interpersonal aggression scores according to level of exposure to pet aggression and level of pet bonding

Figure 5. Mean depression scores according to level of exposure to pet aggression and level of pet bonding

Figure 6. Mean anxiety scores according to level of exposure to pet aggression and level of pet bonding

List of Appendices

Appendix A. Background questionnaire

Appendix B. Childhood pet ownership history questionnaire

Appendix C. Exposure to Pet Aggression Scale (EPAS) items

Appendix D. Interview questions for Study 1

Appendix E. Informed consent letter

Appendix F. Debriefing information

Childhood Experiences with Family Pets and Psychosocial Functioning in Early Adulthood

The purpose of this study was to investigate the association between children's experiences with family pets and mental health. Specifically, this study sought to establish whether having a strong emotional bond with a family pet in childhood is associated with mental health and positive social functioning in early adulthood. In addition, this study sought to establish whether witnessing aggression toward family pets is associated with later experiences of mental health problems and interpersonal difficulties. Finally, because previous research has tended to focus solely on positive *or* negative experiences with animals, this study included an evaluation of the potential interaction between pet bonding and witnessing pet aggression in their associations with psychosocial functioning in early adulthood. A subsidiary purpose of this study was to provide basic descriptive information about the participants' experiences with pets in childhood, particularly the characteristics of exposure to pet aggression.

Prevalence and Demographics of Pet Ownership

Human beings have a long history of interactions with animals of other species, but it is thought that companion animals started to take an increasingly important role in the family in the early 19th century, when parents came to believe that animals could contribute to the socialization of their children (Grier, 1999). Today, pet ownership is very common among families around the world (Bexell, Jarrett, Yang, & Tan, 2005; Fifield & Forsyth, 1999; Miura, Bradshaw, & Tanida, 2002; Rost & Hartman, 1994; Siegmund & Biermann, 1988; Vizek-Vidovic, Stetic & Bratko, 1999). Representative

surveys in the U.S. indicate that approximately 60% of households currently include one or more family pets (Marx, Stallones, Garrity, & Johnson, 1988; Poresky & Daniels, 1998; Risley-Curtiss, Holley, & Wolf, 2006; Rowan, 1992). It is noteworthy that many individuals who do not have family pets express a desire to have pets (Albert & Bulcroft, 1988; Fifield & Forsyth, 1999; Kidd & Kidd, 1985; Pagani, Robustelli, & Ascione, 2007; Rost & Hartman, 1994).

Dogs are the most popular family pets in the U.S. and Canada. Survey results indicate that between 39% and 79% of pet-owning families include dogs (Catanzaro, 1984; Covert, Whiren, Keith, & Nelson, 1985; Daly & Morton, 2003; 2006; Risley-Curtiss et al., 2006; Siegel, 1995; Triebenbacher, 1998a). Also, pet owners tend to report that dogs are their favourite or most important pets (Bagley & Gonsman, 2005; Bryant & Donnelan, 2007; Kidd & Kidd, 1989; Marx et al., 1988; Poresky, Hendrix, Mosier, & Samuelson, 1988; Poresky & Daniels, 1998). There is disagreement across survey results as to whether cats (range 17% to 50%) or fish (range 21% to 35%) are the next most common pets (Catanzaro, 1984; Daly & Morton, 2003; 2006; Davis & Juhasz, 1995; Risley-Curtiss et al., 2006; Siegel, 1995; Triebenbacher, 1998a). Each of several other types of pet, including birds, reptiles, and small mammals (e.g., gerbils, rabbits) are typically reported by between 5% and 20% of pet-owners (e.g., Catanzaro, 1984; Daly & Morton, 2003; 2006). It is not unusual for families to have multiple pets, and to have more than one species of pet (Albert & Bulcroft, 1988; Marx et al., 1988).

Pet ownership appears to be most common among families that include children (Albert & Bulcroft, 1988; Marx et al., 1988; Rowan, 1992; Salmon & Salmon, 1983;

Siegmund & Biermann, 1988). Research typically has found that between 70% and 90% of children currently have family pets (Bryant & Donnelan, 2007; Daly & Morton, 2003; Kidd & Kidd, 1985; Rost & Hartmann, 1994; Siegmund & Biermann, 1988; Triebenbacher 1998a; 1998b), although the prevalence of pet ownership is generally lower in samples that include families with very young children (Albert & Bulcroft, 1988; Bexell et al., 2005; Melson, 1988; Triebenbacher, 1998a). Retrospective surveys indicate that the vast majority of adolescents and adults (approximately 90% or more) had at least one pet in childhood (Cain, 1983; Cain, 1985; Catanzaro, 1984; Covert et al., 1985; Kidd & Kidd, 1989; 1994; Miura et al., 2002; Poresky et al., 1988; Robin, ten Bensel, Quigley, & Anderson, 1983).

Benefits of Pet Ownership

Pet ownership is thought to afford a number of benefits to humans that may contribute to improved psychological well-being. This may partly explain the wide prevalence of pet ownership around the world. Many parents believe that it is important for children to have family pets (Catanzaro, 1984), and that pet ownership can teach children to be independent, responsible, gentle, and respectful of living things (Albert & Bulcroft, 1988; Cain, 1983; 1985; Catanzaro, 1984; Fifield & Forsyth, 1999; Salmon & Salmon, 1983). In addition to these perceived benefits, other proposed benefits of pet ownership can be grouped into the following categories: 1) physical activity and health, 2) pleasurable companionship, 3) contact comfort, and 4) social support. Each of these benefits will be discussed in turn.

Physical Health and Activity. Pets may enhance human well-being by contributing to the physical health of their human companions. A review of the health benefits of pet ownership indicated that pet ownership has been associated with improved general health, reduced doctor visits, increased survival rates among individuals with heart problems, and reductions in physiological indicators of stress (Crawford, Worsham, & Swinehart, 2006).

A number of authors have suggested that one of the important benefits of pet ownership that contributes to physical and psychological health is the increase in opportunities (and motivation) for exercise (Akiyama, Holtzman, & Britz, 1986; Cain, 1985; Edney, 1995; Friedmann & Thomas, 1985; Kidd & Kidd, 1980; Wilson & Barker, 2003). Studies reveal that pet owners also perceive this increase in physical activity as one of the benefits of pet ownership (Carmack, 1985; Miura et al., 2002; Rew, 2000; Salmon & Salmon, 1983). Among children, physical activity is likely to take the form of active play with pets (Kidd & Kidd, 1985; Robin & ten Bensel, 1985; Smith, 1983); whereas adult pet-owners get exercise by walking with their dogs (Messent, 1983; Rogers, Hart, & Boltz, 1993). As physical activity has been associated with improvements in psychological well-being (e.g., Fox, 1999), pet ownership may indirectly contribute to mental health by encouraging humans to be more active.

Pleasurable companionship. One of the most frequently cited benefits of pet ownership, by researchers and pet-owners alike, is that pets provide companionship that individuals perceive as enjoyable (Akiyama et al., 1986; Albert & Bulcroft, 1988; Archer & Winchester, 1994; Bexell et al., 2005; Bonas, McNicholas, & Collis, 2000; Bryant &

Donnelan, 2007; Cain, 1983; 1985; Catanzaro, 1984; Covert et al., 1985; Davis & Juhasz, 1995; Edney, 1995; Fifield & Forsyth, 1999; Friedmann & Thomas, 1985; Kidd & Kidd, 1994; Mallon, 1994a; Miura et al., 2002; Morrow, 1998; Okoniewski, 1984; Quigley, Vogel, & Anderson, 1983; Robin et al., 1983; Salmon & Salmon, 1983; Siegel, Angulo, Detels, Wesch, & Mullen, 1999; Wilson & Barker, 2003). Children report that they like playing with their pets, and observations of their behaviour (by parents and researchers) confirm that many children spend a great deal of time playing with, and caring for, their pets (Bexell et al., 2005; Filiatre, Millot, & Montagner, 1986; Kidd & Kidd, 1985; Melson, 1988; Melson & Fogel, 1996; Okoniewski, 1984; Rost & Hartmann, 1994; Smith, 1983; Triebenbacher, 1998a). People of all ages consider their pets to be their friends (Archer & Winchester, 1994; Bexell et al., 2005; Covert et al., 1985; Kidd & Kidd, 1994; Mallon, 1994a; Miura et al., 2002; Okoniewski, 1984; Salmon & Salmon, 1983; Strand, 2004).

Contact comfort. A number of authors have suggested that physical contact between humans and animals is one of the benefits of pet ownership, as it provides a source of comfort (Bryant, 1990; Cain, 1985; Collis & McNicholas, 1998; Edney, 1995; Friedmann & Thomas, 1985; Salmon & Salmon, 1983; Siegmund & Bierman, 1988; Shiloh, Sorek, & Terkel, 2003). Harlow and colleagues demonstrated that physical touch (contact comfort) is necessary for the healthy social development of infant primates (e.g., Harlow & Zimmerman, 1959), and later research on the effects of physical touch indicated that it is associated with improvements in psychological health among humans (Kidd & Kidd, 1987). For example, several studies have documented reductions in

symptoms of anxiety and depression among children and adolescents who receive massage therapy (e.g., Field, Grizzle, Scafidi, Schanberg, 1996; Field, Morrow, Valdeon, & Larson, 1992). A number of studies have found that physical contact with animals is associated with reductions in physiological indicators of stress (e.g., Shiloh et al., 2003).

In support of the importance of tactile contact with animals are reports from children themselves, as well as observations of their behaviour with their pets. In a series of structured observational studies, Filiatre and colleagues found that many of the interactions that took place between (male) children and their dogs involved bodily contact (Filiatre, Millot, Montagner, Eckerlin, & Gagnon, 1988; Filiatre et al., 1986; Millot & Filiatre, 1986; see also Smith, 1983). Although some physically aggressive behaviour was observed, 41% of all interactions (verbal and non-verbal) involved the child stroking, kissing, or hugging the dog, or placing his hand on the dog in some other manner (Millot & Filiatre, 1986). Touching behaviours were more common than verbal behaviours and all other non-verbal behaviours, such as gesturing or throwing objects (Filiatre et al., 1988; Millot & Filiatre, 1986). Children report that they enjoy petting and cuddling with their pets (Bexell et al., 2005; Kidd & Kidd, 1985), and that they consider physical contact to be an important part of pet ownership (Rost & Hartmann, 1994).

Social support. A common theoretical construct that has been used to describe human-animal relationships is social support (Barba, 1995). Social support has been defined as information that influences a person to feel that he/she is cared for, valued, and part of an interpersonal network (Cobb, 1976). Social support is thought to play a protective role in mental health via one of two pathways. The buffering model suggests

that social support contributes to well-being only when the person is challenged by stressful events and requires additional resources to cope with the stressors. The direct- or main-effect model suggests that social support contributes to well-being regardless of the presence of stressors, perhaps because social interactions lead to positive affect and may help individuals to avoid potential stressors. Research has provided support for both models (Cohen & McKay, 1984; Cohen & Wills, 1985).

A number of studies have been conducted to investigate whether human social support contributes to psychological well-being. Research involving children and adolescents indicates that greater perceived social support is associated with lower levels of antisocial behaviour and psychological distress (e.g., anxiety, depression) compared with lower perceived social support (Benhorin & McMahon, 2008; Biggam & Power, 1997; Cheng, 1998; Rosenthal & Wilson, 2008; White, Bruce, Farrell, & Kliever, 1998; Wolchik, Ruhlman, Braver, & Sandler, 1989). If children receive social support from their pets, as has been proposed by several authors (Bodsworth & Coleman, 2001; Bonas et al., 2000; Bryant & Donnelan, 2007; Edney, 1995; Wilson & Barker, 2003), then this support may contribute to mental health in a manner that is similar to the protective effects of human social support. As with human social support models, Garrity and colleagues suggest that relationships with pets may enhance human well-being directly, and through buffering effects of support during times of distress (Garrity, Stallones, Marx, & Johnson, 1989).

Several dimensions of social support have been proposed. Collis and McNicholas (1998) observed that most of the multidimensional models of social support share

characteristics of Cobb's (1976) framework. They noted six of the most commonly described dimensions of social support (emotional support, network support, esteem support, instrumental support, nurturance, informational support) and suggested ways in which human-animal relationships might provide social support in these multiple ways. Additional research has been published since the Collis and McNicholas (1998) study that provides further evidence that pets provide these types of social support to humans.

For example, *network support* refers to a sense of belonging to a group that shares mutual interests and activities. Pets may provide this type of support directly, as they offer companionship in their roles as friends or family members. Pets also may be an indirect source of network support because of their ability to facilitate social interactions among humans (Wells, 2004; Wilson & Barker, 2003). Children and adults indicate that pets help them to initiate and maintain social relationships (Cain, 1983; Okoniewski, 1984; Salmon & Salmon, 1983). Joubert (1987) reported that pet owners spent significantly more time socializing with other people than non-owners. Several observational studies have found that people are more likely to initiate positive social interactions (e.g., smiles, conversations) towards individuals who have pets with them than towards individuals who do not have pets with them (McNicholas & Collis, 2000; Messent, 1983; Wells, 2004).

Pets as Attachment Figures for Children

Considering the numerous benefits of pet ownership reported by parents and children, and considering the nature of activities shared between children and their pets, it seems clear that children can develop social relationships with animals that involve

affection. Indeed, many children report that they love their pets and consider them to be part of their families (Albert & Bulcroft, 1987; Cain, 1983; 1985; Davis & Juhasz, 1995; Kidd & Kidd, 1985; Morrow, 1998; Risley-Curtis et al., 2006; Robin et al., 1983; Salmon & Salmon, 1983; Strand, 2004; Triebenbacher, 1998a).

The term *attachment* is frequently used in the human-animal interaction (HAI) literature to describe affectionate relationships between humans and animals (e.g., Brown, Richards, & Wilson, 1996; Cowles, 1985; Kurdek, 2008; Rynearson, 1978; Taylor, Williams, & Gray, 2004). Ainsworth (1973) defined attachment as an “affectional tie that one person forms to another specific person, binding them together in space and enduring over time” (p. 1). Attachment typically has been described in relation to the infant-caregiver relationship, however, some have erroneously contended that attachment is confined to such relationships (Ainsworth, 1979). In fact, attachments extend beyond the parent-child relationship to include other significant figures in childhood and adulthood (Ainsworth, 1989; Bowlby, 1980; Seibert & Kerns, 2009). Supporting the extension of attachment theory to human-animal relationships, Bowlby (1982) wrote extensively on the similarities between attachment behaviours displayed by human infants, and attachment behaviours displayed by the young of different species of animals (e.g., proximity seeking). He provided a number of examples in which non-human animals developed attachments to human caregivers in the absence of mothers of their own species.

Although the term attachment is frequently used in the HAI literature, as noted by Crawford et al. (2006), the instruments currently used to measure children’s relationships

with pets do not necessarily assess all of the components of attachment, as described by the pioneers of attachment theory (e.g., Bowlby, 1982; Ainsworth, 1989). In fact, very few authors have explicitly drawn on traditional attachment theory to describe the characteristics of human-animal relationships, or to generate hypotheses for HAI research (Barba, 1995). Despite these concerns, however, the HAI literature provides some limited evidence to suggest that child-pet relationships may have some (or all) of the characteristics of attachment relationships.

Attachment behaviour is defined as any behaviour that is intended to maintain proximity to an attachment figure; the attachment figure is differentiated from all other individuals and is not interchangeable with any other (Ainsworth, 1989; Bowlby, 1980). Research was cited previously indicating that children spend a great deal of time in close physical proximity to their pets (e.g., Filiatre et al., 1988), and Triebenbacher (1998a) reported that many children felt that being physically close to their pets helped them to feel better. Kurdek (2009) found that proximity maintenance was one of the most salient attachment features of relationships between college students and their dogs, and was a more salient feature of relationships with dogs than of relationships with mothers, fathers, siblings, or significant others.

Little empirical evidence is currently available to support the notion that a family pet is a unique, non-interchangeable individual, however, some anecdotal evidence supports this notion. For example, consider the following statement from a child who was grieving the loss of a family pet: "I was crying for a long time, hoping that Shaba would come back... Mom said she would buy another, well I didn't want another... I wanted

Shaba” (Robin et al., 1983, p. 441). Furthermore, consider the following statement by an adult pet owner: “he really was an unusual cat. You’d have to know him to understand just what I mean. I’ve never been able to have what we had with another cat, and certainly not with another person” (Carmack, 1985; p. 151).

An important characteristic of attachment is that unexpected, inexplicable, or prolonged separation from the attachment figure leads to distress, anxiety, and anger; permanent separation leads to sadness and anger (Ainsworth, 1979; 1989; Bowlby, 1980). Research on pet bereavement indicates that the death of a pet can sometimes result in an intense, prolonged grieving process, for both adults and children (Brown et al., 1996; Cain, 1983; Robin et al., 1983). In fact, the death of a pet can be as distressing as the death of a human relative (Carmack, 1985; Gage & Holcomb, 1991; Gerwolls & Labott, 1994). In some cases the grieving response can include symptoms of depression and anxiety (Akiyama et al., 1986; Archer & Winchester, 1994; Stallones, 1994). Anecdotal reports provide further evidence that unwanted separations from pets lead to sadness and anger. For example, consider the following statement by an institutionalized “delinquent” youth: “I was sad and angry. I said if I ever found out who shot her, I would kill them for sure” (Robin et al., 1983; p. 441).

According to Ainsworth (1989) the key feature of attachment relationships, one that differentiates attachments from other types of affectional bonds, is that the individual experiences a sense of safety and comfort from the relationship with the attachment figure. Research indicates that pets provide a source of comfort to humans (e.g., Miura et al., 2002; Morrow, 1998), and that people tend to turn to their pets during times of

loneliness, sadness, and distress (e.g., Cain, 1983; Rost & Hartmann, 1994). Surveys of pet owners reveal that protection and safety are among the most important perceived benefits of pet ownership (Archer & Winchester, 1994; Cain, 1983; Cohen, 2002; Kidd & Kidd, 1994; Quigley et al., 1983; Rew, 2000; Salmon & Salmon, 1983). There is some limited evidence to suggest that that pets may physically protect children from harm by abusive family members (Robin et al., 1983). Kurdek (2008; 2009) found that security and comfort were important characteristics of human-dog relationships, and concluded that some individuals can develop attachments to their dogs.

The currently available evidence suggests that relationships between humans and animals share many of the same characteristics, and provide similar benefits (e.g., social support, security, comfort), as relationships between human beings. For the purposes of this paper, it is assumed that many child-pet relationships are affectional bonds, and that some of those affectional bonds may be described as attachments. However, it is not yet clear that currently available measures of human-animal bonds assess all aspects of attachment in its traditional sense, and it is not yet widely accepted that children can become attached to their pets (e.g., see Kobak, 2009). Therefore, the term “bond” will be used to describe the affectional relationship that may develop between children and pets.

Although more research must be conducted to support the contention that child-pet relationships can be considered attachments in the traditional sense, attachment theory provides a framework from which to generate hypotheses about the psychological effects of relationships with pets. Research suggests that children who develop secure attachments to humans are less likely to experience both internalizing (e.g., anxiety) and

externalizing (e.g., aggression) mental health difficulties, and are more likely to be socially competent than children who develop less secure attachments to others (e.g., Bohlin, Hagekull, & Rydell, 2000; Erikson, Sroufe, & Egeland, 1985; Lewis, Feiring, McGuffog, & Jaskir, 1984; Wilkinson & Walford, 2001). If the assumption is made that attachment theory is applicable to human-pet relationships, then individuals who develop strong emotional bonds to their pets would be expected to experience fewer mental health problems, and be more socially competent, than individuals who are less strongly bonded to their pets. In the following section, previous research on the psychological effects of bonding with pets will be reviewed.

Pets and Mental Health

Although childhood pet ownership is common, and a number of psychological benefits of pet ownership have been proposed, very little empirical research has been conducted to investigate the association between the quality of children's relationships with family pets and mental health. Therefore, a central purpose of this study was to extend previous research on the association between bonding with childhood pets and different aspects of mental health. The studies that have been previously conducted focus mainly on four domains of mental health functioning: 1) social functioning (e.g., prosocial behaviour, empathy), 2) aggression and conduct problems, 3) stress and anxiety, and 4) depression. Accordingly, these four domains were selected as the focus of the current study.

A slightly larger body of research exists on the association between pet *ownership* and mental health, which presumably includes individuals with varying levels of bonding

with pets. Additional evidence of an association between experiences with companion animals and mental health comes from research on the psychological effects of animal-assisted interventions (i.e., therapeutic interventions involving structured or unstructured activities with animals). Because of the scarcity of previous research on the association between pet bonding and mental health, the literature on the psychological effects of pet ownership and animal-assisted interventions will be reviewed. Furthermore, because of the scarcity of previous research that involves children and/or adolescents, the literature review will include research on adult populations.

Social Functioning

Pet bonding. A number of studies have been conducted to investigate the association between the quality of bonding with pets and the quality of children's interpersonal functioning. Poresky and Hendrix (1990; Poresky, 1996) recruited families with young children, three to six years of age, through day care centres, birth announcements, and media coverage. Parents completed the Companion Animal Bonding Scale (CABS; Poresky, Hendrix, Mosier, & Samuelson, 1987) to provide a measure of their children's ($n = 88$) relationships with pets, and the Iowa Social Competency Scales to assess their children's social functioning. The Young Children's Empathy Measure was administered to the children, which involves the presentation of vignettes designed to elicit various emotions. A significant positive correlation was observed between the CABS and the *reassurance* sub-scale of the measure of social competence, and a significant negative correlation was observed between the CABS and the *uncooperative*

sub-scale of the measure of social competence. Also, a significant positive correlation was observed between CABS scores and empathy scores.

Melson, Peet, and Sparks (1991) conducted a survey of pet-owning families ($n = 404$) that included children in kindergarten, second grade, and fifth grade. The authors developed a new measure, the Pet Attachment Scale, to assess cognitive, behavioural, and affective dimensions of children's relationships with pets. This measure was completed by the children's parents, along with Bryant's (1982) Index of Empathy for Children and Adolescents. Harter's Pictorial Scale of Perceived Competence and Social Acceptance was administered to children in kindergarten and second grade, and the Perceived Competence Scale for Children was administered to children in the fifth grade. A significant positive correlation was observed between measures of pet bonding and perceived social competence among children in kindergarten. A significant positive correlation was observed between measures of pet bonding and empathy among fifth grade children as well as kindergarten boys.

Vizek-Vidovic et al. (1999) investigated the association between pet bonding and social functioning among a sample of 826 fourth, sixth, and eighth grade elementary school children in Croatia. Bonding with pets was measured with the Child Pet Attachment scale, social functioning was measured with the Child Prosocial Orientation Scale, and empathy was measured with the Child Empathy Scale. From the information provided in the report, it is assumed that each of these measures was newly developed by the authors for the study, as no references were provided to indicate that they had been previously validated. Participants were divided into groups according to whether their pet

bonding scores were higher or lower than average. The results of ANOVAs indicated that children who had stronger than average bonds with their pets had significant higher empathy and prosocial orientation scores compared with children who were less strongly bonded with their pets.

Daly and Morton (2006) conducted a study involving 155 Canadian elementary school students in fourth, sixth, and eighth grades. Children completed Bryant's (1982) Empathy Index and the Lexington Attachment to Pets Scale (LAPS; Johnson, Garrity, & Stallones, 1992). A significant positive correlation was observed between scores on the measures of empathy and pet bonding.

Only two studies have failed to provide evidence of an association between pet bonding and social functioning. Daly and Morton (2003) reported a non-significant correlation between measures of pet bonding (CABS) and empathy (Bryant's Empathy Index) among children. In a retrospective study, university students were asked to rate their level of bonding with childhood pets using the CABS. No significant correlations were observed between CABS scores and the quality of adult interpersonal relationships, as measured by a series of items in which participants were asked to indicate the extent to which they got along with parents, siblings, and classmates (Poresky, Hendrix, Mosier, & Samuelson, 2001).

Pet ownership. Other research has been conducted to investigate the association between pet *ownership* and social functioning, without taking into account children's levels of bonding with their pets. Melson (1998) reported that pet-owning children in the second and fifth grades spent more time in organized group activities than children who

did not own pets. Paul and Serpell (1996) reported that children whose families obtained a new pet dog were visited by their friends significantly more frequently than children who did not have pets. Finally, the results of two studies indicated that children who owned pets scored significantly higher on a measure of prosocial behaviour than children who did not own pets (Toeplitz, Piotrowska, & Zygier, 1995; Vizek-Vidovic et al., 1999); however, in one of the studies, the association between ownership and prosocial behaviour was significant only for dog-owners, not cat-owners (Vizek-Vidovic et al., 1999). Literature on the association between pet ownership and the social functioning of adults is focused mainly on the tendency for animals to elicit social behaviour from unfamiliar people in public places. This research was cited previously in the section on social support.

Although some published research provides evidence of an association between pet ownership and positive social functioning, several studies have failed to produce similar results. Two early studies indicated that adults who owned pets liked people less than adults who did not own pets (Cameron, Conrad, Kirkpatrick, & Bateen, 1966; Cameron & Mattson, 1972). Paul and Serpell (1996) reported a reduction in the amount of time spent with friends during the 12-month period immediately after the family obtained a new pet dog; although, this was only one of the measures of social behaviour that was used. Poresky and Hendrix (1990) did not find a significant association between pet ownership and parent reports of children's social competence. Vizek-Vidovic and colleagues found no significant differences in ratings of prosocial behaviour between university students who reported having pets as children and those who reported that they

did not have childhood pets (Vizek-Vidovic, Arambasic, Kerestes, Kuterovac-Jagodic, & Vlahovic-Stetic, 2001).

Finally, a number of studies have failed to provide evidence that children who own pets are more empathic than children who do not own pets (Daly & Morton, 2003; 2006; Paul, 2000; Poresky, 1990; Poresky, 1996; Vizek-Vidovic et al., 1999). Exceptions include 1) a study which indicated that university students who had pets as children were more empathic than students who did not have childhood pets (Vizek-Vidovic et al., 2001), and 2) the findings of Daly and Morton that children who owned both cats and dogs (2006), or who owned dogs only (2003), had a significantly higher mean empathy score than children who had no pets, or other types of pets. Hyde, Kurdek, and Larson (1983) reported higher levels of empathy among adult pet owners than among non-owners, but the difference between the groups was not significant.

Animal-assisted interventions. Research on the outcomes associated with animal-assisted interventions provides additional evidence that having positive experiences with animals can improve children's social functioning. The presence of a dog in elementary school classrooms has been associated with improvements in the social behaviour of students (Hergovitch, Monshi, Semmler, & Zieglmayer, 2002; Tissen, Hergovitch, & Spiel, 2007), and increases in human-directed empathy have been reported by children who participate in humane education programs (Ascione, 1992; Ascione & Weber, 1996; Sprinkle, 2008). The results of two case studies demonstrated that both children made significant improvements in their relationships with peers after participating in several weekly animal-assisted therapy (AAT) sessions (Kogan, Granger,

Fitchett, Helmer, & Young, 1999). Positive social effects of animal-assisted interventions also have been reported for children with developmental disabilities (Esteves & Stokes, 2008; Redefer & Goodman, 1989).

Improvements in social behaviour have been documented in adults who participate in animal-assisted interventions. Results of several studies indicated increases in positive social interactions among psychiatric patients who participated in animal-assisted interventions (Beck, Seraydarian, & Hunter, 1986; Corson, Corson, Gwynne, & Arnold, 1977; Holcomb & Meacham, 1989; Marr et al., 2000). A significant increase in social sensitivity was observed among incarcerated male adults who participated in a two-week animal-assisted intervention (Fournier, Geller, & Fortney, 2007). Finally, animal-assisted interventions have been associated with increases in positive social behaviours (e.g., smiling, verbal interactions) among elderly adults (Bernstein, Friedmann, & Malaspina, 2000; Fick, 1993; Perelle & Granville, 1993).

In one of the only published studies that failed to demonstrate any positive social impact of an animal-assisted intervention, adolescent girls at a detention centre reported more social problems after eight weeks of the intervention. However, participants in the control group also developed significantly more social problems over the same eight-week period, and were not significantly different from the experimental group after the intervention (Conniff, Scarlett, Goodman, & Appel, 2005).

Aggression and Antisocial Behaviour

Pet bonding. Although the majority of research on the association between exposure to companion animals and social behaviour has tended to focus solely on the

positive aspects of social functioning, a few studies have been conducted to investigate the influence of pet bonding on aggressive and antisocial behaviour. For example, Melson and Taylor (cited in Melson et al., 1991) found a negative association between pet bonding and mother-reported behaviour problems among kindergarten children. No additional details about this study were available from the study authors.

Bryant and Donnellan (2007) investigated the association between relationships with pets and aggressive tendencies involving a sample of 107 boys between the ages of eight and 13 years. Participants completed a measure of the extent to which their pets provided a sense of social support. A peer nomination procedure was used to evaluate the extent to which children used aggressive conflict resolution strategies with peers. Results of a regression analysis indicated that children with concerns about their socio-economic status who experienced a sense of self-enhancing social support from their pets were less likely to be described by their peers as someone who expresses strong feelings of anger in response to the anger of others.

Kidd and Kidd (1980) administered a personality assessment to 223 adult pet owners (aged 18-76 years) who identified themselves as pet lovers. Participants were recruited by asking veterinarians to distribute information packets to their clients. Results indicated that both male and female pet lovers scored significantly lower than published norms on the aggression scale of the personality assessment.

The results of Brown's (2000) study were inconsistent with those described above. Adolescent boys at a detention centre ($n = 146$) completed the CABS to assess their relationships with childhood pets and the Millon Adolescent Clinical Inventory was

used to assess antisocial personality traits. Results indicated no evidence of an association between bonding with childhood pets and antisocial personality traits.

Pet ownership. In one study that investigated the association between pet ownership and behaviour problems among children, Paul and Serpell (1996) found that children whose families obtained a new pet dog were rated by their mothers as less uncooperative and less argumentative than children who did not own dogs. Friedmann, Katcher, Eaton, and Berger (1984) found no significant differences on a measure of anger among current pet owners, previous pet owners, and individuals who had never owned pets. Also, Watson and Weinstein (1993) found that working women who owned pets scored slightly lower on a measure of anger than women who did not own pets, but the difference was not statistically significant.

Animal-assisted interventions. A number of studies have been conducted to evaluate the effects of animal-assisted interventions on children's aggressive and antisocial behaviour. Much of this research has been conducted in elementary school classrooms. For example, Tissen et al. (2007) randomly assigned three elementary school classrooms to receive one of three types of social skills intervention. Children who participated in social skills training with a dog present reported significant reductions in experiences of physical aggression after the intervention. No changes in physical aggression were reported for the group who received social skills training without the presence of a dog, or the group who were exposed to a dog in their classroom but who did not participate in the social skills intervention. An *increase* in relational aggression was reported for the group who received social skills training without the dog; however,

reductions in relational aggression were reported for both groups who were exposed to a dog, with and without social skills training. Several other studies corroborate the finding that the mere presence of a dog in the classroom is associated with teacher-reported reductions in aggressive behaviour among students (Hergovitch et al., 2002; Kotrschal & Ortbauer, 2003; Sprinkle, 2008).

In Kogan et al.'s (1999) case studies of two pre-adolescent boys with severe emotional difficulties, one of the specified goals of the animal-assisted therapy for one of the children was to decrease tantrums, and the authors reported that the child demonstrated significant improvements in this area after the intervention. In another study, children who were receiving services for attention and conduct problems were randomly assigned to participate in an outward bound (OB) program or a zoo program. Significantly fewer aggressive episodes were observed among children in the zoo program than the OB program. Before the zoo program began, it was estimated that approximately 35 aggressive episodes would occur that would require physical restraint of one or more youth participants. No such aggressive episodes were observed among the zoo group (Katcher & Wilkins, 1998).

A handful of studies have been conducted to evaluate the effects of animal-assisted interventions on participants' subjective feelings of anger or hostility. In Mallon's (1994a; 1994b) reports of the effects of the Green Chimney's animal-facilitated treatment program, youth participants indicated that they would visit with the animals when they were feeling angry, because it helped to make them feel better. Hanselman (2001) investigated the effects of an anger management intervention for adolescents, in which

dogs were present during the sessions. Significant decreases in state and trait anger were reported after the intervention; however, it is impossible to determine the unique effects of the presence of the dogs on anger outcomes. Beck et al. (1986) found that psychiatric patients who participated in an activity group with a bird in the room scored significantly lower on the hostility sub-scale of a psychiatric rating scale than patients who participated in an activity group without a bird present. Finally, Crowley-Robinson, Fenwick, and Blackshaw (1996) compared anger-hostility scores among elderly participants who were exposed to a resident dog, weekly visits with the dog and a researcher, or weekly visits with the researcher alone. Participants who had a resident dog at their long-term care facility, and those who received weekly visits from the researcher, reported significant reductions in ratings of anger-hostility after participating in the intervention.

The study by Conniff et al. (2005) was the only one that failed to demonstrate any beneficial effect of an animal-assisted intervention on the aggressive behaviour of the youth participants. Similar to the results that were reported for social behaviour, significant *increases* in aggressive behaviour were reported for both the experimental and control groups. Also, it is important to note that Hergovitch et al. (2002) reported reductions in aggressive behaviour among children who had a dog in their classroom, but the difference was not found to be statistically significant.

Stress and Anxiety

Pet ownership and bonding. Levinson (1970) was one of the first authors to hypothesize that pet ownership could reduce anxiety at various stages of child

development. Little empirical research has since been conducted to investigate the associations between pet ownership, pet bonding, and anxiety among children; and the few studies that have been conducted have generally not produced significant findings. Only Melson, Windecker-Nelson, and Schwartz (cited in Melson, 1998) provided some evidence of an association between pet bonding and anxiety among children. Those who reported feeling a sense of emotional closeness with their pets were less likely to be described as anxious by their parents.

Vizek-Vidovic et al. (1999) found no significant differences on a measure of social anxiety between children who had pets and children who did not have pets, and another study failed to provide evidence that pet ownership protected against the development of post-traumatic stress symptoms among children exposed to war (Arambasic, Kesteres, Kuterovac-Jagodic, & Vizek-Vidovic, 2000). Shiloh et al. (2003) reported that children who had more positive attitudes about pets did not have lower levels of anxiety in a stressful situation than those who has less positive attitudes about pets.

Results of research with adult participants are mixed. Several studies found reductions in physiological indices of stress (i.e., heart rate, blood pressure) during stressful tasks among pet owners, especially when their pets were present during the tasks (Allen, Blascovich, Tomaka, & Kelsey, 1991; Allen, Shykoff, & Izzo, 2001; Allen, Blascovich, & Mendes, 2002; Baun, Bergstrom, Langston, & Thoma, 1983; Jenkins, 1986). Akiyama et al. (1986) investigated the effects of pet ownership on the mental health of women who had lost a spouse. Results indicated that pet owners reported

significantly fewer symptoms of general nervousness, persistent fears, and feelings of panic, in comparison to non-owners. In addition, Guest, Collis, and McNicholas (2006) reported significant reductions in anxiety among deaf individuals who acquired an assistance dog. However, several studies have not provided evidence of an association between pet ownership and different indices of anxiety (Friedmann et al., 1984; Straede & Gates, 1993; Vizek-Vidovic et al., 2001; Watson & Weinstein, 1993).

Furthermore, some studies have failed to provide evidence of an association between pet bonding and anxiety among adults. Budge, Spicer, Jones, and St. George (1998) measured pet bonding and mental health among a sample of 176 adults who were recruited through veterinary practices. Pet bonding was assessed using the Pet Attachment Survey (Holcomb, Williams, & Richards, 1985) and anxiety was assessed using a sub-scale of a mental health inventory. A regression analysis indicated that bonding with pets was not a significant predictor of anxiety scores.

Watson and Weinstein (1993) investigated the association between pet bonding and anxiety among female employees ($n = 84$) of the American Medical Association. Half of the participants owned cats or dogs, and half of the participants did not own pets. Pet bonding was assessed using the Companion Animal Attachment Scale (Stallones, Johnson, Garrity, & Marx, 1990), and anxiety was assessed using the State-Trait Anxiety Inventory (Spielberger, 1983). The correlation between pet bonding scores and anxiety scores was not significant.

Animal-assisted interventions. Kaminski, Pellino, and Wish (2002) found that pet therapy did not affect hospitalized children's self-reported experiences of worrying, although parent reports indicated non-significant reductions in children's feelings of being "scared" after the intervention. Conniff et al. (2005) assessed anxiety outcomes of their animal-assisted intervention for adolescent girls in the detention centre. As with social and aggression outcomes, significant increases in anxiety were reported for both the experimental and control groups.

Slightly more encouraging findings were reported in two studies in which animal-assisted interventions were provided to adult participants. Crowley-Robinson et al. (1996) compared tension-anxiety scores among elderly participants in three groups: resident dog, weekly dog/researcher visits, and weekly researcher visits. Significant reductions in tension-anxiety scores were observed for the resident dog group, but not for the dog/researcher visit group or the researcher visit group. Barker and Dawson (1998) evaluated anxiety ratings of psychiatric patients who attended at least one 30-minute animal-assisted therapy session. Significant reductions in state anxiety were observed for patients with several types of psychiatric disorder. No significant differences were observed between the anxiety ratings of participants who attended the animal-assisted therapy sessions and those who attended "therapeutic recreation" sessions; however, it is important to note that approximately 35% of the participants in the therapeutic recreation group also attended at least one animal-assisted therapy session.

A relatively larger body of research has been conducted to investigate the effects of what might be considered a brief form of animal-assisted intervention. Participants in

these studies are exposed to a companion animal, usually dogs, for a short time (e.g., 10 minutes) to determine whether the presence of an animal is associated with reductions in indicators of stress/anxiety. In some cases, the effects of the presence of companion animals are assessed when participants are exposed to stimuli that are expected, or intended, to induce anxiety (e.g., reading aloud, visiting the dentist). The results of these studies generally indicate that the presence of dogs is associated with reductions in blood pressure and behavioural indicators of distress (e.g., crying), increases in peripheral skin temperature (suggesting a relaxation effect), and reductions in self-reported feelings of anxiety (Barker, Pandurang, & Best, 2003; DeMello, 1999; Friedmann, Katcher, Thomas, Lynch, & Messent, 1983; Hansen, Missinger, Baun, & Megel, 1999; Havener et al., 2001; Nagenast, Baun, Megel, & Leibowitz, 1997; Shiloh et al., 2003; Straatman, Hanson, Endenburg & Mol, 1997; Vormbrock & Grossberg, 1988; Wilson, 1991)

Depression

Pet bonding. Research on the association between pet bonding and depression is sparse. Paul and Serpell (1996) recruited families who were planning to adopt a dog through an animal rescue organization. A comparison group of families who did not have a pet dog were recruited by distributing information about the study to households on the same street as the dog-owning participants, and by asking the dog-owning participants to recruit friends and neighbours who did not have dogs. Children's bonding with pets was assessed by asking mothers to rate their children's level of attachment on a visual analogue scale, with scores ranging from one to 120. Mothers also completed a measure of their children's well-being. The results indicated that children who were reported to be

more strongly bonded to their pets were less likely to be described as “tearful” or “weepy” after 12 months of pet ownership, in comparison to baseline measures that were obtained before the families obtained pets.

Garrity et al. (1989) conducted a telephone survey of a random sample of U.S. adults over the age of 65 years. Interviewers administered a pet attachment scale developed by the authors as well as the Center for Epidemiological Studies’ Depression Scale (CES-D). A significant negative correlation was observed between the measures indicating that elderly adults who reported that they were highly bonded to their pets had significantly lower depression scores than those who were not strongly bonded to their pets.

On the other hand, Budge et al. (1998) did not find a significant association between pet bonding and depression among adults. The methods of this study were described in the previous section on anxiety.

Pet ownership. The results of two studies that included very large samples of adult participants ($n > 1800$) provide evidence of an association between pet ownership and depression. Siegel et al. (1999) conducted a survey of gay men with HIV and found that those who had pets were significantly less likely to meet criteria for a depressive disorder than those who did not have pets. Tower and Nokota (2006) found that unmarried women who owned pets had significantly fewer depressive symptoms than unmarried women who did not own pets; however, this effect was not found for married women or for men.

Some smaller-scale studies have corroborated the above results. Jessen, Cardiello, and Baun (1996) reported significantly lower depression scores among hospitalized elderly adults who had birds in their rooms, compared with a control group who did not have birds, and Guest et al. (2006) reported significant reductions in depression scores among deaf individuals who acquired an assistance dog. In contrast, several other studies have not revealed significant differences between pet owners and non-owners on measures of depression (Akiyama et al., 1986; Crowley-Robinson & Blackshaw, 1998; Friedmann et al., 1984; Fritz, Farver, Hart, & Kass, 1996; Garrity et al., 1989; Stallones et al., 1990; Straede & Gates, 1993; Watson & Weinstein, 1993).

Animal-assisted interventions. Research evaluating the effects of animal-assisted interventions on feelings of sadness, depression, and loneliness among children has produced mixed results. In Mallon's (1994a; 1994b) reports of the effects of the Green Chimney's animal-facilitated treatment program, it was noted that the animals seemed to help the youth when they were feeling sad. Kaminski et al. (2002) reported that parents perceived that their hospitalized children felt happier and less lonely after participating in a pet therapy program; also, parental ratings of happiness were significantly higher for the pet therapy group than for a group of children who participated in play therapy. However, no significant changes in happiness or loneliness were identified from the children's self-reports. Both Conniff et al. (2005) and Hanselman (2001) reported significant *increases* in depressive symptoms among adolescents who participated in animal-assisted interventions.

Perhaps the strongest evidence of a positive effect of animal-assisted interventions on depression comes from two studies involving adult participants. First, Walsh and Merton (1994) assessed the effects of an animal-assisted therapy program for women in detention facilities. The women were completely responsible for the care and training of the dogs for between four and 12 weeks. A significant reduction in depression scores was observed between the time that the women started the program and the time they left the program. Second, Folse and colleagues assessed the effects of a weekly animal-assisted intervention for college students with mild to moderate levels of depression. Participants were randomly assigned to one of three groups: 1) animal-assisted intervention in addition to group psychotherapy (i.e., a dog was present during therapy sessions); 2) animal-assisted therapy only, without group psychotherapy (i.e., the group played with a puppy each week); or 3) a no-treatment control group. Contrary to expectations, the participants who were exposed to the dog during group psychotherapy did not report significantly lower post-treatment depression scores than the no-treatment control group. Also contrary to expectations, the group who simply played with a puppy each week reported significantly lower post-intervention depression scores than the control group (Folse, Minder, Aycock, & Santana, 1994).

Research with elderly participants on the effects of animal-assisted interventions on depression has mixed results. Two studies found no significant improvement in depression scores among elderly males who participated in six weekly 10-minute visits with a dog (Phelps, Miltenberger, Jens, & Wadeson, 2008) or who had an aviary introduced to their long-term care facility (Holcomb, Jendro, Weber, & Nahan, 1997).

Crowley-Robinson et al. (1996) compared depression scores among elderly participants who had a dog living in their facility to those who were exposed to weekly dog/researcher visits, or weekly visits from the researcher alone. Significant reductions in depression were observed for all three groups, but the authors did not report whether significant differences were observed between the groups. Brickel (1984) reported significant reductions in symptoms of depression among two groups of elderly adults who received therapy for depression. In one of the groups, a dog was present during therapy sessions, and this group was noted to have a greater mean change in depression scores than the no-dog group. Finally, Souter and Miller (2007) conducted a meta-analysis including five studies (four doctoral dissertations and a book chapter not cited above) that investigated the effects of animal-assisted interventions on depressive symptoms. All studies involved random assignment of participants to experimental and control groups. Participants in four of the studies were elderly adults, and one study involved psychiatric patients. The overall effect size was moderate and significant, and in all but one of the studies, participants showed significant reductions in depression after receiving the animal-assisted intervention.

Summary of Research on Pets and Mental Health

Overall, there is considerable evidence to suggest that people of all ages may experience positive psychological effects from interactions with animals. Individuals who have stronger emotional bonds with their pets tend to be more sociable and empathic, and less aggressive, than individuals who are less strongly bonded with their pets. Little evidence currently exists to support the notion that strongly bonded individuals

experience fewer symptoms of depression or anxiety than those who are less strongly bonded with their pets. However, research on pet ownership and animal-assisted interventions has revealed that exposure to companion animals is sometimes associated with reductions in symptoms of depression and anxiety. Clearly, additional research is needed to elucidate the associations among different forms of human-animal interaction and indices of psychological health.

The pattern of results of HAI research suggests that the level of bonding with pets may be a crucial factor contributing to the psychological effects of exposure to companion animals, as has been suggested previously (e.g., Peacock, Chur-Hansen, & Winefield, 2012; Poresky & Daniels, 1998; Poresky & Hendrix, 1990). For example, although seven of nine studies cited above revealed a significant association between empathy and pet bonding (Daly & Morton, 2006; Melson et al., 1991; Poresky, 1990; 1996; Poresky & Hendrix, 1990; Vizek-Vidovic et al., 1999), only three of nine studies revealed significant differences in empathy between pet owners and non-owners (Daly & Morton, 2003; 2006; Vizek-Vidovic et al., 2001). Similarly, although the results of two of three previously-cited studies revealed an association between pet bonding and symptoms of depression (Paul & Serpell, 1996; Garrity et al., 1989), only four of 12 studies revealed differences in depression between pet owners and non-owners (Jessen et al. 1996; Guest et al., 2006; Siegel et al., 1999; Tower & Nokota, 2006).

Among the studies in which pet ownership was found to be significantly associated with depression or anxiety (e.g., Akiyama et al., 1986; Siegel et al., 1999), samples typically consisted of individuals with limited sources of social support, or who

were experiencing difficult life circumstances (e.g., elderly women who had lost a spouse, men living with HIV). Such individuals may be more likely to develop strong bonds with their pets (e.g., Albert & Bulcroft, 1988; Bodsworth & Coleman, 2001), so these studies that have purported to measure the effects of pet *ownership*, may actually have been measuring the effects of pet ownership among people who have stronger than average bonds with their pets. In contrast, studies that failed to provide evidence of an association between pet ownership and anxiety or depression typically included community samples of individuals who were not selected because they had experienced a potentially stressful event (e.g., Budge et al., 1998; Stallones et al., 1990). These studies may have been more likely to include individuals with more varying levels of pet bonding.

Given that pet ownership is not always associated with improved mental health functioning, it is not yet clear why animal-assisted interventions, which involve only temporary or limited exposure to companion animals, are often associated with positive psychological outcomes. That most animal-assisted intervention studies report significant findings could simply reflect a publication bias. However, variability in results of intervention and pet ownership studies could also reflect differences in participants' opportunities or ability to develop affectional bonds with the animals. In most intervention studies that failed to demonstrate significant positive effects, the participants were exposed to a number of different animals over the course of the intervention (e.g., Conniff et al., 2005), or were exposed to the animals for a very brief amount of time (e.g., Holcomb et al., 1997; Phelps et al., 2008; Straatman et al., 1997). These individuals

would have few opportunities to develop bonds with the animals. In contrast, in the studies that did reveal positive mental health and social effects of animal-assisted interventions, many of the participants were exposed to the same animal(s) on a daily or weekly basis over the entire course of the intervention (e.g., Crowley-Robinson et al., 1996; Esteves & Stokes, 2008; Hergovitch et al., 2002; Kogan et al., 1999; Redeker & Goodman, 1989; Sprinkle, 2008). These participants may have had more opportunities to develop bonds with the animals.

Children who live with family pets in their homes may have more opportunities to develop bonds with animals than children who participate in temporary animal-assisted interventions. However, animal-assisted interventions are designed so that people are likely to have direct, positive social interactions with animals. On the other hand, some children may simply choose not to spend time interacting with family pets, limiting their ability to form a bond with the pet. Furthermore, other factors within the home environment may influence the propensity of children to develop bonds with their pets. For example, children's interest and attitudes towards pets seem to be influenced by the way in which their parents interact with family pets (Kidd & Kidd, 1990; 1997; Paul & Serpell, 1992; Raupp, 1999; Schenk, Templer, Peters, & Schmidt, 1994). Also, stress associated with providing pet care, or disagreements among family members about pets, may negate some of the positive effects of pet ownership (e.g., see Bryant, 1990; Quigley et al., 1983). Furthermore, some children may be exposed to animal cruelty within their homes, which may affect their their psychological well-being. This latter point will be discussed in detail in the following sections.

Exposure to Animal Cruelty in Childhood

Most of the research that has been conducted on human-animal interactions has focused on the positive aspects of pet ownership, and the ways in which relationships with pets might improve psychological well-being. However, some children witness their pets being physically abused or neglected. Vermeulen and Odendaal (1993) defined companion animal abuse as “the intentional, malicious, or irresponsible, as well as unintentional or ignorant, infliction of physiological and/or psychological pain, suffering, deprivation, or the death of a companion animal by humans” (p. 249). This definition includes both physical cruelty and neglect.

Research conducted with community samples of children in Italy and Australia revealed that approximately two-thirds to three-quarters of children had witnessed others engaging in animal cruelty (Baldry, 2003; 2005; Gullone & Robertson, 2008; Thompson & Gullone, 2006). Most of these studies used the Physical and Emotional Tormenting Against Animals Questionnaire (PET; Baldry, 2004) to assess participants’ experiences with animal cruelty. Peers, friends, neighbours, and adults (other than parents) were the most frequently reported perpetrators of animal cruelty, but approximately 10-20% of children reported that they had observed a parent engage in animal cruelty.

Studies of undergraduate students in the United States found that between 22% and 51% of students had witnessed others abusing animals (DeGue & DiLillo, 2009; Flynn 1999; 2000a; Henry, 2004a; 2004b; Miller & Knutson, 1997). All of these studies used the Boat Inventory on Animal-Related Experiences (Boat, 1999), or a modification of that measure, to assess participants’ experiences with animal cruelty. The majority of

these participants reported that they first observed animal cruelty in childhood (Flynn, 2000a; Henry, 2004b; Miller & Knutson, 1997), and that friends or neighbours (adults and children) were the most frequent perpetrators. Approximately 16-30% of students who witnessed animal cruelty reported that they had observed a parent abusing animals (Flynn, 2000a; Henry, 2004a; DeGue & DiLillo, 2009).

The likelihood of children witnessing animal cruelty is higher among families in which other forms of family violence have occurred. Children whose mothers are victims of domestic violence are significantly more likely to witness animal cruelty than children from families in which no domestic violence occurs (Ascione, Weber, Thompson, Heath, Maruyama, & Hayashi, 2007; DeGue & DiLillo, 2009; Volant, Johnson, Gullone, & Coleman, 2008). For example, in one study, 62% of female victims of domestic violence indicated that their children had observed pet abuse, compared with only three percent of a community sample of women who had not experienced domestic violence (Ascione et al., 2007). Furthermore, there is some evidence to suggest that animal cruelty occurs more frequently in families in which children have been abused (DeViney, Dickert, & Lockwood, 1983; Flynn, 2000b).

Given that a substantial number of children witness animal cruelty, a second central purpose of this study was to investigate whether exposure to animal cruelty is associated with mental health. Animal cruelty directed toward family pets was of particular interest in the current study. In the following sections, theoretical support is provided for the hypothesis that exposure to pet aggression may lead to mental health problems. This is followed by a summary of a small body of empirical research linking

exposure to animal cruelty to the domains of psychosocial functioning of interest in the current study (empathy, aggression, anxiety, and depression).

Exposure to Animal Cruelty and Mental Health

When children experience unwanted, unexpected, or prolonged separations from their attachment figures, or are threatened with the loss of the attachment figure, they are likely to experience emotional distress, anxiety, and anger (Ainsworth, 1989; Bowlby, 1978; 1982). Furthermore, when children are permanently separated from attachment figures, they tend to experience sadness (possibly depression) and anger (Bowlby, 1980; 1982). If attachment theory can be applied to child-pet relationships, children whose pets are abused or killed would be expected to experience emotional distress. It is plausible that emotional distress due to pet abuse that is ongoing or severe could contribute to the development of internalizing mental health problems, such as depression or anxiety.

A number of factors may contribute to the development of externalizing problems among children who witness family members abusing family pets. As discussed previously, children who are faced with real (or threatened) separations from attachment figures are likely to experience feelings of anger (Bowlby, 1982). Children who are separated from their pets, or whose pets are abused, express feelings of anger directed towards the individuals who were responsible for the abuse or separation (e.g., Robin et al., 1983). This anger may then be directed towards pets, family members, and/or other individuals outside the family (e.g., peers), in the form of aggressive and antisocial behaviour. Furthermore, evidence provided by the research of social learning theorists suggests that children learn aggressive behaviour through their observations of the

behaviour of others (e.g., Bandura, Ross & Ross, 1961). Therefore, children may learn to be aggressive with animals by observing and imitating the behaviour of friends and family members (Arkow, 1996; Baldry, 2003). Aggressive interactions with pets may then generalize to relationships with humans, or develop concurrently with other forms of aggressive and antisocial behaviours (Arluke, Levin, Luke, & Ascione, 1999; Dadds, Turner, & McAloon, 2002; Merz-Perez, Heide, & Silverman, 2001; Wright & Hensley, 2003).

In the following sections, research will be reviewed which suggests that children who witness their pets being killed or abused may be at risk of developing mental health and interpersonal difficulties. The literature linking animal cruelty with symptoms of internalizing disorders, symptoms of externalizing disorders, and empathy will be discussed separately.

Internalizing difficulties. Three bodies of research provide support for the assertion that children who witness animal cruelty may be at risk of experiencing emotional distress and internalizing difficulties: 1) studies that have attempted to directly evaluate the negative emotional effects of witnessing animal cruelty, 2) research on the psychological effects of witnessing domestic violence, and 3) studies that document the severity of grief responses that are experienced by individuals who lose their pets.

A small number of studies were identified in which the authors attempted to directly assess the emotional distress that might be experienced by individuals who witness others abuse animals. Two studies involved surveys of undergraduate students (Flynn, 2000a; Henry, 2004b), and in both studies over 60% of participants who had

observed animal cruelty reported that the experience had bothered them. Flynn (2000a) found that many students continued to be bothered by the experience. In two other studies, surveys were conducted with female pet-owners who were seeking help from domestic violence shelters (McIntosh, 2004) and their children (Ascione et al., 2007). McIntosh (2004) reported that 65% of participants whose partners had threatened, abused, or killed a family pet believed that their children were aware of the aggression directed at the pet, and thought that their children had been affected by those experiences. Ascione et al. (2007) found that approximately one-third of children had seen or heard one of their pets being hurt. In response to a question about the extent of emotional distress they had experienced when their pet was abused, 59% reported that they were *very upset* and 33% were *sort of upset*.

Little research has been conducted to investigate the emotional effects of witnessing animal cruelty, and no published research has been conducted to evaluate whether exposure to animal cruelty is associated with symptoms of specific psychological disorders. However, the effects of exposure to other forms of family violence are well-documented. Reviews of the literature consistently lead to the conclusion that children who are exposed to domestic violence are at an increased risk of experiencing symptoms of internalizing mental health problems (Evans, Davies, & DiLillo, 2008; Holt, Buckley, & Whelan, 2008; Kolbo, Blakely, & Engleman, 1996; Mohr, Noone Lutz, Fantuzzo, & Perry, 2000), such as depression (e.g., Sternberg et al., 1993) and post-traumatic stress disorder (e.g., Moretti, Obsuth, & Odgers, 2006). These difficulties can persist into adulthood (e.g., Maker, Kemmelmeier, & Peterson, 1998).

Given that many children consider their pets to be family members (Albert & Bulcroft, 1988), it seems reasonable to expect that the psychological effects of witnessing the death or harm of a family pet might be similar to the psychological effects experienced by children who witness the victimization of other family members.

Finally, as discussed previously, studies that document the emotional responses of individuals who are grieving the loss of their pets provide evidence that the death of a pet can be an emotionally distressing experience (e.g., Brown et al., 1996). This area of investigation is relevant to the current study, as children may witness their pets being killed. For example, two retrospective studies indicated that more than half of those who witnessed animal cruelty as children had witnessed an animal being killed (Flynn, 2000a; Miller & Knutson, 1997).

The literature on pet bereavement provides evidence that emotional distress may be intensified for children who lose their pets as a result of animal cruelty. Compared with adults, children have been observed to develop stronger affectional bonds with their pets (Jarolmen, 1998; Poresky, 1997), and to experience more intense and prolonged grief after the death of a pet (Brown et al., 1996; Jarolmen, 1998). Also, individuals whose pets die suddenly tend to experience more intense grief than those who anticipated the death of their pets (e.g., because of an illness) (Archer & Winchester, 1994; Brown et al., 1996; Jarolmen, 1998). Feelings of anger, sadness, and betrayal directed toward the individual (s) who perpetrated the abuse (see Robin et al., 1983) may further intensify the emotional distress. Finally, it is important to note that witnessing animal cruelty might be a distressing experience for children, even if the abuse does not result in the animal's death.

In fact, Flynn (2000a) found that those who reported having seen an animal being hurt or tortured were more likely to report lasting emotional distress than those who had seen an animal being killed.

Externalizing difficulties. Five studies were identified in which the association between exposure to animal cruelty and (human-directed) antisocial behaviour was investigated. Two studies involved surveys of women who were seeking help from domestic violence shelters. McIntosh (2004) reported that some of the participants noted a link between their partners' animal cruelty and their children's interpersonal aggression. The other was a longitudinal study in which women who reported that their partner had abused animals were significantly (2.4 times) more likely to report that their children had engaged in fire-setting behaviour than women whose partners had not abused animals (Becker, Stuewig, & Herrera, 2004). In another study involving adolescents, witnessing animal cruelty (by parents, other adults, or peers) was a significant predictor of engaging in bullying behaviour (Gullone & Robertson, 2008). Finally, Henry (2004a; 2004b) conducted two surveys of undergraduate psychology students regarding their childhood experiences with animal cruelty. Participants who reported that they had observed others engage in animal cruelty had a significantly higher mean score on a self-report measure of delinquency than participants who had not observed animal cruelty.

Empathy. No previous research was identified in which the association between empathy and witnessing animal cruelty was investigated. However, a small number of studies suggest that exposure to family violence may be associated with empathy in childhood. Straker and Jacobson (1981) found that children who had been physically

abused had lower empathy scores than children who had not been physically abused, and Ranney (1996) reported that women with a history of child sexual abuse had lower empathy scores than those with no history of sexual abuse. In another study, children whose mothers experienced domestic violence had lower levels of empathic responding than those mothers who did not experience domestic violence (Hinchey & Gavelek, 1982). If exposure to family violence is associated with lower levels of empathy, exposure to pet aggression also may be associated with lower levels of empathy.

Multidimensional Nature of Children's Experiences with Pets

Previous research has tended to focus solely on positive or negative experiences with animals. Because both bonding with family pets and exposure to animal cruelty may be associated with children's mental health, it may be important to consider both positive and negative experiences with animals when investigating the influence of pet ownership on mental health. Children who have stronger bonds with their pets are likely to have higher levels of empathy and sociability, and display less antisocial behaviour, than children who are less strongly bonded with their pets. However, children who have observed their pets being abused may learn that aggression is socially acceptable, and may be more likely to engage in aggressive behaviour than children who have not observed pet abuse. This may be true even for children who have developed bonds with their pets. Alternatively, a strong bond with pets may negate some of the effects of witnessing animal cruelty, in that children who have strong bonds with their pets may be more empathic, and less likely to engage in aggressive behaviour, whether or not they have observed their pets being abused. Furthermore, among children who do not have

strong bonds with family pets, exposure to pet abuse may be associated with especially high levels of aggression and low levels of empathy.

In the case of internalizing disorders, children who have strong bonds with their pets might be expected to experience fewer symptoms than children who do not have strong bonds with their pets. Furthermore, children who observe their pets being abused or killed might be expected to experience more symptoms than children whose pets are not abused. However, children who have strong bonds with their pets may experience more emotional distress as a result of observing their pets being abused compared to those who are less strongly bonded with their pets. Therefore, for children who observe pet aggression, those who have stronger bonds with their pets might be expected to experience more symptoms of anxiety and/or depression than those who are not strongly bonded with their pets. In other words, a different association between bonding and internalizing symptoms might be expected depending on the extent to which children are exposed to pet aggression. This view is supported by research that suggests that individuals who are more strongly bonded with their pets experience a greater amount of grief after the death of a pet than those who are less strongly bonded with their pets (Archer & Winchester, 1994; Brown et al., 1996; Gerwolls & Labott, 1994; Field, Orisini, Gavish, & Packman, 2009; Planchon & Templer, 1996). This potential interaction between bonding and exposure to animal cruelty in predicting mental health functioning has not been explored in the HAI literature previously. It may be that conflicting results on the association between pet ownership/bonding and mental health in previous studies may be due to the fact that exposure to animal cruelty was not considered.

Purpose

Although pet ownership is common among families that include children (e.g., Albert & Bulcroft, 1988), a minority of HAI research has been conducted to investigate the effects of childhood experiences with family pets, and little is known about the long-term psychological consequences of childhood experiences with pets. No previous studies were identified in which the authors investigated whether witnessing animal cruelty in childhood is associated with the development of mental health disorders, or whether there might be an interaction between pet bonding and exposure to pet aggression. The HAI literature has been criticized as lacking the measurement of multiple areas of functioning using standardized assessment tools (Chur-Hansen, Stern, & Winefield, 2010; Wells, 2009). Therefore, the purpose of this study was to investigate whether both positive and negative childhood experiences with family pets are associated with several areas of psychosocial functioning in early adulthood using established, psychometrically sound measures of mental health and social functioning.

Study 1

The purpose of Study 1 was to assess the psychometric properties of several scales that were to be used as part of the main study to investigate the association between experiences with childhood pets and later psychosocial functioning. An important goal of the main study was to assess childhood experiences with animals and psychosocial functioning using psychometrically sound measures. There is very little consistency across previous studies in the measures that have been used. Therefore, measures were selected for the current study based on their psychometric properties and

their suitability for answering the research questions, rather than on their use in previous HAI research.

In this study, a recently developed measure of empathy, the Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009) was compared with the commonly-used Interpersonal Reactivity Index (Davis, 1980). The psychometric properties of the Lexington Attachment to Pets Scale (LAPS; Johnson et al., 1992) were compared to those of the more popular Companion Animal Bonding Scale (Poresky et al., 1988). The Children's Exposure to Domestic Violence Scale (CEDV; Edleson, Shin, & Johnson Armendariz, 2007) was modified so that adult participants could retrospectively report about exposure to domestic violence in childhood. Finally, items regarding participants' experiences with their favourite childhood pets were combined to provide a new multidimensional measure of the extent of exposure to aggression toward pets in childhood, the Exposure to Pet Aggression Scale (EPAS). Below, each of these scales will be introduced, and the rationale for selecting each scale will be provided.

Empathy. The most commonly used measure of empathy that has been used in previous HAI research is Bryant's Empathy Index (Bryant, 1982). However, this measure was developed for children, so it was necessary to select a measure of empathy that would be appropriate for young adults. The Interpersonal Reactivity Index (IRI, Davis, 1980) is one of the most commonly used empathy measures (Raniers, Corcoran, Drake, Shryane, & Vollm, 2011); however the validity of the IRI has been questioned (Joliffe & Farrington, 2006). Consequently, a more psychometrically sound measure of empathy was sought.

The TEQ (Spreng et al., 2009) is a recently published measure of empathy that was the result of an extensive development process. Item selection for the scale began with an exploratory factor analysis including all items from several available empathy measures, as well as additional items that were written based on a theoretical review. The resulting scale had good internal consistency across three separate samples ($\alpha = .85 - .87$) and moderate item-total correlations were observed. Evidence of validity was established by demonstrating significant positive correlations with other measures of empathy and social sensitivity.

The TEQ was developed to address some of the limitations of previous empathy measures (e.g., low test-retest reliability), and to identify commonalities among the various conceptions of empathy that had been previously published (Spreng et al., 2009). Specifically, the IRI has been criticized because two of the sub-scales (Fantasy and Personal Distress) are arguably only distally related to the construct of empathy (e.g., Alterman, McDermott, Cacciola, & Rutherford, 2003). Indeed, the original IRI was intended as a multidimensional measure of empathic responding; separate scores were calculated for the four sub-scales. The author of the original IRI did not calculate a total score using all of the scale items, and therefore did not provide any psychometric data regarding the IRI total score in the original article describing the scale (Davis, 1980). In further support of the use of the TEQ over the IRI, many of the items on the IRI focus on negative emotional experiences (e.g., other people's misfortunes, emergencies), whereas the TEQ items reflect a more broad range of positive and negative emotional experiences (e.g., *when someone else is feeling excited, I tend to get excited too*).

Although the authors of the TEQ reported a considerable amount of information about the psychometric properties of the scale using three separate samples (Spreng et al., 2009), no other information is available from any other published source. In order to justify the use of the TEQ over the commonly-used IRI, the properties of the two scales were compared. The total IRI score, as well as scores on two IRI sub-scales: Empathic Concern (EC) and Perspective-Taking (PT), were of interest in the current study. These sub-scales were chosen as they are assumed to be representative of the two main components of empathy; namely, the tendency to both understand the emotions of others (which requires taking the perspective of another person) and to experience a congruent emotional response. Also, it is common for researchers to use the seven-item EC sub-scale of the IRI instead of the full scale in studies involving the measurement of empathy (e.g., Besel & Yuille, 2010).

A measure of interpersonal aggression was included in order to facilitate the assessment of the construct validity of the TEQ. From a theoretical perspective, highly empathic individuals should be less likely to engage in interpersonal aggression than individuals with lower levels of empathy, because of their ability to understand and experience the likely emotional response of the intended 'victim' of the aggression (Hastings, Zahn-Waxler, Robinson, Usher & Bridges, 2000; McPhedran, 2009). Previous research has confirmed that highly empathic individuals are less likely to be aggressive than those who are less empathic (e.g., Findlay, Girardi, & Coplan, 2006). Therefore, a negative correlation between scores on the TEQ and scores on the aggression measure was expected.

Bonding with childhood pets. A number of measures of pet bonding have been developed, but the Companion Animal Bonding Scale (CABS; Poresky et al., 1987) has been used most often in research on the human-animal bond (Anderson, 2007), including the studies that were cited in the general introduction (e.g., Brown, 2000; Daly & Morton, 2003). Despite the popularity of the CABS, the scale contains only eight items and these items are mainly concerned with the frequency of various activities (e.g., *how often did you clean up after your companion animal?*). Triebenbacher (1999) suggests that younger children may obtain lower bonding scores than older children because two of the eight CABS items refer to care-taking activities, and younger children may be less likely to participate in these activities. Therefore, scores on the CABS may reflect a child's developmental level rather than the child's level of bonding, suggesting that the CABS may not be appropriate for assessing pet bonding in childhood. Finally, Johnson et al. (1992) were critical of the use of a non-random convenience sample of high school and university students during the development of the CABS.

The LAPS does not appear to have the same disadvantages as the CABS. It includes a larger number of items assessing various characteristics of the human-pet relationship. Some items were selected based on a review of existing pet bonding scales, and other items were developed using a theoretical approach (Johnson et al., 1992). The authors also included items that were indicative of a low bond (e.g., *I am not very attached to my pet*). In addition, the LAPS may have stronger psychometric properties than the CABS. For example, internal consistency was stronger for the LAPS ($\alpha = .93$) than for the CABS ($\alpha = .82$) in the initial validation studies (Johnson et al., 1992; Poresky

et al., 1987). However, very little psychometric data have been published for the LAPS. Furthermore, it was necessary to modify the original version of the scale for the purposes of the current study, so that adults could retrospectively report about their relationships with childhood pets. It was therefore desirable to assess the modified version of the LAPS, and to compare it to the more popular CABS.

Exposure to family violence in childhood. Because previous research has established that there is an association between animal cruelty and family violence (Ascione et al., 2007), and that exposure to family violence is associated with mental health (e.g., Evans et al., 2008), it was deemed important to include measures of exposure to family violence in the current study. No psychometrically sound, retrospective measures of childhood exposure to domestic violence were identified that suited the purposes of the current study. Therefore, modifications were made to the Children's Exposure to Domestic Violence Scale (CEDV; Edelson et al., 2008). The original CEDV is a 42-item self-report measure of exposure to family and community violence. In the current study, only the 10 items from the Violence sub-scale were used, which refer to parental conflict (e.g., *how often has your mom's partner stopped your mom from eating or sleeping, or made it hard for her to eat or sleep?*). The CEDV was originally developed for use with children and adolescents, so the items were modified for use with adults to assess exposure to parental violence during childhood. Furthermore, additional questions were included to assess violence perpetrated by the mother toward her partner (e.g., *how often did your mom stop her partner from eating or sleeping, or make it hard to eat or sleep?*).

The widely-used Conflict Tactics Scale (CTS; Strauss, 1979) was deemed inappropriate for the current study for several reasons. First, the purpose of the CTS is to measure the extent of physical violence between partners. It is not a retrospective measure, nor is it a measure of children's exposure to parental violence, although previous researchers have modified the CTS for these purposes, and the scale author suggests that the scale can be modified for such purposes (Strauss, 1996). More importantly, because the CTS was not intended as a measure of children's exposure to domestic violence, the revised version of the scale (Strauss, 1996) contains several items that participants may not be able to answer accurately (e.g., *my father made my mother have sex without a condom*). The items on the CEDV are less physically and sexually explicit than the items on the CTS; therefore, completing the CEDV might be less distressing for the participants than completing the CTS. Finally, the CEDV contains fewer items than the CTS, requiring a shorter amount of participants' time to complete.

Exposure to pet aggression in childhood. Previous studies (e.g., Becker et al., 2004; Henry, 2000a) have often included a single, dichotomous item to assess exposure to animal cruelty (i.e., exposure vs. no exposure). However, Henry (2004a) found that the number of instances of animal cruelty observed, the identity of the perpetrator of the abuse, and the age at which participants first observed animal cruelty were associated with rates of participation in animal cruelty, and Thompson and Gullone (2006) found that adolescents who had witnessed animal cruelty more frequently were more likely to engage in animal cruelty. Furthermore, the importance of including multiple dimensions in the assessment of child-perpetrated animal cruelty (e.g., frequency and severity of the

abuse) has been suggested by several authors (e.g., Ascione & Shapiro, 2009; Ascione, 1993; Dadds, Whiting, Bunn, Fraser, Charlson, & Pirola-Merlo, 2004; Guymer, Mellor, Luk, & Pearse, 2001). Therefore, it was deemed important to assess multiple dimensions of exposure to pet aggression in the current study.

No previously-developed measurement procedure was identified that provides a total score to indicate the overall level of exposure to animal cruelty in childhood, with the level of exposure measured along multiple dimensions. The Boat Inventory of Animal-Related Experiences (Boat, 1999) has been used in several previous studies to assess participants' experiences with animal cruelty (e.g., DeGue & DiLillo, 2009). Items are included to assess whether participants have ever seen someone hurt an animal, the identity of the perpetrator(s), the type of animal, and the type of aggression (e.g., drowning, strangulation). However, no strategy is provided for calculating a total score representing the extent of exposure to animal cruelty. Gullone and Robertson (2008) summed responses to four items on Baldry's (2004) Physical and Emotional Tormenting Against Animals (PET) Scale that referred to witnessing others engage in animal cruelty. These four PET scale items refer to the frequency with which respondents observed other specific individuals (i.e., father, mother, friend) engage in animal cruelty, with responses ranging from *never* to *very often*. However, the PET scale does not assess the severity of the abuse, or the length of time to which individuals were exposed to animal cruelty. Furthermore, because the current study is concerned with exposure to aggression directed specifically toward family pets, by any individual, the PET scale and Boat inventory were deemed inappropriate for the current investigation.

Because no multidimensional measures of animal cruelty were available, several items were included in the current study to form a new measure of the extent of exposure to aggression toward childhood pets, the Exposure to Pet Aggression Scale (EPAS). Aggression is behaviour that causes harm to another (Bandura, 1973). Previous studies typically used the term *animal cruelty* or *animal abuse* when assessing exposure to aggressive acts toward animals. However, participants may be reluctant to use these labels to describe milder forms of harm to animals. In order to allow for the investigation of whether the severity of the observed aggression influences the association with mental health, the term *aggression* was chosen instead of cruelty or abuse.

The EPAS was designed to capture aggressive acts toward family pets that varied in severity from very mild to very severe. Descriptors were provided on the questionnaire to guide participants in their ratings of the severity of the aggression, and to help ensure some consistency in these ratings across individuals. Mild aggression was described as physical aggression that caused no serious harm, including behaviours such as teasing, poking or pushing. Moderate aggression was described as physical aggression that resulted in physical injuries causing pain or visible harm, such as burns, bruises or cuts. Severe aggression was described as aggressive behaviour that resulted in multiple painful injuries or the death of the animal, and included behaviours such as shooting and torture.

Purpose. The purpose of Study 1 was to assess the psychometric properties of the modified and newly developed scales (TEQ, LAPS-R, CEDV, EPAS) with a sample of undergraduate students, and to compare these properties to those of more commonly-used

scales (IRI, CABS). Alpha coefficients were calculated for each scale to provide a measure of reliability (internal consistency). Correlations were calculated among the relevant scales in order to provide evidence of validity. It was predicted that the TEQ and the modified, retrospective version of the LAPS would possess stronger psychometric properties compared with the more commonly-used IRI and CABS, and that the EPAS and modified CEDV would be appropriate for use in the main study. A secondary purpose of this study was to provide some preliminary data regarding the extent to which university students had observed aggression toward their childhood pets. Because the EPAS asked participants to report mild forms of pet aggression, it was predicted that a greater proportion of the participants would report exposure to pet aggression compared with previous studies.

Method

Participants. Participants were undergraduate students ($n = 28$), enrolled in first- and second-year psychology courses at Carleton University, who reported having at least one family pet in childhood. They were recruited using the psychology department's online research participation system (SONA), and were compensated by receiving 1.5% on their final grade in one psychology course. Participants ranged in age from 18 to 28 years ($M = 20.54$, $SD = 2.58$) and 82% were female. The majority of participants identified their ethnicity as White (54%) or indicated two or more ethnic groups (21.4%). One or two participants selected each of 6 other ethnicity categories (e.g., Black, South Asian, Southeast Asian).

Measures. Participants provided basic information about themselves (age, gender, ethnicity), as well as their current and childhood pet ownership history (Appendix A). Questions were included about the number and types of pets, the length of time participants had each pet, and the reason why the participant no longer has the pets (e.g., pet died, pet was given away). This information was provided for up to 10 childhood pets. Participants then identified their three favourite childhood pets (Appendix B).

Empathy. The Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009) is a 16-item self-report measure of an individual's tendency to understand and experience the emotions of others. Responses are provided on a five-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *always*), to indicate the frequency with which the individual feels or acts in the manner described by each item (e.g., *I enjoy making other people feel better*). Total scores can range from zero to 64, with higher scores indicating greater levels of empathy.

The only published psychometric data for the TEQ were provided by the authors of the scale. Spreng et al. (2009) reported good internal consistency ($\alpha = .85$ and $\alpha = .87$ in two separate samples) and test-retest reliability ($r = .81$). In support of the validity of the TEQ, a significant positive correlation ($r = .74$) was found between the TEQ and the EC sub-scale of the IRI. Furthermore, the TEQ was significantly positively correlated with two other measures of social comprehension (Spreng et al., 2009).

To compare the psychometric properties of the recently-developed TEQ to the IRI (Davis, 1980) participants also completed the IRI. The scale consists of 28 items that make up four sub-scales (Fantasy, Perspective-Taking, Empathic Concern, Personal

Distress). Participants indicate the extent to which each item describes them (0 = *does not describe me well*, 4 = *describes me very well*). Davis (1980) reported alpha coefficients ranging from .70 to .78, and test-retest reliability coefficients of .61 to .81, across subscales and genders.

Interpersonal aggression. The Aggression Questionnaire (AQ; Buss & Perry, 1992) was included in order to facilitate the assessment of the construct validity of the empathy scales. The AQ is a 29-item self-report measure of aggression, including physical aggression, verbal aggression, anger, and hostility (e.g., *when frustrated, I let my irritation show*). Responses are provided on a 5-point scale (1 = *extremely uncharacteristic of me*, 5 = *extremely characteristic of me*), and total scores can range from 29 to 145. The authors reported an alpha coefficient of .89 for the total scale, and a nine week test-retest reliability coefficient of $r = .80$. Evidence of convergent validity was provided by significant positive correlations with other measures of anger and aggression (e.g., Williams, Boyd, Cascardi, & Poythress, 1996; Harris, 1997).

Bonding with childhood pets. The Lexington Attachment to Pets Scale (LAPS; Johnson et al., 1992) is a 23-item self-report measure of the level of emotional bonding individuals have with their pets (e.g., *I believe my pet is my best friend*). Participants rate their level of agreement with each item on a four-point scale (0 = *strongly disagree*, 1 = *somewhat disagree*, 2 = *somewhat agree*, 3 = *strongly agree*). Total scores can range from zero to 69, and higher scores indicate stronger bonding with pets. For the purposes of the current investigation, the items of the LAPS were modified so that each item is written in the past tense (e.g., *I believed my pet was my best friend*). Participants who had family

pets in childhood completed the retrospective version of the scale (LAPS-R) three times, once for each of their three favourite childhood pets.

The authors of the original scale (which refers to current pet ownership) reported high internal consistency ($\alpha = .93$) for a sample of adult pet owners (Johnson et al., 1992), and Daly and Morton (2006) reported an alpha coefficient of .99 for their sample of Canadian children and adolescents. Daly and Morton (2006) reported a significant positive correlation ($r = .71$) between LAPS scores and scores on a pet attitude scale, providing evidence of convergent validity. Participants in the current study completed the original version of the LAPS, with respect to their current or most recent pets, in order to compare the reliability and validity of the LAPS-R to the original LAPS.

To facilitate the evaluation of the validity of the LAPS-R, participants completed the CABS (Poresky et al., 1987), a commonly-used measure of the strength of bonding between people and pets. The CABS includes eight items scored on a five-point scale (1 = *never* to 5 = *always*). Total scores range from eight to 40. The scale authors reported alpha coefficients of .82 for the scale measuring current pet ownership, and .77 for a retrospective version of the scale referring to childhood pet ownership. Participants in the current study completed the current version of the CABS with respect to a favourite pet that they currently own, as well as the retrospective version of the CABS with respect to their favourite childhood pet.

Exposure to family violence in childhood. A modification of the Violence subscale of the CEDV (Edelson et al., 2007) was used to measure exposure to domestic violence in childhood. The revised scale included 19 items to assess exposure to parental

conflict and violence perpetrated by both male and female caregivers. Participants respond on a four-point scale indicating the frequency with which they observed each event. Scores on the original Violence sub-scale can range from zero to 30, with higher scores indicating greater exposure to parental violence; the scale refers only to violence perpetrated by a caregiver toward the respondent's mother. The authors of the original scale reported alpha coefficients for the Violence sub-scale of .78 and .74, for two separate administrations, and a test-retest coefficient of $r = .684$. Evidence of the convergent validity of the CEDV was demonstrated by a significant positive correlation with another measure of exposure to violence.

A total score was calculated including all 19 items. Scores on the revised CEDV can range from zero, indicating no exposure to parental violence during childhood, to a maximum of 57, indicating frequent exposure to a variety of aggressive acts perpetrated by both the male and female caregivers. Scores were calculated for two sub-scales, each referring to violence perpetrated by a male (CEDV-M) or female caregiver (CEDV-F) toward his or her partner. The first item, which refers to the frequency of disagreements between adults, was included on each sub-scale. Scores on each sub-scale can range from zero to 30.

The Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) is a 28-item retrospective self-report measure of childhood experiences of abuse and neglect (e.g., *when I was growing up, I didn't have enough to eat*). Responses are provided on a five-point scale (1 = *never true*, 5 = *very often true*). Scores are calculated for five scales: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect.

Median alpha coefficients for each sub-scale ranged across seven samples from $\alpha = .66$ (physical neglect) to $\alpha = .92$ (sexual abuse). Test-retest reliability and convergent, discriminant, and criterion-related validity also have been demonstrated (Bernstein & Fink, 1998; Bernstein et al., 2003). For example, Bernstein et al. (2003) reported that CTQ scale scores were consistent with therapist ratings from a structured interview.

Exposure to pet aggression in childhood. Participants who had family pets in childhood responded to a question about whether each of their three favourite pets' basic needs were met (food, water, shelter), and to identify all individuals who were physically aggressive with each pet. An open-ended item requested that participants describe the most severe instance of physical aggression toward each pet that they observed, and participants rated their perception of the severity of that example of physical aggression on a 5-point scale (1 = *mild*, 3 = *moderate*, 5 = *severe*) (Appendix C).

For each individual that participants identified as having been physically aggressive toward their pets, participants responded to five questions about the frequency and severity of the aggression, as well as the length of time over which the aggression was observed. They had the option to provide additional comments. Participants responded to these questions for up to five people that they observed being physically aggressive with each of their three favourite pets. Three separate scores were calculated to assess exposure to aggression toward participants' favourite childhood pets (EPAS-F), as well as the second (EPAS-2) and third (EPAS-3) favourite childhood pets. In each case, items were included to assess the frequency and severity of the aggression, the

length of time over which the participants observed the aggression, and the number of individuals who were observed to be aggressive toward pets.

First, a score was calculated to measure the extent of exposure to physical aggression toward each participant's favourite childhood pet (EPAS-F). Items included 1) the number of individuals observed to be aggressive with the pet, 2) the severity of the most severe instance of physical aggression observed toward the pet by any individual, 3) the mean frequency of aggression toward the pet across individuals, and 4) the total length of exposure (zero to five years) to aggression toward the pet across individuals. Participants who did not identify any aggressive individuals on the first item received scores of zero on the remaining three items. EPAS-F scores can range from zero to 20. A score of zero indicates no exposure to aggression toward the favourite childhood pet, and a score of 20 indicates frequent exposure to pet aggression, exposure to at least one severe instance of aggression (e.g., involving death), and exposure to pet aggression by several individuals over a period of five years or more.

Two scores were calculated to measure the extent of exposure to aggression toward each participant's second (EPAS-2) and third (EPAS-3) favourite pets. The included items were identical to those included in the EPAS-F, except that the items on each scale referred to one specific pet (i.e., the second or third favourite pet). Scores can range from zero to 20.

Participants were asked to provide feedback about their experiences completing the questionnaires in a short interview (Appendix D). The length of the interviews did not exceed five minutes. In some cases, follow-up questions were included for clarification.

Procedure. Students who volunteered to participate in the study using the SONA system made an appointment to complete the questionnaires in the Laboratory for Child Forensic Psychology (Social Sciences Research Building, Room 111). When they arrived at the laboratory, each participant was directed to an interview room which included two chairs, a couch, a coffee table, and a television. Participants were provided with a detailed description of the nature of their participation, and asked to sign a consent form to indicate that they had read the informed consent information and that they agreed to participate in the study. After having an opportunity to ask questions, participants completed the self-report questionnaires in private. All participants completed the background questionnaire and childhood pet ownership history chart first. The remaining questionnaires were presented to the participants in six separate packages. To control for the possibility that the order of the questionnaires might influence participants' responses, the order of the packages was randomly determined using an online random order generating tool.

One questionnaire package included three separate measures of participants' current social functioning (TEQ, IRI, AQ). The order of these questionnaires was determined randomly using the online tool. The second questionnaire package included the two measures of childhood family violence; the order of the CEDV and the CTQ was determined randomly (by coin toss). The third questionnaire package included basic questions about the participants' favourite pet that they currently own, as well as the LAPS and the CABS. The basic pet ownership questions were completed first, and the order of the LAPS and CABS was randomly determined. Finally, one questionnaire

package was presented for each of the three favourite childhood pets; these three questionnaire packages were presented together. Instructions directed participants to respond to the questions about pets they had between the ages of six and 12 years. Participants completed the LAPS-R, the CABS-R, and the EPAS items for their most favourite childhood pets; they did not complete the CABS-R for the second and third favourite pets. The order of the presentation of the LAPS-R and the CABS-R was determined randomly, and the order of the presentation of the bonding and aggression measures was also randomly determined.

Once participants completed the questionnaires, the interview took place, and the participants were verbally debriefed. A paper copy of the debriefing information also was given to participants to take away with them. Following the debriefing, and immediately before the participants left the laboratory, participants were asked to remain in the laboratory for a mood restoration period. Five peaceful photographs were each displayed for one minute on the television screen in the interview room. This mood restoration period was intended to reduce any immediate distress that may have been experienced by participants while they were completing the questionnaires. Research suggests that individuals who view natural landscapes experience reductions in distress (Ulrich, 1986).

Results

Pet ownership history. All participants in the pilot study were required to have had at least one pet in childhood, when they were between the ages of six and 12 years. The total number of childhood pets ranged from one to 14 ($M = 5.19$, $SD = 3.5$), and most participants had more than one pet during childhood. Only 4% of the participants

reported having a single pet during childhood, 22% had two pets, and 74% reported having three or more childhood pets.

Dogs were reported to be the favourite childhood pet by 42% of the sample, and the other participants reported that cats (31%), small mammals (11%), birds (8%), reptiles (4%), or fish (4%) were their favourite pets. Participants reported that they had their favourite childhood pets for an average of 7.7 years ($SD = 5.7$), and 19% indicated that they still had their favourite childhood pets. Among those who did not currently have their favourite pets, the most common reason was that the pet had died or been euthanized due to illness or old age (62%). The other reported reasons were that the pet had been given to a friend or relative (14%), sold or given to an unknown person (10%), died in an accident (4%), or had run away or been lost (4%).

Among participants who had two or more childhood pets, 36% reported that dogs were their second favourite pets, and the other participants reported that cats (24%), small mammals (16%), birds (12%), or fish (12%) were their second favourite pets. Participants reported that they had their second favourite childhood pets for an average of 6.5 years ($SD = 5.4$), and 12% indicated that they still had their second favourite childhood pets. Among those who did not currently have their second favourite pets, the most common reason was that the pet had died or been euthanized due to illness or old age (59%). The other specified reasons were that the pet was given to a friend or relative (9%), released to the wild or not allowed back in the house (9%), had run away or been lost (9%), was sold or given to an unknown person (5%), or was taken to the SPCA or humane society (5%).

Among participants who had three or more childhood pets, 42% of participants reported that small mammals had been their third favourite pets, and other participants reported that dogs (21%), cats (21%), birds (11%), or fish (5%) were their third favourite pets. Participants reported that they had their third favourite pets for an average of 4.1 years ($SD = 3.5$), and 11% indicated that they still had their third favourite childhood pets. Among those who did not currently have their third favourite pets, the most common reason was that the pet had died or been euthanized due to illness or old age (65%). The other specified reasons were that the pet died in an accident (18%), was given to a friend or relative (12%), or had run away or been lost (6%).

Empathy. Descriptive statistics, alpha coefficients, and bivariate correlations among empathy measures are presented in Table 1 in order to compare the recently developed TEQ with the commonly-used IRI. Most notably, the results indicated a strong positive correlation ($r = .73$) between the TEQ and the EC sub-scale of the IRI. Alpha coefficients for the TEQ and EC sub-scale were .82 and .74, respectively. Non-significant positive correlations with the PT sub-scale of the IRI were observed for both the TEQ and the EC sub-scale. Negative, but non-significant, correlations with the Aggression Questionnaire were observed for the EC sub-scale ($r = -.21$) and the TEQ ($r = -.33$).

Bonding with childhood pets. In order to compare the psychometric properties of the pet bonding scales, descriptive statistics and alpha coefficients were calculated for each scale. These data, along with bivariate correlations among the scales, are presented in Table 2. Alpha coefficients for the three LAPS-R scales (each referring to one of three favourite childhood pets), and the LAPS scale for the favourite current pet, ranged from

.90 to .94. Alpha coefficients for the CABS and CABS-R were .88 and .73, respectively. Significant positive correlations were obtained between scores on the LAPS-R for the favourite childhood pet (LAPS-R1) and scores on all other measures of pet bonding. In most cases, stronger correlations were obtained between different versions of the LAPS scale, than between the LAPS and the CABS.

Considerable variability was observed in participants' scores on the pet bonding measures; for example, scores on the LAPS-R1 ranged from 20 to 66. Differences in the level of bonding were observed across pets. A paired-sample t-test indicated that the mean score on the LAPS-R1, referring to the favourite childhood pet ($M = 48.0$, $SD = 12.3$), was significantly higher than the mean score on the LAPS-R2, referring to the second favourite childhood pet ($M = 42.6$, $SD = 14.1$), $t(24) = 3.34$, $p = .003$. Mean scores on the LAPS-R1 were highest for participants who reported dogs, cats, or birds as their favourite pets, and lowest for those whose favourite pets were small mammals, reptiles, or fish. However, a one-way ANOVA indicated that the mean LAPS-R1 scores were not significantly different across pet type, $F(4, 22) = 1.52$, $p = .231$.

Exposure to family violence in childhood. Descriptive statistics and bivariate correlations among scores on the exposure to domestic violence (CEDV) and child abuse (CTQ) measures are presented in Table 3.

Total scores on the CEDV can range from zero to 57 and sub-scale scores can range from zero to 30. Observed total scores on the revised CEDV ranged from zero to 23 ($M = 6.5$, $SD = 5.5$). Observed scores on CEDV-M sub-scale ranged from zero to 11 ($M = 3.8$, $SD = 2.7$; $Mdn = 3.5$). Scores on the CEDV-F sub-scale ranged from zero to 18 ($M =$

4.0, $SD = 3.9$; $Mdn = 3.0$). Alpha coefficients for the total CEDV score, and the CEDV-M and CEDV-F sub-scales were .85, .75, and .84, respectively.

Scores on each sub-scale of the CTQ can range from five to 25; in the current study, scores ranged from five to 21. Mean scores were lowest on the Sexual Abuse scale and highest on the Emotional Abuse and Emotional Neglect scales. Total CEDV scores were significantly positively correlated with scores on the Emotional Abuse ($r = .52$) and Emotional Neglect ($r = .53$) CTQ scales, but correlations between the CEDV and the other three CTQ scales were not significant.

Exposure to pet aggression in childhood. Descriptive statistics and bivariate correlations among the scores on different versions of the EPAS are presented in Table 4.

Of the total sample of participants, 44% ($n = 12$) reported observing aggression toward at least one of their three favourite childhood pets. Eight participants reported aggression to only one pet, three participants reported aggression to two pets, and one participant reported aggression toward three favourite pets. Among participants who had three or more childhood pets, more participants reported aggression toward their favourite pets (37%) than toward their second favourite (26%) and third favourite (21%) pets.

One-third of the sample ($n = 9$) reported some exposure to aggression toward their most favourite childhood pets by at least one individual; all of these participants were female. Two-thirds of these participants ($n = 6$) identified a father or step-father as one of the individuals who was aggressive with their pet; other, less frequently reported aggressors included mothers, siblings of both genders, and a male cousin. Six participants

identified a single individual who was aggressive toward their favourite pets and three participants identified two aggressors. The types of pet toward which the aggression was directed included dogs (56%), cats (33%), and small mammals (11%). No participants reported aggression toward birds, reptiles, or fish.

Among those who reported observing pet aggression ($n = 9$), the severity of the most severe instance of aggression ranged from mild to moderate ($M = 1.9$, $SD = .78$) on a five-point scale on which one represents mild aggression and five represents severe aggression (e.g., torture). The severity of a typical instance of observed aggression ranged from mild to moderate for the first aggressor ($M = 1.7$, $SD = .71$). Three participants indicated that they observed pet aggression only once or a few times over a period of several years. One participant observed the aggression a few times a year, and five participants observed aggression a few times a month. The age at which participants first observed individuals being aggressive with their favourite pets ranged from 2 years to 12 years ($M = 8.0$, $SD = 3.0$, for the first aggressor only). The total length of time between the first instance of observed aggression and the last instance of observed pet aggression was an average of 4.6 years ($SD = 4.6$) for the first aggressive individual, and 2.7 years ($SD = 2.9$) for the second aggressive individual.

A score was calculated to provide a multidimensional measure of the extent of exposure to aggression toward the favourite childhood pet. Total scores can range from zero to 20; observed scores on the EPAS-F ranged from zero to 14 ($M = 3.4$, $SD = 5.0$) for the full sample, and from nine to 14 for those who had observed aggression toward their favourite pets ($M = 10.2$, $SD = 1.8$). The alpha coefficient for the EPAS-F was .89.

Among participants who had two or more childhood pets ($n = 26$), 15% reported that they had observed at least one individual being aggressive toward their second favourite pet. All four of these participants identified their fathers as one of the individuals who was aggressive with their second favourite pets; other aggressive individuals included a mother, a brother, and an adult neighbour. Two participants identified a single individual who was aggressive toward their second favourite pets, one participant identified two aggressive individuals, and one participant identified three aggressive individuals. The types of pet toward which the aggression was directed included dogs (75%) and cats (25%). No participants reported aggression toward small mammals, birds, reptiles, or fish.

Among those who reported observing pet aggression ($n = 4$), the severity of the most severe instance of aggression toward the second favourite pet ranged from mild to moderate/severe on a five point scale ($M = 2.3$, $SD = 1.5$). The severity of a typical instance of aggression ranged from mild to moderate for the first aggressive individual ($M = 1.5$, $SD = 1.0$). Three participants indicated that they observed pet aggression only once or a few times over a period of several years, and one participant observed the aggression a few times per week. The age at which participants first observed individuals being aggressive with their second favourite pets ranged from six to 11 years ($M = 8.25$, $SD = 2.1$, for the first aggressor only). The total length of time between the first instance of observed aggression and the last instance of aggression was an average of 3.8 years ($SD = 5.2$ years) for the first aggressive individual only.

Among participants who had three or more childhood pets ($n = 20$), one-fifth reported that they had observed individuals being aggressive toward their third favourite pets. Two of the four participants reported that their fathers had been the aggressors; other aggressive individuals included a mother and a child neighbour. All four of these participants identified only a single individual who was aggressive with their third favourite pets. The types of pet toward which the aggression was directed included dogs (50%), cats (25%), and small mammals (25%). No participants reported aggression toward birds, reptiles, or fish.

Among those who reported observing pet aggression ($n = 4$), the severity of the most severe instance of aggression toward the third favourite pet ranged from mild/moderate to moderate/severe on a five point scale ($M = 2.8$, $SD = .96$). The severity of a typical instance of aggression ranged from mild to moderate ($M = 2.0$, $SD = .82$). Three participants indicated that they observed pet aggression only once or a few times over a period of several years, and one participant observed the aggression a few times a week. The age at which participants first observed individuals being aggressive with their third favourite pets ranged from six to 12 years ($M = 8.3$, $SD = 2.1$). The total length of time between the first instance of observed aggression and the last instance of observed aggression was an average of 1.5 years ($SD = 3.0$ years).

Two scores were calculated to provide multidimensional measures of the extent of exposure to aggression toward each participant's second (EPAS-2) and third (EPAS-3) favourite pets (Table 4). Total scores can range from zero to 20; observed scores on the two scales ranged from zero to 16. A significant positive correlation ($r = .89$) was

observed between scores on the EPAS-2 and EPAS-3. Correlations between the EPAS-F and the EPAS-2 ($r = .39$) and EPAS-3 ($r = .30$) were not significant ($p > .05$). The mean score on the EPAS-F was higher than mean scores on the EPAS-2 and EPAS-3, but paired-sample t-tests indicated that the differences were not significant ($p > .05$).

Discussion

The purpose of Study 1 was to evaluate the properties of new and modified scales to determine whether they would be appropriate for use in the larger study about the association between childhood experiences with pets and psychosocial functioning in early adulthood. The recently developed TEQ was compared with the commonly used IRI in order to establish whether the TEQ would be a more appropriate measure of empathy. The LAPS was modified so that it could be used as a retrospective measure of bonding with childhood pets, and was compared to the commonly used CABS. The CEDV was modified in order to provide a retrospective account of the extent to which participants witnessed domestic violence between caregivers during childhood. Finally, the EPAS was developed to provide a multi-dimensional measure of the extent to which participants witnessed aggression toward their favourite childhood pets.

The correlation between scores on the TEQ and the empathic concern (EC) sub-scale of the IRI in the current study ($r = .73$) was virtually identical to that reported by the TEQ authors ($r = .74$; Spreng et al., 2009), suggesting that the TEQ measures a construct that is similar to that measured by the EC sub-scale. However, the results of this and other studies indicate that the TEQ may be a more appropriate measure of empathy. According to the authors of the two scales (Davis, 1980; Spreng et al., 2009), and the

results of the current study, the items on the TEQ possess a greater degree of internal consistency than the items on the EC sub-scale. In the current study, a stronger negative correlation with the Aggression Questionnaire was found for the TEQ than for the EC sub-scale. Furthermore, the TEQ authors reported that the TEQ was a better predictor of social cognitive functioning than any of the IRI sub-scales (Spreng et al., 2009).

Although the TEQ appears to focus on the emotional features of empathy rather than cognitive features, the authors of the TEQ suggest that the scale does capture information about the cognitive aspect of empathy, arguing that these concepts overlap in the theoretical literature (Spreng et al., 2009). In support of this argument, the TEQ authors reported a significant positive correlation between the TEQ and the perspective-taking sub-scale of the IRI. This correlation was not significant in the current study; however, the correlation between the EC and PT sub-scales of the IRI also was not significant.

Participants completed the LAPS to provide a measure of bonding with their favourite current pet and the newly modified LAPS-R to provide a retrospective measure of bonding with each of their three favourite childhood pets. In addition they completed a version of the CABS for their favourite current pet (if applicable) and their favourite childhood pet. Results indicated that the retrospective version of the LAPS possesses good internal consistency. Alpha coefficients for the LAPS-R were greater than .90 across the three favourite childhood pets, and were comparable to the coefficient ($\alpha = .92$) for the original version of the scale in the current study and to the coefficient ($\alpha = .93$) reported by the authors of the LAPS (Johnson et al., 1992). Furthermore, alpha

coefficients were greater for all versions of the LAPS than for the CABS. Evidence of the construct validity of the LAPS-R was demonstrated by the significant positive correlation between the LAPS-R and the retrospective version of the CABS for the favourite childhood pet, as both of these measures are intended to measure the degree of bonding between people and childhood pets. These results suggest that the modified version of the LAPS is an acceptable retrospective measure of bonding with childhood pets.

Analyses of pet bonding scores indicated that the level of bonding varied across pets. The mean score on the LAPS-R was significantly higher for the favourite childhood pet than the second favourite pet. LAPS-R scores also were higher for certain types of pet (e.g., dogs) than for other types of pet (e.g., fish), although the difference did not reach significance with this small sample of participants. These results indicate that a complete understanding of experiences with childhood pets may require inquiry regarding multiple individual pets. On the other hand, given the strong positive correlations among LAPS-R scores for the three favourite childhood pets, a LAPS-R score for the most favourite childhood pet could be considered a reasonable approximation of the level of bonding with other favourite childhood pets.

The CEDV was developed to assess children's exposure to domestic violence, and it was modified in the current study so that young adults could retrospectively report about their exposure to domestic violence in childhood. Participants completed a modified version of the 10-item violence sub-scale of the CEDV, as well as nine new items that assessed exposure to violence perpetrated by a female caregiver. Edleson et al. (2007) reported alpha coefficients of .78 and .74 for two separate administrations of the

Violence sub-scale with a sample of children and youth. The original Violence sub-scale referred to violence perpetrated by a male caregiver only. The internal consistency of the 10 item retrospective CEDV-M sub-scale (male caregiver only) in the current study was comparable ($\alpha = .75$). The newly modified CEDV-F sub-scale, referring to violence perpetrated by a female caregiver, demonstrated a greater degree of internal consistency ($\alpha = .84$), as did the total CEDV score which included violence perpetrated by both the male and female caregivers ($\alpha = .85$). These results suggest that the modified version of the CEDV is an acceptable retrospective measure of exposure to domestic violence in childhood.

The participants' responses on the EPAS indicate that a substantial proportion of university students observed aggression toward one or more of their family pets in childhood. It is important to note that most of these participants observed very mild forms of aggression. Close to half of the participants observed aggression toward at least one of their three favourite childhood pets, and all but one of those participants reported that a caregiver was one of the aggressors. Fathers were the individuals most frequently reported to be aggressive toward childhood pets. Dogs and cats were the types of pet toward which the aggression was typically directed; only two participants reported aggression toward small mammals, and none of the participants reported aggression toward birds, reptiles, or fish. The severity of the reported aggression typically ranged from mild to moderate; only two participants (7%) reported observing aggression toward one of their favourite pets in the moderate/severe range. The age at which participants first observed aggression toward their favourite pets ranged from early to late childhood.

The average age at which participants first observed pet aggression was approximately eight years for each of the three favourite pets. The average length of time over which participants were exposed to aggression toward their pets ranged from 1.5 years for the third favourite pet to 4.6 years for the most favourite pet.

Scores on the different versions of the EPAS provided multidimensional measures of the extent of exposure toward the three favourite childhood pets. EPAS scores included the number of individuals observed to be aggressive toward the pets, the frequency and severity of the observed aggression, and the length of time over which participants witnessed multiple instances of pet aggression. Alpha coefficients for the different versions of the EPAS ranged from .89 to .93, indicating that the EPAS possesses an adequate degree of internal consistency. Because no other multidimensional measures of childhood exposure to pet aggression were identified, it was not possible to evaluate the validity of the EPAS by comparing EPAS scores to scores on other measures of exposure to pet aggression.

An important limitation of the pilot study was the very small sample size. According to DeVellis (2003), internal consistency can be inflated when small samples are used, and small samples may not be representative of the population. However, the alpha coefficients for the TEQ, LAPS-R, and CEDV observed with this small sample were very consistent with those reported by the authors of the scales, suggesting that the values are accurate. Another limitation was that it was not possible to evaluate the validity of the newly-developed EPAS by calculating correlations between the EPAS and comparable multi-dimensional measures of exposure to pet aggression. Furthermore, the

use of a sample of predominantly female university students in introductory psychology courses limits the generalizability of the results.

In summary, the results of this study suggest that there are substantial individual differences in the level of bonding that people report with their childhood pets, and that individuals who report having strong bonds with their favourite pets tend to also have strong bonds with other pets. The results also suggest that exposure to mild forms of aggression toward childhood pets is a relatively common experience, but that exposure to pet aggression varies across participants and pets. Finally, the results suggest that the new and modified versions of the scales (TEQ, LAPS-R, CEDV, EPAS) are appropriate for use in the larger study about university students' experiences with childhood pets.

Study 2

The purpose of the main study was to investigate the association between childhood experiences with family pets and later psychosocial functioning with a large sample of university students. The results of the research cited in the general introduction suggests that childhood experiences with animals are associated with mental health and social functioning. However, little research has been conducted on the psychological effects of witnessing pet aggression or the association between childhood experiences with pets and psychosocial functioning in early adulthood. Based on the results of previous research, it was predicted that young adults who were more strongly bonded with their favourite childhood pets would report fewer current symptoms of anxiety and depression, lower levels of aggression, and higher levels of empathy than those who were less strongly bonded with their pets. Those who witnessed more frequent or severe

aggression directed toward their favourite childhood pets were predicted to report more symptoms of depression and anxiety, higher levels of aggression, and lower levels of empathy than those who did not witness pet abuse.

Because previous research has focused solely on positive *or* negative experiences with family pets, a central purpose of this study was to determine whether it is informative to consider both pet bonding and exposure to pet aggression when investigating the association between experiences with pets and psychosocial functioning. An interaction between pet bonding and exposure to pet aggression was predicted. Although a negative association between bonding and mental health problems was predicted among those who were not exposed to pet aggression, a positive association between bonding and mental health problems was predicted among those who were exposed to higher levels of pet aggression in childhood. Specifically, for those participants who exposed to lower levels of pet aggression, lower levels of depression, anxiety, and aggression, and higher levels of empathy were predicted among those who had stronger bonds with their pets compared with those who were less strongly bonded with their pets (suggesting a possible protective effect of pet bonding). However, for those participants who were exposed to higher levels of pet aggression, higher levels of anxiety, depression, and aggression, and lower levels of empathy were predicted among those who had stronger bonds with their pets compared with those who were less strongly bonded with their pets. In other words, the level of exposure to pet aggression was predicted to moderate the association between bonding with childhood pets and psychosocial functioning in early adulthood.

Method

Participants. Data from 380 participants were collected. Participants were undergraduate students enrolled in first- and second-year psychology courses at Carleton University. They were recruited using the psychology department's online research participation system (SONA), and were compensated by having 0.5% added to their final grade in one psychology course. Eligible participants ranged in age from 18 to 25 years ($M = 19.4$, $SD = 1.6$) and 79% were female. Participants identified themselves as belonging to the following ethnic groups: 74% White, 5.7% East Asian, 3.8% Black, 3.2% South Asian, 1.6% First Nations, 6% other, and 5.7% reported more than one ethnic group.

Measures. Participants provided basic information about themselves (age, gender, ethnicity), as well as their childhood pet ownership history. Questions were included about the type of pets, the length of time that participants had the pets, and the reason why the participants no longer had the pets (e.g., pet died, pet was given away). This information was provided for up to five childhood pets. Participants then identified their three favourite childhood pets. These items were the same as those in Study 1.

Bonding with childhood pets. The Lexington Attachment to Pets Scale (LAPS; Johnson et al., 1992) is a 23-item self-report measure of the level of emotional bonding individuals have with their pets (e.g., *I believe my pet is my best friend*). Participants rate their level of agreement with each item on a four-point scale (0 = *strongly disagree*, 1 = *somewhat disagree*, 2 = *somewhat agree*, 3 = *strongly agree*). Total scores can range from zero to 69, and higher scores indicate stronger bonding with pets. For the purposes of the

current investigation, the items of the LAPS were modified so that each item was written in the past tense (e.g., *I believed my pet was my best friend*). Participants who had family pets in childhood completed the retrospective version of the scale (LAPS-R) three times, once for each of their three favourite childhood pets. The results of Study 1 indicated that the LAPS-R possesses adequate psychometric properties.

Family violence in childhood. A modification of the Violence sub-scale of the CEDV (Edelson et al., 2008) was used to measure exposure to domestic violence in childhood. The revised scale included 19 items to assess exposure to parental conflict and violence perpetrated by both male and female caregivers. Participants responded on a four-point scale indicating the frequency with which they observed each event. Total scores on the revised CEDV can range from zero, indicating no exposure to parental violence during childhood, to a maximum of 57, indicating frequent exposure to a variety of aggressive acts perpetrated by both male and female caregivers. Scores were calculated for two sub-scales, each referring to violence perpetrated by a male (CEDV-M) or female caregiver (CEDV-F) toward his or her partner. Scores on each sub-scale can range from zero to 30.

The short form of the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) is a 28-item retrospective self-report measure of childhood experiences of physical and emotional abuse, physical and emotional neglect, and sexual abuse (e.g., *when I was growing up, I didn't have enough to eat*). Responses are provided on a five-point scale (1 = *never true*, 5 = *very often true*). Scores on each sub-scale can range from zero to 25, and higher scores indicate more frequent experiences of childhood abuse or neglect.

Exposure to pet aggression in childhood. Participants who had family pets in childhood responded to a question about whether each of their three favourite pets' basic needs were met (food, water, shelter), and to identify all individuals who were physically aggressive with each pet. For each individual that participants identified as having been physically aggressive toward their pets, participants responded to five questions about the frequency and severity of the aggression, as well as the length of time over which the aggression was observed. Participants responded to these questions for up to five people that they observed being physically aggressive with each of their three favourite pets (Appendix C).

A score was calculated to provide a multidimensional measure of the extent of exposure to physical aggression toward each participant's favourite childhood pet (EPAS-F). Items included 1) the number of individuals observed to be aggressive with the pet, 2) the severity of the most severe instance of physical aggression observed toward the pet by any individual, 3) the mean frequency of aggression toward the pet across individuals, and 4) the total length of exposure (zero to five years) to aggression toward the pet across individuals. Participants who did not identify any aggressive individuals on the first item received scores of zero on the remaining three items. EPAS-F scores can range from zero to 20. A score of zero indicates no exposure to aggression toward the favourite childhood pet, and a score of 20 indicates frequent exposure to pet aggression, exposure to at least one severe instance of aggression (e.g., involving death), and exposure to pet aggression by several individuals over a period of five years or more. In Study 1, the alpha coefficient for the EPAS-F was .89.

Empathy. The Toronto Empathy Questionnaire (TEQ; Spreng et al., 2009) is a 16-item self-report measure of an individual's tendency to identify and experience the emotions of others. Responses are provided on a five-point scale (0 = *never*, 1 = *rarely*, 2 = *sometimes*, 3 = *often*, 4 = *always*), to indicate the frequency with which the individual feels or acts in the manner described by each item (e.g., *I enjoy making other people feel better*). Total scores can range from zero to 64, with higher scores indicating greater levels of empathy. The results of Study 1 and the results reported by the authors of the scale (Spreng et al., 2009) indicate that the TEQ possesses adequate psychometric properties.

Interpersonal aggression. The Aggression Questionnaire (AQ; Buss & Perry, 1992) is a 29-item self-report measure of physical aggression, verbal aggression, and feelings of anger or hostility (e.g., *if somebody hits me, I hit back*). Responses are provided on a five-point scale (1 = *extremely uncharacteristic of me*, 5 = *extremely characteristic of me*). Total scores can range from 29 to 145, with higher scores indicating greater levels of aggression. The psychometric properties of the AQ were described above in the method section of Study 1.

Anxiety. The State-Trait Anxiety Inventory, Trait version (STAI-T; Spielberger, 1983) is a 20-item self-report measure that assesses anxiety as a stable personality characteristic (e.g., *I feel nervous and restless*). The STAI-T consists of 20 items to which participants provide a response on a four-point scale indicating how they typically feel (1 = *almost never*, 4 = *almost always*). Total scores can range from 20 to 80, with higher scores indicating greater levels of anxiety. The STAI was intended to be used with high

school and college students (Spielberger, 1983). The administration time for the STAI-T is approximately five minutes.

Spielberger (1983) reported alpha coefficients of .90 or greater among groups of male and female high school and college students for the STAI-T. Among college students, 20-day test-retest reliabilities were .86 for males and .76 for females. All item-total correlations were above .30 and the median item-total correlation for college students was .57. Spielberger (1983) provided evidence of the validity of the STAI-T, for example by demonstrating significant positive correlations between the STAI-T and other measures of trait anxiety.

Further evidence of the reliability and validity of the STAI is available from other researchers. For example, Gros, Antony, Simms, and McCabe (2007) reported an alpha coefficient of .93 for a Canadian sample of adults with anxiety disorders. Iwata and Mishima (1999) reported alpha coefficients ranging from .93 to .95 across five samples of Japanese and American post-secondary students. In a review of studies that utilized the STAI-T and reported relevant reliability data, Barnes, Harp, and Jung (2002) reported a mean alpha coefficient of .89 and a mean test-retest reliability coefficient of .88 for the STAI-T.

In support of the convergent validity of the STAI, Creamer, Foran, and Bell (1995) reported a significant positive correlation between scores on the Beck Anxiety Inventory and scores on the STAI-T. Furthermore, Gros et al. (2007) reported significant positive (moderate-high) correlations between scores on the Trait scales of the STAI and the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA).

Depression. The Beck Depression Inventory - Second Edition (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depressive symptoms. For each item, participants select one of four responses (scored 0-3) that best describes their feelings over the past two weeks (e.g., *I cry more than I used to*). Total BDI-II scores can range from zero to 63, with higher scores indicating greater intensity of depression. The BDI-II takes approximately five minutes to complete. The item referring to suicidal ideation was omitted; therefore, total BDI-II scores in the current study can range from zero to 60.

Evidence of the psychometric soundness of the BDI-II is reported in the manual, and has been provided through additional research. Beck et al. (1996) reported an alpha coefficient of .93 for a sample of Canadian college students, item-total correlations that typically exceeded .50, and a test-retest reliability coefficient of .93. Evidence of the validity of the BDI-II was provided, for example by demonstrating significant positive correlations with other depression scales. Also, individuals with mood disorder diagnoses scored significantly higher on the BDI-II than college students and individuals with anxiety disorders and other disorders (Beck et al., 1996).

Cronbach's alpha values ranged from .89 to .91 across three studies that employed large samples ($n > 400$) of undergraduate students, and item-total correlations typically exceeded .40 across these studies (Dozois, Dobson, & Ahnberg, 1998; Storch, Roberti, & Roth, 2004; Whisman, Perez, & Ramel, 2000). Another study demonstrated high test-retest reliability ($r = .96$ between total scores), with intervals of one to 12 days ($M = 3.2$ days) between administrations (Sprinkle et al., 2002). Evidence for convergent validity

was provided by findings of significant positive correlations between BDI-II scores and scores on the depression factor of the STAI-T ($r = .76$; Storch et al., 2004), as well as between the BDI-II and the original BDI ($r = .93$; Dozois et al., 1998). Sprinkle et al. (2002) demonstrated criterion validity by obtaining a significant positive correlation ($r = .83$) between BDI-II total scores and the number of depressed mood symptoms as measured by the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I). Furthermore, the BDI-II was able to discriminate between those with varying levels of depression severity, as well as between those with and without a current diagnosis of depression.

Procedure. Data were collected using Survey Monkey. Participants completed the questionnaires in one of 10 different orders, in order to control for potential effects of the order of the questionnaires. The demographic and pet ownership history items were always presented first. The remaining questionnaires were divided into three sections: experiences with childhood pets (LAPS-R, EPAS), family violence in childhood (CEDV, CTQ), and current psychosocial functioning (TEQ, AQ, BDI, STAI). The order of the presentation of the questionnaires within each section was determined randomly, as was the order of the presentation of sections. Participants who did not have childhood pets did not complete the questionnaires assessing experiences with pets.

Students who volunteered to participate in the study through the SONA system were immediately directed to a website informing them that they would receive an e-mail with the electronic survey link and a unique participant code within 48 hours. When participants arrived at the survey website, they were required to enter their assigned

participant codes. Once the participant code was entered, the informed consent information (Appendix E) was displayed on the screen. Participants were required to indicate whether or not they consented to participate in the study by clicking a box to indicate yes or no. If participants indicated that they did not consent to participate in the study, they were immediately taken to the debriefing page. If participants agreed to participate in the study, the questionnaires were presented to the participants on separate pages. After participants completed the questionnaires, the debriefing information was displayed on the screen, and participants were prompted to print the debriefing information for further reference (Appendix F). Finally, five mood restoration photos were displayed on the following five pages. An introductory page included the following instructions: *“Please look at the five pictures on the following pages. Look at each picture for a minute or so and think about a happy memory, or one of your favourite things. Research shows that looking at pictures of natural landscapes is relaxing for people. If you found that reading or answering some of the questions in this survey was a bit upsetting, then viewing these pictures may help to reduce some of your feelings of distress.”* On the final screen, a message was displayed to thank the participants.

Results

This section begins with a description of the procedures that were used to examine the raw data for missing values, outliers, and violations of the assumptions of the proposed statistical analyses, as well as the procedures that were used to correct problems with the data set. In order to provide a context for the results of the main analyses, descriptive information is then provided about the participants' pet ownership history,

their level of bonding with childhood pets, and the extent of exposure to pet aggression during childhood. A short section is included to examine the association between childhood pet ownership and psychosocial functioning in early adulthood, without taking into consideration the levels of pet bonding and exposure to pet aggression. Finally, the results of the main analyses are presented that describe the associations among bonding with childhood pets, exposure to aggression toward childhood pets, and psychosocial functioning in early adulthood.

Data Cleaning. A total of 427 students signed up to participate in the study through the SONA system. A number of students ($n = 43$) did not enter a participant code on the survey website, and a few students ($n = 4$) entered a participant code but did not consent to participate in the study. Participants were excluded from the analyses if they failed to complete more than half of the questions ($n = 21$), failed to provide information about childhood pets ($n = 4$), failed to complete the LAPS-R and/or EPAS for their childhood pets ($n = 9$), or failed to complete two or more of the mental health measures ($n = 6$). Participants also were excluded if there was strong evidence of a response bias or inconsistent responding ($n = 19$). For example, some participants completed the survey more than once but provided different responses to the same questions, and some participants provided the same numerical response to all the items on questionnaires with reverse-scored items. Two participants were excluded because they were over 25 years of age, and one participant was excluded because he/she responded to the pet ownership questions for pets that were owned only before age six years.

The remaining data ($n = 318$) were screened for the presence of outliers and missing values. Outliers with a z-value greater than 3.29 were brought within range by assigning scores with a z-value of 3.0. Missing values for individual questionnaire items were imputed based on each participant's mean response on the respective questionnaires. Scores were imputed only if participants had three or fewer missing values on each questionnaire. For the vast majority of participants who skipped or missed questions, only a single missing value was imputed.

The distributions of scores on the independent variables were examined for evidence of non-normality. The distribution of pet bonding (LAPS-R1) scores for the favourite pet was significantly negatively skewed. The distribution of pet aggression scores, representing exposure to aggression toward the favourite childhood pet (EPAS-F), was significantly positively skewed. Among participants who had owned pets during childhood, approximately two thirds ($n = 171$) had not been exposed to aggression toward their favourite pets, resulting in an EPAS-F score of zero. The EPAS-F scores of the remaining participants were fairly evenly distributed (Figure 1). An additional 19 participants completed the first few questions on the EPAS-F, but failed to complete the questions regarding pet aggression by specific individuals, so EPAS scores could not be calculated. Because these participants identified at least one individual who was aggressive toward their favourite pets, they would have received EPAS-F scores greater than zero. Although a series of moderated regression analyses had been planned, these observations suggested that it would be more appropriate to divide the participants into two groups based on whether or not they observed pet aggression.

Because pet bonding scores and exposure to pet aggression varied by pet type (see p. 90-95), only participants whose favourite pets were dogs or cats were included in the main analyses. All participants ($n = 80$) who reported aggression toward their favourite pets (dogs or cats) by at least one individual were included in the main analyses (Exposure Group). Because of the difficulties created by unequal sample sizes in factorial designs (Tabachnick & Fidell, 2007), a random sample of participants ($n = 80$) who did not report pet aggression toward any of the three favourite pets (No Exposure Group) was selected so that ANCOVA could be conducted with groups with equal sample sizes. Participants were then assigned to one of three groups based on their level of bonding with their favourite pets: Low Bond ($n = 55$, $M_{LAPS-R} = 33.6$), Medium Bond ($n = 54$, $M_{LAPS-R} = 49.0$), and High Bond ($n = 51$, $M_{LAPS-R} = 61.3$). No additional outliers were identified in any of the groups.

The distributions of scores on the dependent variables were examined for evidence of non-normality. Scores on the TEQ were significantly negatively skewed for the Low Bond group only. Scores on the AQ were significantly positively skewed for the Medium Bond group only. Scores on the BDI were significantly positively skewed for all groups, except for the Low Bond group. Scores on the STAI were not significantly skewed for any of the groups. Because deviations from normality tend not to have a substantial impact on the analyses with large sample sizes (Tabachnick & Fidell, 2007), a decision was made to avoid transforming the variables in order to allow for a more straightforward interpretation of the results.

Measures of exposure to domestic violence (CEDV) and experiences of child abuse (CTQ) were included to serve as covariates in the main analyses because of the established association between child maltreatment and mental health (e.g., Evans et al., 2008), and because of the association between child maltreatment and animal cruelty (e.g., Ascione, et al., 2007). As in Study 1, CEDV and CTQ scores were significantly positively correlated with each other. Descriptive statistics, alpha coefficients and bivariate correlations among scores on the exposure to domestic violence (CEDV) and child abuse (CTQ) measures are presented in Table 5.

Because it is recommended that covariates are uncorrelated with each other (Tabachnick & Fidell, 2007), a decision was made to select a single child maltreatment measure to serve as the covariate in each analysis. The Emotional Neglect sub-scale of the CTQ (CTQ-EN) was selected as the covariate for the analysis with empathy (TEQ) as the dependent variable. The CTQ-EN was the only measure of child maltreatment that was significantly correlated with the TEQ ($r = -.24$). The CTQ-EN also was positively correlated with the other CTQ sub-scales, and with the CEDV total score and sub-scale scores. The Emotional Abuse sub-scale of the CTQ (CTQ-EA) was selected for the remaining analyses because correlations with the three other dependent variables ($r = .26$ to $.44$) were higher than for any of the other CTQ sub-scales. Scores on the CTQ-EA also were positively correlated with scores on the other CTQ sub-scales and with the CEDV total score and sub-scale scores.

A series of ANOVAs was performed with each dependent variable to determine whether there was an interaction between each of the independent variables and the

covariates. Such interactions would indicate that the homogeneity of the regression slopes assumption would be violated in ANCOVA, thus precluding the use of ANCOVA (Tabachnick & Fidell, 2007). Results indicated no significant interactions between the independent variables and the covariates. Therefore, it was concluded that the data were appropriate for ANCOVA. However, before presenting the main analyses, descriptive information about the participants' experiences with childhood pets will be presented, in order to provide a context for the main results.

Pet ownership history. Most participants (84%, $n = 266$) reported having at least one pet in childhood, when they were between the ages of six and 12 years. Among participants who had childhood pets, the total number of pets ranged from one to 11 ($M = 3.73$, $SD = 2.5$), and most participants had more than one pet during childhood. Approximately 16% of the pet owners had a single pet, 23% had two pets, 22% had three pets, and 39% had four or more childhood pets.

Dogs were reported to be the favourite pet by 50% of the pet owners, and the other participants reported that cats (25%), small mammals (12%), birds (2%), reptiles (2%), fish (8%), or other animals (2%) were their favourite pets. The largest proportion of childhood pet owners (32%) reported that their favourite pets were obtained when they were younger than six years of age. The average length of pet ownership for the favourite pet was 6.9 years ($Med = 8.0$ years, $SD = 4.0$), and 30% of participants reported that they still had their favourite childhood pets. Among participants who no longer had their favourite pets, the most common reason was that the pet had died or been euthanized due to illness or old age (69%). The other most commonly reported reasons were that the pet

had died in an accident (9%), was given to a friend or relative (7%) or to an unknown person (4%), or had run away or been lost (4%).

Among participants who had two or more childhood pets, 35% reported that dogs were their second favourite pets, and the other participants reported that cats (28%), small mammals (15%), fish (11%), birds (7%), reptiles (3%) or other animals (1%) were their second favourite pets. Participants reported that they had their second favourite pets for an average of 5.3 years ($SD = 3.8$), and 35% reported that they still had their second favourite childhood pets. Among participants who no longer had their second favourite pets, the most common reason was that the pet had died or been euthanized due to illness or old age (60%). The other most commonly reported reasons were that the pet had been given to a friend or relative (8%), died in an accident (7%), sold or given to an unknown person (7%), or had run away or been lost (5%).

Among participants who had three or more childhood pets, 25% reported that small mammals had been their third favourite pets, and the other participants reported that cats (24%), fish (19%), dogs (15%), birds (8%), reptiles (5%), or other animals (4%) were their third favourite pets. Participants reported that they had their third favourite pets for an average of 3.6 years ($SD = 3.6$), and 14% reported that they still had their third favourite pets. Among participants who no longer had their third favourite pets, the most common reason was that the pet had died or been euthanized due to illness or old age (50%). The other most commonly reported reasons were that the pet had died in an accident (15%), was given to a friend or relative (14%), or had run away or been lost (7%).

Bonding with childhood pets. Considerable variability was observed in participants' scores on the measure of bonding with the three favourite childhood pets. Descriptive statistics, alpha coefficients, and bivariate correlations among LAPS-R scores are presented in Table 6. Paired-sample *t*-tests indicated that the mean LAPS-R score for the favourite pet was significantly higher than LAPS-R scores for the second favourite pet, $t(189) = 5.30, p < .001$, and third favourite pet, $t(111) = 8.43, p < .001$. Also, the mean LAPS-R score for the second favourite pet was significantly higher than for the third favourite pet $t(106) = 6.51, p < .001$. However, LAPS-R scores for the favourite pet were significantly positively correlated with scores for the second favourite pet ($r = .78$) and third favourite pet ($r = .57$), and LAPS-R scores for the second favourite and third favourite pets were also positively correlated ($r = .68$).

Mean scores on the LAPS-R1 were highest for participants who identified dogs or cats as their favourite pets (see Figure 2). A one-way ANOVA indicated that mean LAPS-R1 scores were significantly different across the six types of pet, $F(5, 256) = 22.27, p < .001$. Post-hoc tests indicated that LAPS-R1 scores for both dogs ($M = 48.3, SD = 12.8$) and cats ($M = 46.8, SD = 12.7$) were significantly greater than for small mammals ($M = 34.7, SD = 17.7$) and fish ($M = 17.8, SD = 10.9$), but were not significantly greater than mean scores for birds ($M = 36.2, SD = 14.4$) or reptiles ($M = 34.3, SD = 18.4$). Mean LAPS-R1 scores for dogs and cats were not significantly different from each other. The mean LAPS-R1 score for dog and cat owners only was 47.8 ($SD = 12.8$).

Among participants who completed the LAPS-R2 for their second favourite pets, mean scores on the LAPS-R2 were highest for participants who reported that dogs or cats

were their second favourite pets. A one-way ANOVA indicated the mean LAPS-R2 scores were significantly different across the six types of pet, $F(5, 174) = 13.96, p < .001$. Post-hoc tests indicated that the mean LAPS-R2 score for dogs ($M = 49.0, SD = 12.3$) was significantly greater than for small mammals ($M = 37.6, SD = 14.5$), birds ($M = 37.5, SD = 14.3$), reptiles ($M = 25.8, SD = 14.1$), and fish ($M = 21.0, SD = 13.8$). The mean LAPS-R2 score for cats ($M = 43.0, SD = 14.1$) was significantly higher than for fish, but was not significantly different from the mean scores for dogs, small mammals, birds, or reptiles.

Among participants who completed the LAPS-R3 for their third favourite pets, mean scores on the LAPS-R3 were highest for participants who reported that dogs or cats were their third favourite pets. A one-way ANOVA indicated that mean LAPS-R3 scores were significantly different across the six types of pet, $F(5, 95) = 8.15, p < .001$. Post-hoc tests indicated that the mean LAPS-R3 scores for both dogs ($M = 47.2, SD = 15.8$) and cats ($M = 43.3, SD = 12.0$) were significantly greater than for small mammals ($M = 32.7, SD = 13.4$) and fish ($M = 20.4, SD = 16.1$), but were not significantly greater than mean scores for birds ($M = 34.9, SD = 14.6$) or reptiles ($M = 26.8, SD = 22.3$). Mean LAPS-R3 scores for dogs and cats were not significantly different from each other.

Exposure to pet aggression in childhood. Of the total sample of pet owners ($n = 266$), 39% ($n = 103$) reported observing physical aggression toward at least one of their three favourite pets. Among participants who had three or more childhood pets ($n = 162$), 23% reported aggression toward only one pet, 17% reported aggression toward two pets, and 3% reported aggression toward the three favourite pets.

Aggression toward the favourite childhood pet. Over one-third of the sample of pet owners (35%, $n = 93$) reported some exposure to aggression toward their favourite childhood pets by at least one individual. Many of these participants (41%) identified only one individual who was aggressive toward their favourite pets, 31% identified two individuals, and 28% identified three or more aggressive individuals. The most commonly reported aggressors included fathers or step-fathers (45%), mothers or foster mothers (28%), brothers (26%), and sisters (13%). Other, less frequently reported aggressors included childhood friends and acquaintances, child and adult neighbours, uncles, and a parent's boyfriend. A number of participants ($n = 17$) did not identify the aggressor(s). The types of pet toward which the aggression was directed included dogs (58%), cats (29%), small mammals (5%), birds (4%), fish (1%), and other, unspecified animals (2%). No participants reported aggression toward reptiles.

The severity of the most severe instance of observed aggression ranged from mild to severe ($M = 1.6$, $SD = .88$) on a five-point scale on which one represents mild aggression and five represents severe aggression (e.g., death, torture). However, most participants (95%) observed aggression in the mild to moderate range. Many participants (57%) reported that they observed pet aggression by the first aggressive individual only once or a few times over a period of several years, and other participants observed pet aggression a few times a year (24%), a few times a month (13%), a few times a week (5%), or daily (1%). The age at which participants first observed individuals being aggressive with their pets ranged from under six years to 12 years. The average length of time between the first instance of observed aggression and the last instance of observed

aggression was 2.0 years ($SD = 2.6$) for the first aggressive individual, 2.1 years ($SD = 2.4$) for the second individual, and 2.1 years ($SD = 2.5$) for the third aggressive individual.

Among participants who had three or more childhood pets, and who reported observing aggression toward the favourite pet, 51% also reported observing aggression toward the second favourite pet and/or the third favourite pet.

A score was calculated to provide a multidimensional measure of participants' exposure to aggression toward the favourite pet. An EPAS-F score was calculated for 93% ($n = 248$) of the total sample of pet owners. The remaining participants did not respond to the questions regarding exposure to pet aggression by specific individuals, so an EPAS-F score could not be calculated. Descriptive statistics, alpha coefficients, and bivariate correlations between the EPAS and LAPS are presented in Table 6. Among participants who reported observing aggression toward their favourite pets, EPAS-F scores ranged from three to 13 ($M = 7.1$, $SD = 3.0$).

Aggression toward other childhood pets. Among participants who had two or more childhood pets and who responded to the EPAS questions regarding the second favourite childhood pet, 21% reported that they had observed at least one individual being aggressive toward their second favourite pets. Many of these participants (58%) identified only one individual who was aggressive toward their second favourite pets, 27% identified two aggressive individuals, and 15% identified three or more aggressive individuals. The most commonly reported aggressors included fathers or step-fathers (46%), brothers (27%), and mothers or foster mothers (24%). Other, less frequently

reported aggressors included sisters, child and adult neighbours, aunts, uncles, childhood friends, and a parent's boyfriend. Some participants ($n = 5$) did not identify the aggressor. The types of pet toward which the aggression was directed included dogs (42%), cats (34%), small mammals (7%), birds (5%), and fish (12%). No participants reported aggression toward reptiles. The majority (78%) of participants who were exposed to aggression toward the second favourite pet also were exposed to aggression toward the favourite pet.

The severity of the most severe instance of observed aggression toward the second favourite pet ranged from mild to severe ($M = 1.4$, $SD = .84$); however most participants (95%) observed aggression in the mild to moderate severity range. Many of these participants (51%) reported that they observed pet aggression by the first aggressive individual only once or a few times over a period of several years, and other participants observed pet aggression a few times a year (23%), a few times a month (11%), or a few times a week (14%). The age at which participants first observed individuals being aggressive toward their second favourite pets ranged from under six years to 12 years. The average length of time between the first instance of observed pet aggression and the last instance of pet aggression was 1.3 years ($SD = 1.8$) for the first aggressive individual, 1.2 years ($SD = 1.7$) for the second aggressive individual, and 0.2 years ($SD = .45$) for the third aggressive individual.

Among participants who had three or more childhood pets and who responded to the EPAS questions regarding the third favourite pet, 9% reported that they had observed at least one individual being aggressive toward their third favourite pets. Most of these

participants (90%) identified only one individual who was aggressive toward their third favourite pets, and one participant identified three aggressive individuals. The most commonly reported aggressors included fathers or step-fathers (50%), brothers (20%), and friends (20%). Other, less frequently reported aggressors included mothers and sisters. One participant did not identify the aggressor. The types of pet toward which the aggression was directed included cats (50%), dogs (20%), fish (20%), and small mammals (10%). The majority of participants (90%) who were exposed to aggression toward the third favourite pet also were exposed to aggression toward the favourite pet and/or the second favourite pet.

The severity of the most severe instance of observed aggression toward the third favourite pet ranged from mild to severe ($M = 1.6$, $SD = 1.3$); however, most participants (90%) observed aggression in the mild to moderate severity range. Many of these participants (44%) reported that they observed pet aggression only once or a few times over a period of several years, and other participants observed pet aggression a few times a year (22%), a few times a month (22%), or a few times a week (11%). The age at which participants first observed individuals being aggressive toward their third favourite pets ranged from under six years to 11 years. The average length of time between the first instance of observed aggression and that last instance of aggression was 3.1 years ($SD = 2.9$) for the first aggressive individual. One participant observed pet aggression by a second and third individual over a two year time period.

Exposure to pet aggression by caregivers. Of the total sample of pet owners, 21% reported observing aggression toward one of their three favourite pets by a caregiver (i.e.,

parent, step-parent, foster parent). Among participants who reported exposure to pet aggression toward one or more of their three favourite pets ($n = 103$), 53% indicated that a caregiver was one of the aggressors, 28% reported pet aggression only by individuals other than caregivers (e.g., siblings, neighbours), and 18% failed to identify the aggressor.

Among participants ($n = 55$) who reported exposure to pet aggression by a caregiver and who reported the identity of the aggressor(s), 82% indicated that their fathers had been one of the aggressors, 51% indicated that their mothers had been one of the aggressors, and 36% indicated that both their mothers and their fathers had been aggressive with their pets. Two participants reported that their step-fathers were the aggressors, and one participant identified a foster-mother as the aggressor.

Pet ownership and psychosocial functioning. A series of analyses was conducted to determine whether childhood pet ownership was associated with psychosocial functioning in young adulthood, without taking into consideration the level of pet bonding or exposure to pet aggression. Four independent samples *t*-tests were conducted to determine whether pet owners ($n = 266$) were significantly different from non-owners ($n = 52$) on the measures of empathy, interpersonal aggression, depression, and anxiety. Results indicated that the differences between childhood pet owners and non-owners were not significant for any of the current measures of psychosocial functioning (see Table 7).

Pet bonding and exposure to pet aggression. A series of two-way ANCOVAs was conducted to evaluate the associations among bonding with childhood pets, exposure to aggression toward childhood pets, and psychosocial functioning in early adulthood.

Only participants who reported cats or dogs as their favourite pets were included in the analyses because of the observed differences in pet bonding scores and exposure to pet aggression across pet type. One independent variable, the level of bonding with childhood pets, included three levels: *Low Bond*, *Medium Bond*, and *High Bond*. The LAPS-R score for the favourite pet was chosen to represent the level of childhood pet bonding because of the significant positive correlation among bonding scores for the three favourite childhood pets. The other independent variable, exposure to pet aggression, included two levels: *Exposure* to pet aggression and *No Exposure* to pet aggression. Participants in the *Exposure* group had witnessed one or more individuals being physically aggressive with their favourite childhood pets. Participants in the *No Exposure* group had not witnessed physical aggression toward any of their three favourite childhood pets. The dependent variables were empathy, interpersonal aggression, depression, and anxiety in young adulthood. Descriptive statistics, alpha coefficients, and correlations among the dependent variables are provided in Table 8. Measures of child maltreatment were included as covariates because of the established association between child maltreatment and mental health, and the association between child maltreatment and animal cruelty. For all four analyses, Levene's test led to the conclusion that error variances were equal across groups ($p > .05$). Because four separate analyses were conducted, an alpha level of .0125 was selected to indicate significant main effects and interactions.

Empathy. A 3 x 2 ANCOVA was conducted to evaluate the association between childhood experiences with pets and empathy in young adulthood. The covariate was a

measure emotional neglect in childhood (CTQ-EN). This covariate was significantly associated with empathy scores in young adulthood, $F(1, 153) = 6.62, p = .011$. Adjusted marginal means are presented in Figure 3. The interaction between pet bonding and exposure to pet aggression was not significant, $F(2, 153) = .339, p = .713$, partial $\eta^2 = .004$, and the main effect of exposure to pet aggression was not significant, $F(1, 153) = 2.37, p = .125$, partial $\eta^2 = .02$. The level of bonding with childhood pets was significantly associated with empathy in young adulthood, $F(2, 153) = 5.20, p = .007$, partial $\eta^2 = .06$. Follow-up tests were conducted to evaluate differences in adjusted means. Participants in the Low Bond group had a significantly lower mean empathy score than those in the Medium Bond group ($p = .030$) and the High Bond group ($p = .002$), but mean empathy scores were not significantly different between the Medium Bond and High Bond groups ($p = .338$).

Interpersonal aggression. A 3 x 2 ANCOVA was conducted to evaluate the association between childhood experiences with pets and interpersonal aggression in young adulthood. The covariate was a measure of emotional abuse in childhood (CTQ-EA). This covariate was significantly associated with aggression scores in young adulthood, $F(1, 153) = 6.45, p = .012$. Adjusted marginal means are presented in Figure 4. The interaction between pet bonding and exposure to pet aggression was not significant, $F(2, 153) = 1.89, p = .155$, partial $\eta^2 = .02$. The main effect of pet bonding was not significant $F(2, 153) = 2.37, p = .097$, partial $\eta^2 = .03$, and the main effect of exposure to pet aggression also was not significant $F(1, 153) = 3.61, p = .059$, partial $\eta^2 = .02$.

Depression. A 3 x 2 ANCOVA was conducted to evaluate the association between childhood experiences with pets and depression in young adulthood. The covariate was a measure of emotional abuse in childhood (CTQ-EA). This covariate was significantly associated with depression scores in young adulthood, $F(1, 153) = 22.61, p < .001$. Adjusted marginal means are presented in Figure 5. The interaction between pet bonding and exposure to pet aggression was not significant according to the stringent alpha level selected for these analyses, $F(2, 153) = 3.96, p = .021, \text{partial } \eta^2 = .05$. The main effect of pet bonding was not significant $F(2, 153) = .446, p = .641, \text{partial } \eta^2 = .006$, and the main effect of exposure to pet aggression also was not significant $F(1, 153) = 4.67, p = .032, \text{partial } \eta^2 = .03$.

Despite these results, follow-up tests were conducted for several reasons. First, a striking pattern of means was apparent in Figure 5, especially with respect to the Medium Bond Group. Furthermore, the interaction was significant at $p < .05$, and the effect size was moderate. Finally, because of the significant skew in the distribution of depression scores, a separate ANCOVA was conducted after a square root transformation of BDI scores. In this analysis, the interaction between pet bonding and exposure to pet aggression was significant, $F(2, 153) = 5.01, p = .008, \text{partial } \eta^2 = .06$.

Given the pattern of results, simple main effects of exposure to pet aggression were examined. In other words, the differences between Exposure and No Exposure groups were evaluated at each level of bonding (Low, Medium, High). Results indicated that, for the Medium Bond group only, participants who had been exposed to pet aggression in childhood had a significantly higher mean depression score than those who

had not been exposed to pet aggression, $F(1, 153) = 11.86, p = .001$. Differences in depression scores between Exposure and No Exposure groups were not significant for the Low Bond group, $F(1, 153) = .124, p = .726$, or the High Bond group, $F(1, 153) = .571, p = .451$.

The simple main effects of bonding also were examined. In other words, the differences between the Low Bond, Medium Bond, and High Bond groups were evaluated at each level of exposure to pet aggression (Exposure, No Exposure). For the No Exposure group, the differences in depression scores among the three bonding groups were not significant, $F(2, 153) = 2.02, p = .136$. For the Exposure group, the differences in depression scores among the three bonding groups also were not significant, $F(2, 153) = 2.40, p = .094$.

In order to evaluate the possible clinical significance of the extent of exposure to pet aggression as it relates to depression, participants were divided into five groups according to their total EPAS scores for their favourite pets (see Table 9). The first group ($n = 77$) received EPAS-F scores of zero. Participants who received EPAS scores greater than zero were divided into three groups of equal sizes: those with scores between one and 4.5, those with scores between five and eight, and those with scores greater than nine. The fifth group of participants did not report enough information to allow the calculation of an EPAS score. These participants indicated that one or more individuals had been aggressive with their favourite pets but did not complete subsequent EPAS questions. Therefore, they would have received EPAS scores greater than zero. For each EPAS group, the proportion of participants who fell in each BDI cut score range was calculated.

The BDI manual (Beck et al., 1996) recommends the following cut score guidelines: minimal (0-13), mild (14-19), moderate (20-28), and severe (29-63). Most participants in each group had BDI scores in the minimal range. However, a greater proportion of participants with EPAS-F scores above five had BDI scores in the moderate or severe range compared with participants who had EPAS scores below five.

Anxiety. A 3 x 2 ANCOVA was conducted to evaluate the association between childhood experiences with pets and anxiety in young adulthood. The covariate was a measure of emotional abuse in childhood (CTQ-EA). This covariate was significantly associated with anxiety in young adulthood, $F(1, 153) = 33.74, p < .001$. Adjusted marginal means are presented in Figure 6. The main effect of pet bonding was not significant $F(2, 153) = .130, p = .878, \text{partial } \eta^2 = .002$, and the main effect of exposure to pet aggression was not significant, $F(1, 153) = .984, p = .323, \text{partial } \eta^2 = .006$. The interaction between pet bonding and exposure to pet aggression was significant, $F(2, 153) = 7.63, p = .001, \text{partial } \eta^2 = .09$.

Given the significant interaction, simple main effects of exposure to pet aggression were examined. In other words, the differences between Exposure and No Exposure groups were evaluated at each level of bonding (Low, Medium, High). Results indicated that, for the Low Bond group, participants who had been exposed to pet aggression in childhood had a significantly lower mean anxiety score than participants who had not been exposed to pet aggression, $F(1, 153) = 3.91, p = .05$. For the Medium Bond group, participants who had been exposed to pet aggression in childhood had a significantly higher mean anxiety score than those who had not been exposed to pet

aggression $F(1, 153) = 11.71, p = .001$. For the High Bond group, mean differences in anxiety scores between Exposure and No Exposure groups were not significant $F(1, 153) = .088, p = .768$.

The simple main effects of bonding were also examined. In other words, the differences between the Low Bond, Medium Bond, and High Bond groups were evaluated at each level of exposure to pet aggression (Exposure, No Exposure). For the No Exposure group, there was a significant difference in anxiety scores among the three bonding groups, $F(2, 153) = 4.36, p = .014$. Results of pairwise comparisons indicated that only the difference between the Low Bond group and the Medium Bond group was significant ($p = .004$). Participants in the Medium Bond group had a lower mean anxiety score than participants in the Low Bond group. For the Exposure group, there was a significant difference in anxiety scores among the three bonding groups, $F(2, 153) = 3.40, p = .036$. Again, results of pairwise comparisons indicated that only the difference between the Low Bond group and the Medium Bond group was significant ($p = .012$). Participants in the Medium Bond group had a higher mean anxiety score than participants in the Low Bond group.

Discussion

The childhood pet ownership histories of participants in this study are comparable to those described in previous studies (e.g., Albert & Bulcroft, 1988; Bryant & Donnellan, 2007). The majority of participants in this study reported having one or more pets in childhood, and many reported having more than one species of pet. Furthermore, participants were most likely to indicate that dogs were their favourite childhood pets.

The central purpose of this study was to investigate whether both positive and negative experiences with childhood pets are associated with psychosocial functioning in young adulthood. Participants completed measures of pet bonding and exposure to pet aggression for their three favourite childhood pets, as well as measures of empathy, interpersonal aggression, depression, and anxiety. A series of ANCOVAs was conducted in order to determine whether bonding with pets was associated with positive psychological functioning, and whether exposure to animal cruelty was associated with psychological and interpersonal difficulties, after controlling for experiences with domestic violence and child abuse/neglect. Furthermore, it was hypothesized that there would be an interaction between pet bonding and exposure to pet aggression. A secondary purpose was to contribute to the HAI literature regarding the characteristics of pet ownership, particularly with respect to exposure to pet aggression.

Bonding with childhood pets. Considerable variability was observed in participants' pet bonding scores. Observed scores on the retrospective measure of pet bonding covered the full range of possible scores on the Lexington Attachment to Pets Scale (LAPS-R) total scores (0-69) for all three favourite childhood pets. For all three favourite pets, the mean LAPS-R scores were significantly higher for dogs and cats than for small mammals and fish. These results are consistent with those of previous research indicating that participants are most likely to identify dogs or cats as their favourite pets compared with other types of animal (Bryant, 1990; Daly & Morton, 2006), and that pet bonding scores are highest for participants who report that dogs and cats are their favourite pets (Bagley & Gonsman, 2005). One exception in the current study was that

the mean LAPS-R2 score for cats was not significantly higher than the mean LAPS-R2 score for small mammals. Although mean LAPS-R scores were higher for dogs and cats than for birds and reptiles, the differences were not statistically significant. This is likely due to the large amount of variability in LAPS-R scores for birds and reptiles as well as the relatively small number of participants who reported that birds or reptiles were their favourite pets. For example, only 7% of the participants reported that birds were their favourite pets, and only 3% of participants reported that reptiles were their favourite pets.

LAPS-R scores for the favourite, second favourite, and third favourite pets were significantly positively correlated, suggesting that levels of bonding are similar across pets. If individuals have strong bonds with one pet then they are likely to have strong bonds with other pets. However, the mean LAPS-R score for the favourite pet was significantly higher than for the second and third favourite pets, and the mean score for the second favourite pet was significantly higher than for the third favourite pet. These differences were expected because participants were asked to rank their pets according to how much they favoured each pet, but the differences may be partly related to differences in pet type. Whereas dogs were most frequently reported to be the favourite pet, small mammals were most frequently reported to be the third favourite pet. Half of pet owners reported that dogs were their favourite pets, but only 35% reported that dogs were their second favourite pets, and 15% reported that dogs were their third favourite pets.

There may be several reasons why people tend to have stronger bonds with dogs and cats than with other animals. First, dogs and cats are more intelligent than smaller pets facilitating the type of human-animal interaction that might be pleasing to humans.

For example, dogs in particular can be trained to engage in behaviours that humans find useful and amusing. Second, dogs and cats are more social and attentive to the behaviour of humans than other animals. For example, in an observational study, Smith (1983) found that dogs oriented their bodies toward people even while they were resting or in a different room. Third, dogs and cats may be more likely to be family pets whereas small mammals are more likely to fall under the care of individual family members (Rost & Hartmann, 1994). Finally, small mammals, reptiles, birds, and fish are likely to be confined to cages, whereas dogs and cats are more likely to have free access to the family home (Smith, 1983) where there are more opportunities to interact with family members. Therefore, family members may be more likely to spend time with pets, and develop bonds with them, if they are dogs or cats than if they are smaller animals.

Exposure to pet aggression in childhood. Almost 40% of participants who had childhood pets reported that they had observed physical aggression toward one or more of their favourite pets. However, it is important to note that most of these participants observed mild forms of pet aggression, and only a small proportion of participants observed aggression in the severe range. Most participants who observed aggression toward their second or third favourite pets had also observed aggression toward their favourite pets. Direct comparisons of these results to those of previous studies are complicated due to differences in methodology, particularly the manner in which participants were questioned about childhood exposure to animal cruelty. Participants in the current study were university students who self-reported about their exposure to pet aggression ranging in severity from mild to severe. Questions were limited to the three

favourite childhood pets that participants had between the ages of six and 12 years.

Furthermore, participants were asked about their three favourite pets separately.

A single previous study was identified in which participants from a community sample were asked specifically about childhood exposure to animal cruelty toward family pets (Ascione et al., 2007). In that study, 3% of women reported that their children ($M_{age} = 10.9$ years) had observed pet abuse in their own homes. The use of the term *abuse* in the question may have resulted in a relatively small proportion of affirmative responses, as participants may have reported only severe instances of pet aggression. Furthermore, parents were asked about their children's experiences, and children's own responses to questions about witnessing pet aggression were not reported.

In other studies, children were asked directly about their exposure to animal cruelty. Baldry's (2003; 2004; 2005) samples included Italian children and adolescents between the ages of nine and 17 years. Two other samples included Australian adolescents between the ages of 12 and 18 years (Gullone & Robertson, 2008; Thompson & Gullone, 2006). The questions in these studies did not refer exclusively to family pets, and the authors avoided the use of terms such as *cruelty* or *abuse*. For example, Baldry (2004, p.13) posed the following question: "have you ever seen your father hurting an animal?" The proportion of children who reported that they had witnessed someone harming animals ranged from 65% to 78% (Baldry, 2005; Thompson & Gullone, 2006). The authors of the other studies reported the proportions of children who had been exposed to animal aggression by different individuals. For example, the percentage of

children who observed an adult (other than a parent) harming animals ranged from 41% to 61% (Baldry, 2003; Gullone & Robertson, 2008).

In a third group of studies, university students were asked to retrospectively report about their own exposure to animal cruelty. Participants were asked about their experiences with animal cruelty using a version of the Boat Inventory on Animal-Related Experiences (Boat, 1999). Follow-up questions regarding the type of animal and the type of aggressive act were included after an initial probe question: “did you ever see anyone deliberately hurt, torture or kill a pet or animal in a cruel way?” (Boat, 1999; p. 96). Therefore, the questions did not refer exclusively to family pets, the initial question included the term *cruel*, and the questions referred to lifetime exposure to animal cruelty, including in adolescence and adulthood. The proportion of students who reported observing animal cruelty ranged from 22% to 51% (DeGue & DiLillo, 2009; Flynn, 1999b; Flynn, 2000a; Henry, 2004a; Henry, 2004b). Miller and Knutson (1997) reported that approximately 30% of participants had witnessed, but never perpetrated, animal cruelty. Taken together, these results indicate that the proportion of individuals who report observing animal cruelty depends greatly on the manner in which questions are framed.

Participants in the current study were most likely to report that dogs and cats were the targets of aggression compared with other types of pet. This result may be largely related to the fact that participants were asked to describe their experiences with their favourite family pets, and dogs and cats were most likely to be identified as the favourite and second favourite pet. However, the pattern of results suggests that a disproportionate

amount of pet aggression was directed toward dogs and cats. This pattern is most apparent in the results pertaining to the third favourite childhood pet. Although 15% of pet owners identified dogs as their third favourite pets, 50% of those who observed aggression toward their third favourite pets indicated that dogs were the target. Also, 25% of participants reported that small mammals were their third favourite pets, but only 10% of those who observed aggression toward their third favourite pets reported that small mammals were the targets.

These results are consistent with the study by Ascione et al. (2007) which found that dogs and cats were more likely to be targets of aggression than other types of family pet. In three other studies, questions pertained not only to family pets but to any animal. Miller and Knutson (1997) found that the most frequent targets of observed animal cruelty were small animals. Flynn (1999b; 2000a) reported the types of animal toward which participants observed and/or perpetrated animal cruelty. Small animals were the most frequently reported targets of lethal aggression; whereas dogs were the most frequently reported targets of aggression that involved hurting or torturing the animal (Flynn, 1999b; 2000a). The reasons for these differences may be similar to the reasons that were proposed for the differences in levels of bonding. Namely that family members are more likely to have opportunities to interact with dogs and cats than with other animals.

The results of the current study extend previous research by providing additional detailed information about the frequency and severity of pet aggression witnessed in childhood, as well as the number of different individuals who were aggressive with pets

and the length of time over which participants observed pet aggression. Previous research on childhood exposure to animal cruelty has not typically included this information (Ascione et al., 2007; Baldry, 2003; Baldry, 2004; Baldry, 2005; DeGue & DiLillo, 2009; Flynn, 1999b; Henry, 2004b).

The results indicated that, for many children who observe pet aggression, the aggression is not a single occurrence; children often observe multiple instances of pet aggression. This observation is corroborated by the results regarding the number of individuals who were observed to be aggressive with pets, and the length of exposure to pet aggression. Sixty percent of participants who observed aggression toward their favourite pets reported that they observed more than one individual being aggressive with their pets. The mean length of time over which participants observed pet aggression ranged from 0.2 years to 2.9 years across aggressors and pets. The majority of participants reported that the most severe instance of pet aggression they observed was in the mild to moderate range; however, 5-10% of participants reported observing more severe instances of aggression (i.e., multiple painful injuries, death, torture) toward one of their three favourite childhood pets when they were between the ages of six and 12 years.

Pet ownership and psychosocial functioning. The results of this study did not provide evidence that childhood pet ownership, *per se*, is associated with psychosocial functioning in young adulthood. Mean scores on the current measures of empathy, aggression, depression, and anxiety were virtually identical for childhood pet owners and non-owners. This finding is consistent with most previous studies regarding the

association between pet ownership and mental health (e.g., Daly & Morton, 2003; Friedmann et al., 1984; Stallones et al., 1990; Vizek-Vidovic et al., 1999). Although the results of some studies have suggested that there may be a positive effect of pet ownership on psychosocial functioning, these studies typically included participants who were experiencing difficult life circumstances, and who may have had stronger than average bonds with their pets (e.g., Akiyama et al., 1986). Therefore, it was important to determine whether the level of bonding with pets is a critical factor in the association between pet ownership and mental health. An important purpose of the current study was to determine whether exposure to animal cruelty should also be considered when investigating the association between childhood experiences with pets and mental health.

Pet bonding and exposure to pet aggression. As expected, in each ANCOVA, the covariates were significantly associated with the dependent variables, indicating that child maltreatment is associated with psychosocial functioning in young adulthood. The associations that were observed between childhood experiences with pets and psychosocial functioning in young adulthood were still significant after partialling out the effects of child maltreatment. These results suggest that child maltreatment and exposure to animal cruelty have unique associations with psychological health.

Because of the nature of the research design, no conclusions can be drawn about causal associations between the independent and dependent variables. This study was conducted to begin to assess the possibility that experiences with childhood pets may directly contribute to psychosocial functioning. Specifically, stronger bonds with pets may lead to more positive functioning and exposure to pet aggression may lead to the

development of psychosocial difficulties. It is also possible that the reverse is true regarding causal associations. Psychosocial factors may contribute to the strength of the bond that develops between children and pets. This possibility will be discussed in the following sections. However, regarding exposure to pet aggression, it seems unlikely that the psychosocial characteristics of a child would cause other individuals to be aggressive with family pets. For example, it is unclear how a child's anxiety would cause others to be aggressive with family pets. A final possibility is that there are no direct causal associations between experiences with childhood pets and psychosocial functioning, and that one or more extraneous variables explain the observed associations. This is an important question that should be addressed in future research.

Empathy. For the empathy dependent variable, no interaction was observed between the level of bonding with childhood pets and exposure to pet aggression. There was no main effect of exposure to pet aggression, but there was a significant main effect of bonding with childhood pets. Participants who had the strongest bonds with their favourite childhood pets had a significantly higher mean empathy score than participants who were the least strongly bonded with their pets, regardless of whether they were exposed to pet aggression. This result is consistent with previous research indicating that bonding with childhood pets is associated with empathy and other measures of positive social functioning (Melson et al., 1991; Poresky, 1990; 1996; Poresky & Hendrix, 1990; Vizek-Vidovic et al., 1999).

Although a number of studies have been conducted on the association between experiences with pets and empathy, researchers have generally been hesitant to put forth

hypotheses about the mechanisms through which this association might develop. There are at least two possible causal explanations for this association. First, a high level of empathy may promote or facilitate the development of strong bonds with family pets. Second, having a strong bond with pets may promote the development of empathy.

Melson et al. (1991) suggested that children who have higher levels of empathy may have a greater ability to understand and respond to the needs of their pets, and that this may lead to the development of stronger bonds with pets. One way in which this might occur is that when children have a better understanding of the needs of their pets, it may lead to more positive interactions between children and pets. For example, animals may respond more frequently and affectionately toward children who feed, groom, or play with them in ways that satisfy their needs. The reciprocal responsiveness between children and pets may result in the development of stronger bonds between children and their pets.

Another explanation for the association between pet bonding and empathy is that bonding with childhood pets helps to facilitate the development of empathy. If this interpretation is correct, then it suggests that giving children opportunities to bond with pets may be a way to promote the development of empathy. Although many recent theories of empathy development focus on genetic or biological components (Knafo, Zahn-Waxler, Hulle, Robinson, & Rhee, 2008), such as the mirror neuron system (Baird, Scheffer, & Wilson, 2011), factors in the child's environment, particularly social interactions, are thought to be at least partly responsible for the development of empathy (Eisenberg, 1988; Knafo et al., 2008; Robinson & Zahn-Waxler, 1994). Previous research

suggests that parents may be able to contribute to the development of bonding between children and pets, as parental attitudes toward pets are associated with children's attitudes toward pets (Kidd & Kidd, 1990; Schenk et al., 1994). This has important implications because of the established positive association between empathy and prosocial behaviour and the negative association between empathy and aggressive behaviour (Eisenberg & Miller, 1987; Findlay et al., 2006; Miller & Eisenberg, 1988; Roberts & Strayer, 1996).

One way in which relationships with pets may promote the development of empathy is through the non-verbal interactions that occur between children and pets (Melson et al., 1991). Because animals are unable to communicate verbally, children must specifically attend to, and discriminate between, the different behaviours that indicate how their pets may be feeling (e.g., content, afraid). Assuming that children who have stronger bonds with their pets spend more time interacting with their pets (Melson et al., 1991; see also Smith, 1983), those who have stronger bonds have more opportunities to develop their abilities to recognize their pets' emotions. The ability to recognize the emotional states of animals through non-verbal cues may then promote the ability to recognize the emotions of other people. This ability to recognize the emotional states of others is associated with empathic responding (Besel & Yuille, 2010; Martin, Berry, Dobranski, & Horne, 1996; Riggio, Tucker, & Coffaro, 1989).

Another way in which relationships with pets may promote the development of empathy is through the social facilitation effects of animals. Research was cited previously which demonstrated that animals can facilitate positive social interactions among humans (e.g., Wells, 2004). If the presence of an animal provides opportunities for

more positive interactions with people, perhaps this results in more opportunities for the development of empathy. Cox (1993) and Roberts (1994) reported more positive family functioning among participants who reported greater levels of bonding with pets. In Cain's (1983) study about the role of pets in the family, many participants noted that the family spent more time together after obtaining a pet, and that the presence of the pet led to an increased sense of closeness and happiness among family members. One participant noted that she drew attention to the feelings of the dog in order to moderate the behaviour of her children. For example, she would say "stop fighting - you're upsetting the dog" (Cain, 1983; p. 76). Increases in positive family interactions may therefore increase opportunities for parents to demonstrate and teach empathy related responding.

It was predicted that exposure to pet aggression in childhood might be associated with empathy in young adulthood. However, no previous research on the association between empathy and witnessing animal cruelty was identified to guide specific hypotheses. Previous research suggested that exposure to other forms of family violence was associated with lower levels of empathy (e.g., Hincley & Gavelek, 1982; Straker & Jacobson, 1981). Therefore, it was predicted that exposure to pet aggression might be associated with lower levels of empathy. The mean empathy scores of participants who were exposed to pet aggression were slightly lower than the scores of those who were not exposed to pet aggression, but the difference was not statistically significant. These results suggest that exposure to pet aggression in childhood may not substantially interfere with the development of empathy. However, it is important to note that many

participants in observed only mild forms of pet aggression, so it may be that exposure to more severe forms of pet aggression does interfere with empathy development.

Depression and anxiety. A number of factors contributed to the hypothesis that exposure to pet aggression in childhood would be associated with depression and anxiety. Attachment theory suggests that children experience emotional distress if they are threatened with the loss of an attachment figure (Ainsworth, 1989; Bowlby, 1982). Previous research on human-animal interactions found that some people experience severe grief responses to the loss of their pets (e.g., Brown et al., 1996) and that many people who witness animal cruelty are distressed by those experiences (e.g., Flynn, 2000a). Furthermore, a substantial amount of research has documented the increased risk of internalizing disorders among individuals who are exposed to other forms of family violence (e.g., Holt et al., 2008).

On the other hand, positive experiences with family pets were predicted to be associated with lower levels of depression and anxiety. Some research suggested that individuals may experience a protective effect of pet ownership on mental health through the social support that is provided by pets (e.g., Garrity et al., 1989). Although little previous research has provided evidence of an association between pet bonding and internalizing symptoms among children, slightly stronger evidence of such associations has been found among adults (e.g., Guest et al., 2006; Siegel et al., 1999). Furthermore, research on animal assisted interventions has revealed associations between positive experiences with animals and reductions in symptoms of both depression (e.g., Folse et al., 1994) and anxiety (e.g., Nagengast et al., 1997).

Because positive experiences with pets and exposure to pet aggression likely have different associations with internalizing symptoms, an interaction between bonding and exposure was predicted in the current study for the depression and anxiety dependent variables. Consistent with this hypothesis, a significant interaction between bonding and exposure was found for anxiety. The interaction was not significant for the depression variable using the strict alpha level selected for the analysis, but it was significant after a transformation was applied to the depression scores to correct for a skewed distribution. The pattern of results regarding mean differences between groups was consistent with the hypotheses for the medium-bond and low-bond groups, but the results for the high-bond group were unexpected. The results for the medium- and low-bond groups will be discussed first.

The results provide some tenuous support for the contention that exposure to pet aggression may contribute to the development of internalizing symptoms. However, this was most apparent when the level of bonding with childhood pets was taken into account. For those with medium-level bonds, significantly higher anxiety and depression scores were observed among those who were exposed to pet aggression compared with those who were not exposed to pet aggression. For those with low childhood pet bonding scores, the differences in depression scores between exposure and no-exposure groups were not significant, and lower anxiety scores were observed among the exposure group compared with the no-exposure group. Children who care more about their pets may experience more emotional distress as a result of witnessing aggression directed toward

their pets. If children do not feel an affectional connection to their pets, then witnessing pet aggression may not be as distressing to them.

It is plausible that the emotional distress that results from witnessing pet aggression may contribute to the development of internalizing disorders, particularly among children who are exposed to severe or frequent pet aggression. An original purpose of this study was to evaluate this possibility by computing an EPAS score that included measures of the frequency and severity of pet aggression witnessed in childhood. Unfortunately, it was not feasible to conduct a regression analysis using EPAS scores because the distribution of EPAS scores deviated substantially from normality. However, some preliminary evidence that more frequent and severe pet aggression is associated with higher rates internalizing symptoms was discernible when the proportion of participants in each BDI cut score range was calculated according to EPAS score range. Participants were divided in to four groups based on their EPAS scores for their favourite pets (EPAS-F). In the groups with higher EPAS-F scores, larger proportions of participants had depression scores in the severe range. Only five percent of participants with EPAS-F scores of zero had depression scores in the severe range, whereas 17% of participants with EPAS-F scores greater than nine had depression scores in the severe range.

If future research provides evidence of a causal association between exposure to pet aggression and internalizing disorders, it will have important implications for child protection efforts. The Ontario Child and Family Services Act (1990) specifies that a child is in need of protection if that child experiences emotional harm (e.g., depression,

anxiety), or is likely to experience emotional harm, as a result of a parent's action or failure to act. The results of this study suggest that children who observe individuals being aggressive with their pets may be at an increased risk of developing internalizing disorders. Therefore, parents who abuse family pets in the presence of their children, or who allow their children to witness frequent or severe pet aggression by other individuals, may be placing their children at risk of emotional harm.

Clearly, more research is needed before any policy recommendations can be made regarding child protection implications of witnessing pet aggression. However, if the results of future research are consistent with those reported here, interventions for the protection of children may be indicated in cases of animal cruelty. For example, it may be advisable to remove abused animals from a child's home to protect children from the emotional distress that results from observing pet aggression, as well as to protect the animals from physical harm. The possibility that individuals who commit very serious acts of animal cruelty in the presence of children should be prohibited from owning animals should also be considered.

If exposure to pet aggression does play a role in the development of internalizing disorders for some individuals, another important implication relates to the psychosocial treatment of internalizing disorders. Mental health care providers may be advised to ask their clients about exposure to pet aggression in childhood, and to address any emotional issues that arise from that exposure during the therapeutic process. Given the results of the current study, this may be the case both for children and for adults who were exposed to pet aggression in childhood. Furthermore, social service professionals who investigate

child maltreatment may be advised to refer children who are exposed to more severe forms of animal cruelty for counseling. A recent survey of child protection workers in Ontario revealed that more than half of the participants had heard children disclose instances of caregiver-perpetrated animal cruelty during investigations in the previous year (Girardi & Pozzulo, 2012).

The results also provide some support for the contention that bonding with pets may play a protective role in mental health. In other words, having a strong bond with a childhood pet may help to buffer children from the development of internalizing difficulties. The buffering effect may occur through the emotional and social support that some people experience from their pets, and may be related to the stress-reducing effects of contact with animals. However, this only seemed to be the case for those participants who were not exposed to pet aggression. Among participants who were not exposed to pet aggression, those with medium-level bonds had lower mean depression and anxiety scores than those who had low-level bonds. These results are consistent with those observed in some previous studies of pet ownership (e.g., Siegel et al., 1999), pet bonding (e.g., Garrity et al., 1989), and animal-assisted interventions (e.g., Folse et al., 1994; Nagengast et al., 1997). However, the opposite pattern was observed for those who were exposed to pet aggression. Among those who were exposed to pet aggression, those with medium-level bonds had higher depression and anxiety scores than those with low-level bonds. Therefore, bonding with pets may play a positive role in mental health, but only for children who do not observe aggression toward their pets. The reason that some previous studies have failed to demonstrate an association between pet bonding/

ownership and internalizing disorders may be because exposure to pet aggression was not considered.

An alternative explanation for the association between pet bonding and mental health is that internalizing disorders influence the development of bonding with pets. For example, perhaps those who experience depression or anxiety develop stronger bonds with their pets because pets provide a source of comfort and help to ease their distress (Kidd & Kidd, 1985). However, this explanation would only apply to those who were exposed to pet aggression, because among those who were not exposed to pet aggression, internalizing symptoms were lower among those who had medium level bonds than those who had low bonds. If the presence of internalizing symptoms does lead to a strengthening of the bond between children and pets, it is not clear why this would be true only for those who were exposed to pet aggression.

Conversely, symptoms of depression or anxiety could somehow interfere the development of relationships with pets so that those with more internalizing symptoms are unable to develop bonds with pets. However, this explanation would only apply to those who were not exposed to pet aggression, because among those who were exposed to pet aggression, internalizing symptoms were higher among those with medium levels bonds than those with low level bonds. This explanation also contrasts with the results of previous research which indicates that individuals tend to seek out their pets for comfort when they are distressed or experiencing difficult life circumstances (Mallon, 1994a). If the presence of internalizing disorders does interfere with the development of bonding

with pets, it is unclear why this would be true only for those who were not exposed to pet aggression and not for those who were exposed to pet aggression.

The results for participants with the highest pet bonding scores were unexpected. Among those who were not exposed to pet aggression, the differences in depression/anxiety scores between the medium bond group and the high bond group were not significant. However, the pattern of results deviated from what was expected. It was hypothesized that those with the strongest bonds with their pets would experience the strongest protective effect of pet bonding; therefore, the high bond group was expected to have lower depression/anxiety scores than the medium bond group. Instead, the high bond group had (non-significantly) higher depression/anxiety scores than the medium bond group. This pattern of results is consistent with the hypothesis of Chur-Hansen, Winefield, and Beckwith (2009) that there is a curvilinear association between pet bonding and mental health. They suggest that very strong attachment to pets may lead people to isolate themselves from other people resulting in poor mental health, that those who are not attached to pets may not experience benefits from relationships with animals, and that those with moderate levels of attachment may experience the most benefit.

However, other explanations are possible. Perhaps children in this group are highly emotionally sensitive, and are therefore more likely to develop internalizing disorders and to develop very strong emotional bonds with their pets. Children in the high bond group who were not exposed to pet aggression had the highest mean empathy score, suggesting that they are sensitive to the emotions of others. Or perhaps children who were already depressed or anxious developed a strong bond with their pets as a coping

strategy, supporting the theory that internalizing distress plays a causal role in the development of bonding with pets. However, these interpretations are not consistent with other observed results in this study, because children with the lowest bonds had higher anxiety/depression scores than those with medium bonds. Furthermore, it is unclear why these explanations would hold only for those who were not exposed to pet aggression, as the opposite pattern was observed among those who were exposed to pet aggression.

Among those who were exposed to pet aggression, the differences in depression/anxiety scores between the medium bond group and the high bond group were not significant. However, again, the pattern of results deviated from what was expected. It was hypothesized that those who had the strongest bonds with their pets would experience the most distress as a result of witnessing aggression toward their pets; therefore, the high bond group was expected to have higher depression/anxiety scores than the medium bond group. Instead, the high bond group had (non-significantly) lower depression/anxiety scores than the medium bond group. A purely speculative explanation is that those children with the highest bonds experienced a protective effect of pet bonding more so than those in the medium bond group. Although the high bond group may have been distressed by witnessing pet aggression, the increased social support, companionship, and/or comfort provided by a very strong affectional relationship with the pet may have helped to buffer the negative effects of exposure to pet aggression.

The associations among pet bonding, exposure to pet aggression, and internalizing symptoms are obviously complicated. Opposite patterns of results regarding the association between pet bonding and internalizing disorders were observed for those who

were exposed to pet aggression compared with those who were not exposed to pet aggression. Furthermore, the results for participants in the high bond group deviated from what was expected based on attachment theory, social support theory, and previous research on human-animal interactions. No previous research is available on the interaction between pet bonding and exposure to pet aggression to which to compare the results of this study, and to aid in the interpretation of these results. This pattern of results warrants attention in future research to determine whether it will be replicated in other samples.

Interpersonal aggression. Social learning theory suggests that children learn aggressive behaviour by observing others engage in aggressive behaviour (Bandura et al., 1961), and attachment theory suggests that children may experience anger if their attachment figures are harmed or if they are threatened with the loss of the attachment figure (Bowlby, 1982). Previous research suggested that children who were exposed to animal cruelty were more likely to engage in animal cruelty themselves (e.g., Baldry, 2005), and to engage in other forms of antisocial behaviour such as bullying (e.g., Gullone & Robertson, 2008). Therefore, it was expected that participants who had been exposed to pet aggression in childhood would report higher levels of interpersonal aggression in young adulthood than those who were not exposed to pet aggression.

Previous research suggested that children and youth who were exposed to animals as part of structured interventions demonstrated reductions in aggression and antisocial behaviour (e.g., Katcher & Wilkins, 1998; Tissen et al., 2007). Also, a limited amount of research suggested that some children who had family pets were less likely to show

anger, and engage in oppositional behaviour, than those who did not have pets or those who were less strongly bonded with their pets (e.g., Bryant & Donnelan, 2007; Paul & Serpell, 1996). It was therefore predicted that participants in the current study who had stronger bonds with their childhood pets might show lower levels of interpersonal aggression than those with lower levels of pet bonding.

However, in the current study, neither the main effect of pet bonding nor the main effect of exposure to pet aggression were significant, although the main effect of exposure approached significance ($p = .06$). Participants who were exposed to pet aggression in childhood had a higher mean interpersonal aggression score than those who were not exposed to pet aggression. Also, the interaction between pet bonding and exposure to pet aggression was not significant. Despite the non-significant results, the pattern of results is noteworthy; they suggest that there may be a different association between pet bonding and interpersonal aggression for those who were exposed to pet aggression compared with those who were not exposed to pet aggression.

Mean interpersonal aggression scores of participants who were exposed to pet aggression were higher than for participants who were not exposed to pet aggression, but only for the medium and high bond groups. Mean interpersonal aggression scores of participants who had the lowest levels of bonding with their pets were almost identical for exposure and no-exposure groups. The largest difference in aggression scores between exposure and no-exposure groups was found for those in the medium bond group. Children who observe aggression toward a family pet may experience feelings of anger and aggression toward the individual who harms the animal (Robin et al., 1983).

Furthermore, children who are exposed to pet aggression may develop higher levels of interpersonal aggression through observational learning. Children who witness pet aggression may learn that such behaviour is normal and socially acceptable (Henry, 2004b; Thompson & Gullone, 2006), and this learned style of aggressive interactions with animals may generalize to other social situations (Ascione, 1993; Gullone & Robertson, 2008). Alternatively, or additionally, exposure to animal cruelty may result in a desensitization toward violence directed at both animals and humans (Henry, 2004b; Thompson & Gullone, 2006).

The level of bonding with childhood pets appears not to be associated with interpersonal aggression for participants who have been exposed to pet aggression. Interpersonal aggression scores were very similar across all three bonding groups. A different pattern was observed for participants who had not been exposed to pet aggression. Interpersonal aggression scores were lower for participants who had medium levels of pet bonding compared with those who reported the lowest levels of pet bonding. Due to the non-significant main effects and interaction, these differences were not tested statistically. However, these results provide some tenuous evidence that bonding with pets may help to protect against the development of aggressive behaviour. One potential mechanism is that the physiological relaxation effect of interactions with animals (Friedmann et al., 1983) may help to reduce anger or aggression. Perhaps relationships with pets contribute to the ability of children to regulate negative emotions. Another possibility is that if bonding with pets helps children to develop empathy and prosocial

skills (e.g., Poresky, 1996), this may help to reduce the likelihood of aggressive interpersonal interactions.

Additional research should be conducted to determine whether the pattern of results observed in the current study is replicated in other samples. The non-significant differences between groups in the current study may have been an anomaly. If further research is conducted and similar results are observed, it may provide evidence that children with moderate levels of pet bonding are somehow protected from the development of aggressive behaviour. However, the potential protective effect of bonding with pets appeared not to exist for those who were exposed to pet aggression in childhood. Except for those in the low-bond group, participants who were exposed to pet aggression in childhood had higher interpersonal aggression scores than those who were not exposed to pet aggression. Further investigation of this association is warranted, especially because previous research has found an association between exposure to animal cruelty and interpersonal aggression (Gullone & Robertson, 2008).

Limitations and directions for future research. Although several suggestions for future research have been provided in the previous sections, research on human-animal interactions is still relatively scarce, and many questions remain as to how experiences with animals influence human development and psychological functioning. Furthermore, several weaknesses of the current study limit the internal and external validity and warrant discussion. Future studies can be designed to overcome the limitations of both the current study and previous HAI research.

The original intention of this study was to use a multidimensional measure of exposure to pet aggression in a regression analysis. Most participants received scores of zero on the EPAS for the favourite pet, indicating no exposure to pet aggression in childhood. Scores of the remaining participants were evenly distributed, resulting in an EPAS distribution that deviated substantially from normality. Therefore, it was not feasible to conduct a regression analysis using EPAS scores, and the participants were divided into two groups according to whether or not they had been exposed to any pet aggression in childhood.

A disadvantage of this approach is that many of the participants in the exposure group were exposed to very mild forms of aggression, and it may not have been appropriate to categorize mild forms of aggression (such as pushing) along with more severe forms of aggression that caused visible injuries or the death of the animal. Indeed, an express purpose of this study was to investigate whether factors such as the severity of the observed aggression influences mental health. A difficulty with including mild forms of aggression is that there may be substantial individual and cultural differences in how people define what constitutes aggressive behaviour. Milder forms of aggression may not cause visible or lasting physical harm to an animal, and the “harm” may be better conceptualized as fleeting discomfort rather than injury. Furthermore, the categorization of behaviours such as pushing or poking as *aggressive* acts depends on the context in which the behaviour occurs and the intention of the person who initiates the physical contact. Some forms of physical contact are considered socially acceptable if directed toward animals but not if directed toward other human beings. For example, consider a

case in which someone wants to sit in a specific chair to watch television, but the chair is occupied by a dog or a person. Pushing a dog off of the chair might be considered normal, socially acceptable behaviour, but pushing a spouse off of the chair might be considered to be aggressive behaviour. Arguably, such behaviour might still be considered “aggressive” even if it is directed toward an animal and is considered to be socially acceptable.

An alternative possibility to creating a dichotomous pet aggression exposure variable would have been to create three or more groups of participants with low, medium, and high levels of exposure to pet aggression. However, it is unclear whether it would have been appropriate to include those with low levels of exposure to pet aggression in the same group as those with no exposure to pet aggression, because it is possible that even a small amount of exposure to mild pet aggression may impact mental health. Alternatively, the No Exposure group could have been compared with two or more Exposure groups (e.g., Low Exposure and High Exposure). In both of these scenarios the analyses would have been conducted with groups with unequal sample sizes, or additional participants would have been excluded in order to create groups with equal sample sizes. Both of these alternatives were undesirable.

Future research is needed in order to better develop the EPAS as a multidimensional measure of exposure to pet aggression to determine whether variables such as the frequency and severity of pet aggression are associated with psychological adjustment. The use of clinical samples might result in more variability in EPAS scores. Participants who have experienced mental health problems or who have been exposed to

family violence could also be compared to community samples. This type of research could help to answer questions about whether exposure to pet aggression is a risk factor for exposure to family violence as well as the development of mental health problems. Given that the purpose of this research was to investigate childhood experiences with family pets, there is a need for a similar scale that can be used with children. It will be important to develop questions that can be used to ask children about whether they have observed pet aggression in a sensitive, ethically sound manner. The EPAS questions could be easily modified to allow for the measurement of exposure to aggression toward animals other than family pets. Furthermore, additional research is needed to evaluate the psychometric properties of the EPAS.

Because this study involved the use of retrospective measures to assess young adults' experiences with animals in childhood, it is possible that some of the responses were inaccurate due to a memory bias. For example, some participants may have overestimated or underestimated the strength of the bond with their childhood pets, and some participants may have forgotten instances of pet aggression. In anticipation of this limitation, only participants aged 25 years or younger were recruited for this study. Furthermore, an interview question was included in the pilot study to assess participants' opinions about their ability to remember details from childhood. Responses indicated that participants did not find it challenging to remember details about their experiences with animals in childhood.

The generalizability of the results of this study is limited due to the characteristics of the sample. The participants were a convenience sample of university students in

introductory psychology courses, and such individuals are unlikely to be representative of the general population. Furthermore, most of the participants in the sample were female, suggesting that the results may not be representative of male populations. Future research should be conducted with community samples to enhance the external validity of the results, and analyses should be conducted to determine whether there are sex differences in childhood experiences with family pets and their associations with mental health.

Now that the current study has provided some evidence that there is an association between exposure to pet aggression and mental health, there is additional justification for conducting a similar study with children. The potential benefits of identifying children who have been exposed to pet aggression may outweigh the potential risks of asking children questions about whether they have observed aggression toward their pets. If questions about experiences with pets are developed in a thoughtful way, it may substantially reduce the emotional distress that could result from being asked these questions. For example, "has your pet ever been hurt?" may be a more appropriate initial question for children than "have you ever seen your father hurting your pet?" Follow-up questions can then be included to elicit more specific information from those who have been exposed to pet aggression, and researchers can avoid asking distressing questions to children whose pets have not been hurt.

Another limitation is that there were some concerns about the quality of the responses. Several participants had to be excluded because they did not complete the measures, or because they provided inconsistent responses on the questionnaires. It may be that because there were so many questions, completing the questionnaires was too

time-consuming for some of the participants. Participants were required to complete the same measures up to three times for each of their three favourite childhood pets, so this may have become tedious. It may be advantageous to include fewer questions in future studies. Although it is unfortunate that a number of participants had to be excluded, the remaining data are likely more accurate because the responses of participants who provided inconsistent information may have skewed the findings.

One reason for the poor quality of some of the responses may be that because the questionnaires were completed online, it may have reduced the sense of responsibility participants felt to complete the survey. Response quality has been identified as one of the disadvantages of online surveys along with other limitations including low response rates and lack of representativeness due to the fact that internet users may be of a higher socio-economic status, and participants may include only those who are internet savvy (Cooper, Kapteyn, Schonlau, & Winter, 2007; Evans & Mather, 2005; Fricker & Schonlau, 2002). However, in a review of studies in which internet-based surveys were compared with mail surveys, Fricker and Schonlau (2002) did not find consistent evidence of differences in response quality.

The cross-sectional design used for this study is another limitation that is shared with previous research in this area (Chur-Hansen et al., 2010). Limitations of cross-sectional designs include the inability to establish causal associations among variables, the inability to provide information about individuals' development over time, and the lack of control for potential confounding factors (Gravetter & Forzano, 2006; Mann, 2003). Prospective, longitudinal studies are needed (Chur-Hansen et al., 2009; Wells,

2007; Wells, 2009) in which individuals are followed starting in early childhood. This type of research could provide information about whether exposure to pet aggression precedes the onset of internalizing symptoms, providing stronger evidence that exposure to pet aggression plays a causal role in the development of psychological disorders.

Longitudinal research would also allow for the determination of whether possible causal associations occur in the other direction; for example, one question is whether mental health influences the strength of the bond that develops between children and pets.

Furthermore, longitudinal designs would facilitate a developmental approach to the study of human-animal interactions. The HAI literature is currently lacking basic information about how experiences with animals change with age. The psychological consequences of both positive and negative experiences with animals may vary depending on the age at which those experiences occur. For example, Henry (2004) found that children were more likely to engage in animal cruelty if they first observed others engaging in animal cruelty at a younger age.

The use of other types of research designs would contribute valuable information to the HAI literature. For example, behavioural observations of child-pet interactions could be made to compare children with high bonds to those with lower bonds. This type of observational research could contribute to the validation of questionnaire measures of human-animal bonds and provide insight about how animals might facilitate positive social interactions among children, peers, and family members. Chur-Hansen and colleagues have advocated for the use of qualitative research strategies, and suggest that mixed-methods approaches including both qualitative interviews as well as the use of

standardized assessments may be productive (Chur-Hansen et al., 2009; Chur-Hansen et al., 2010). They suggest that such strategies may result in the discovery of additional characteristics of human-animal interactions that may be associated with human health, as well as novel hypotheses for future research.

Further research should be conducted to evaluate the nature and quality of human-animal interactions within the context of attachment theory (Chur-Hansen et al., 2010). It is common for researchers to refer to human-animal relationships as attachments (e.g., Johnson et al., 1992), and previous research has been cited above to indicate that some human-animal relationships share many of the features of attachment relationships. However, the conceptualization of human-animal relationships as attachments is not yet commonly accepted (Kobak, 2009), and current measures of human-pet bonding do not reflect all the characteristics of traditional attachments (Crawford et al., 2006). Questions remain about whether there might be different categories of human-animal attachments as there are in human attachments (i.e., secure, anxious, avoidant), and what the key similarities and differences between human attachments and pet attachments might be. It may be possible to use the Ainsworth's Strange Situation paradigm as part of future research in this area (Melson, 1998). For example, a fascinating question is whether a child's negative emotional response to the mother leaving the room might be tempered by the presence of a pet to which the child has an emotional bond. According to Ainsworth (1979), infants are less likely to protest if they are left with another attachment figure than if they are left with an unfamiliar individual.

The current study examined the associations between experiences with family pets and specific areas of psychosocial functioning. Future research could investigate whether experiences with pets are associated with other positive and negative areas of psychosocial functioning, such as nonverbal communication, self-esteem, post-traumatic stress disorder and conduct disorder. It may also be informative to directly compare the effects of experiences with pets to experiences with other animals. For example, it may be that witnessing animal cruelty has a more substantial impact on mental health if the target of aggression is a family pet rather than an unknown stray or wild animal. In summary, a multitude of diverse opportunities exist for future research on human-animal interactions.

Conclusions

Although it is likely that a number of biological and environmental factors contribute to psychosocial functioning, the results of the current study indicate that these factors may include experiences with childhood pets. A new measure of exposure to pet aggression was developed in order to evaluate multiple dimensions of exposure to pet aggression, including the frequency and severity of the observed aggression. Results indicated that exposure to mild forms of physical aggression toward family pets was not unusual, and that some individuals witnessed more severe aggression toward their pets. The results related to bonding with pets were consistent with previous research indicating that there are substantial individual differences in the extent to which people develop bonds with their pets, and that people tend to develop stronger bonds with dogs and cats than with other types of pet.

This was the first study to investigate the negative psychological effects of witnessing pet aggression in childhood using established, psychometrically sound measures of mental health. It was also the first study to consider the interaction between positive and negative experiences with animals. The results support the assertion that both bonding with pets and exposure to pet aggression should be considered when investigating the association between experiences with pets and mental health.

Limitations of this study prevent conclusions from being drawn about possible causal associations among the variables. Future research should consider additional variables that may be associated with experiences with pets and mental health, and utilize designs that allow stronger conclusions to be drawn about the causal effects of experiences with pets on mental health. The results of this research may have important implications for child protection and mental health intervention.

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Table 1

Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Empathy Measures in Study 1

Empathy Measure	<i>M</i>	<i>SD</i>	α	1	2	3	4
1. TEQ Total Score	50.8	7.2	.82	-	.53**	.73**	.20
2. IRI Total Score	66.7	15.6	.89		-	.67**	.71**
3. IRI - Empathic Concern Sub-scale	21.2	4.1	.74			-	.26
4. IRI - Perspective Taking Sub-scale	16.9	5.6	.84				-

Note: TEQ = Toronto Empathy Questionnaire (Spreng et al., 2009); IRI = Interpersonal Reactivity Index (Davis, 1980)

* $p < .05$, ** $p < .01$

Table 2

Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Measures of Pet Bonding in Study 1

Scale	Mean	SD	Observed Range	α	1	2	3	4	5	6
1. LAPS-R (Pet 1)	48.0	12.3	20-66	.90	-	.76**	.65**	.67**	.77**	.44*
2. LAPS-R (Pet 2)	42.6	14.1	16-66	.92		-	.86**	.49*	.57*	-.08
3. LAPS-R (Pet 3)	43.4	14.2	18-69	.94			-	.38	.48	-.06
4. CABS-R (Pet 1)	25.8	6.0	15-36	.73				-	.31	.53*
5. LAPS	50.1	15.0	8-66	.92					-	.62**
6. CABS	29.3	8.0	10-39	.88						-

Note: LAPS = Lexington Attachment to Pets Scale (Johnson et al., 1992), CABS = Companion Animal Bonding Scale (Poresky et al., 1987). Sample sizes for each analysis varied due to differences in pet ownership history. Scores on the LAPS and LAPS-R can range from zero to 69; scores on the CABS and CABS-R can range from 8 to 40. The LAPS-R and CABS-R are retrospective versions of the scales that refer to the same favourite childhood pet. Similarly, the LAPS and CABS both refer to the same favourite current pet.

* $p < .05$, ** $p < .01$

Table 3

Descriptive Statistics and Bivariate Correlations Among Measures of Family Violence in Study 1

Scale	Mean	SD	Observed Range	1	2	3	4	5	6	7	8
1. CEDV - Total	6.5	5.5	0-23	-	.83**	.91**	.52**	.14	-.05	.53**	.20
2. CEDV - Male	3.8	2.7	0-11		-	.56**	.45*	.18	-.05	.43*	.12
3. CEDV - Female	4.0	3.9	0-18			-	.48*	.06	-.05	.53**	.25
4. CTQ - Emotional Abuse	9.3	4.4	5-21				-	.52**	.25	.76**	.57**
5. CTQ - Physical Abuse	6.8	2.6	5-13					-	.02	.24	.40*
6. CTQ - Sexual Abuse	5.3	1.5	5-13						-	.32	-.12
7. CTQ - Emotional Neglect	9.3	4.1	5-18							-	.68**
8. CTQ - Physical Neglect	6.0	1.8	5-11								-

Note: CEDV = Childhood Exposure to Domestic Violence scale (Edelson et al., 2008); total scores can range from zero to 57; male and female sub-scale scores can range from zero to 30. CTQ = Childhood Trauma Questionnaire (Bernstein & Fink, 1998); scale scores can range from five to 25. * $p < .05$, ** $p < .01$

Table 4

Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Measures of Exposure to Pet Aggression in Study 1

Scale	Mean	SD	Observed Range	α	1	2	3
1. EPAS-F	3.4	5.0	0-14	.89	-	.39	.30
2. EPAS-2	1.9	4.3	0-16	.92		-	.89**
3. EPAS-3	1.8	4.3	0-16	.93			-

Note: EPAS = Exposure to Pet Aggression Scale. EPAS-F refers to the favourite pet, EPAS-2 refers to the second favourite pet, EPAS-3 refers to the third favourite pet. EPAS scores can range from zero to 20. * $p < .05$, ** $p < .01$

Table 5

Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Measures of Family Violence in Study 2

Scale	Mean	SD	Observed Range	α	1	2	3	4	5	6	7	8
1. CEDV - Total	4.5	4.9	0-43	.88	-	.96	.93	.62	.46	.23	.58	.58
2. CEDV - Male	3.4	3.5	0-27	.85		-	.81	.61	.45	.21	.58	.56
3. CEDV - Female	2.9	2.8	0-22	.80			-	.62	.41	.21	.57	.56
4. CTQ - Emotional Abuse	8.3	3.7	5-25	.86				-	.62	.26	.72	.64
5. CTQ - Physical Abuse	6.4	2.8	5-25	.80					-	.31	.50	.49
6. CTQ - Sexual Abuse	5.4	1.9	5-25	.92						-	.29	.37
7. CTQ - Emotional Neglect	8.4	3.8	5-24	.90							-	.62
8. CTQ - Physical Neglect	6.1	2.1	5-24	.70								-

Note: CEDV = Childhood Exposure to Domestic Violence scale (Edelson et al., 2008); total scores can range from zero to 57; male and female sub-scale scores can range from zero to 30. CTQ = Childhood Trauma Questionnaire (Bernstein & Fink, 1998); scale scores can range from five to 25. All correlations are significant ($p < .01$).

Table 6

Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Childhood Pet Measures for Study 2

Scale	Mean	SD	Observed Range	α	1	2	3	4
1. LAPS-R (Pet 1)	43.4	15.9	0-69	.96	-	.78**	.57**	.21**
2. LAPS-R (Pet 2)	41.4	15.8	0-69	.96		-	.68**	.05
3. LAPS-R (Pet 3)	36.3	16.9	0-69	.96			-	-.04
4. EPAS (Pet 1)	2.2	3.7	0-13	.87				-

Note: LAPS-R = retrospective version of the Lexington Attachment to Pets Scale (Johnson et al., 1992), EPAS = Exposure to Pet Aggression Scale. Pet 1 is the favourite childhood pet, Pet 2 is the second favourite childhood pet, and Pet 3 is the third favourite childhood pet. Sample sizes for each analysis varied due to differences in pet ownership history. Scores on the LAPS-R can range from zero to 69; scores on the EPAS can range from zero to 20. * $p < .05$, ** $p < .01$

Table 7

Comparison of Childhood Pet Owners and Non-owners on Measures of Current Psychosocial Functioning

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
Empathy (TEQ)				
Pet Owners	46.81	7.71	-.234	.815
Non-owners	46.54	7.13		
Aggression (AQ)				
Pet Owners	70.77	17.86	1.49	.136
Non-owners	74.81	17.67		
Depression (BDI)				
Pet Owners	11.30	9.86	-.336	.737
Non-owners	10.81	8.23		
Anxiety (STAI-T)				
Pet Owners	42.39	12.14	.215	.830
Non-owners	42.79	11.80		

Note: TEQ = Toronto Empathy Questionnaire (Spreng et al., 2009), AQ = Aggression Questionnaire (Buss & Perry, 1992), BDI = Beck Depression Inventory-II (Beck et al., 1996), STAI-T = State-Trait Anxiety Inventory - Trait Version, (Spielberger, 1983).

Table 8

Descriptive Statistics, Alpha Coefficients, and Bivariate Correlations Among Dependent Variables for Study 2

Scale	Mean	SD	Observed Range	α	1	2	3	4
1. Empathy (TEQ)	46.8	7.6	24-63	.87	-	-.31**	-.14*	-.17**
2. Aggression (AQ)	71.4	17.9	35-125	.89		-	.48**	.49**
3. Depression (BDI)	11.2	9.6	0-42	.93			-	.82**
4. Anxiety (STAI-T)	42.5	12.1	20-75	.95				-

Note: TEQ = Toronto Empathy Questionnaire (Spreng et al., 2009), AQ = Aggression Questionnaire (Buss & Perry, 1992), BDI = Beck Depression Inventory-II (Beck et al., 1996), STAI-T = State-Trait Anxiety Inventory - Trait Version, (Spielberger, 1983). Scores on the TEQ can range from zero to 64, scores on the AQ can range from 35 to 175, scores on the BDI can range from zero to 60 (item 9 referring to suicidal ideation was omitted), scores on the STAI-T can range from 20 to 80. * $p < .05$, ** $p < .01$

Table 9

Proportion of Participants in Each BDI Depression Cut Score Range According to EPAS-F Score Range

	<i>n</i>	<i>M</i> _{BDI}	Minimal Range BDI = 0-13	Mild Range BDI = 14-19	Moderate Range BDI = 20-28	Severe Range BDI = 29-63
EPAS-F = 0	77	8.5	78%	9%	8%	5%
EPAS-F = 1 - 4.5	25	12.7	60%	24%	8%	8%
EPAS-F = 5 - 8	25	13.6	60%	16%	12%	12%
EPAS-F = 9+	24	13.6	66%	13%	4%	17%
No EPAS-F Score	11	13.8	55%	0%	36%	9%

Note: BDI = Beck Depression Inventory (Beck et al., 1996); scores were calculated excluding Item 9 referring to suicidal thoughts. EPAS-F = Exposure to Pet Aggression Scale (Favourite Pet); participants with no EPAS score indicated that one or more individuals had been aggressive with their favourite pets but did not complete subsequent EPAS questions.

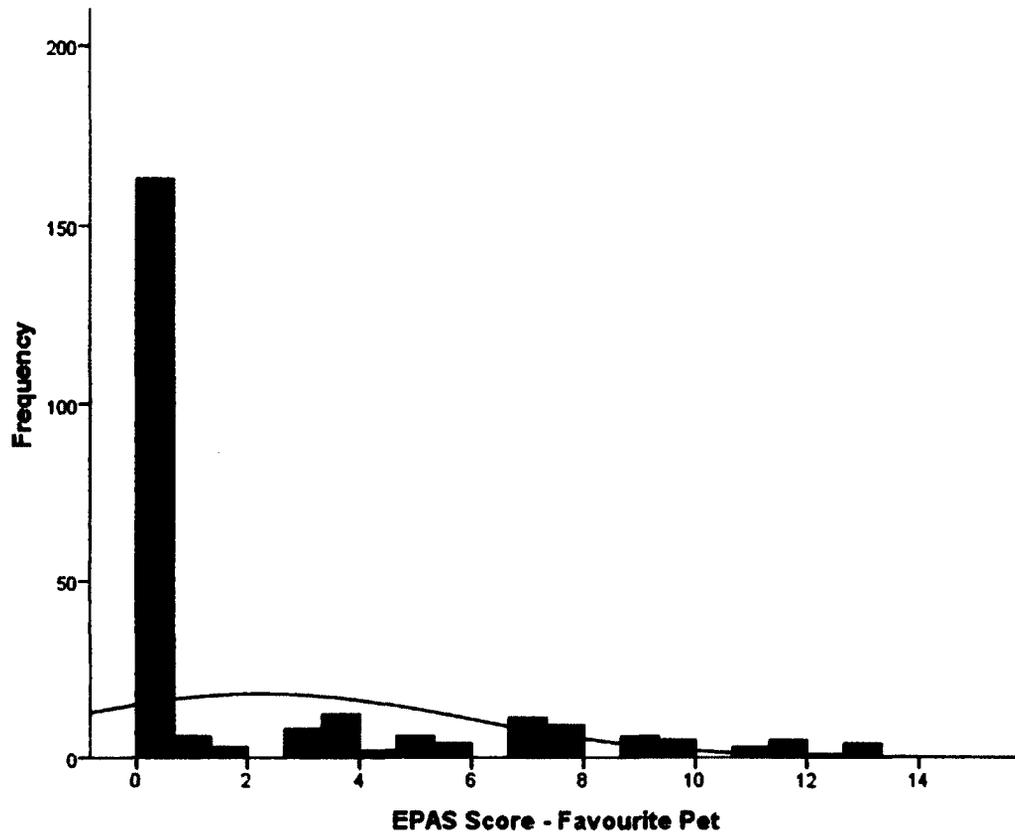


Figure 1. Distribution of Exposure to Pet Aggression Scale (EPAS) scores for the favourite childhood pet. Bars represent the number of participants in the sample who obtained each EPAS score. Scores on the EPAS can range from zero to 20. A score of zero indicates no exposure to pet aggression and a score of 20 indicates frequent exposure to pet aggression, exposure to at least one severe instance of aggression, and exposure to pet aggression by several individuals over a period of five years or more.

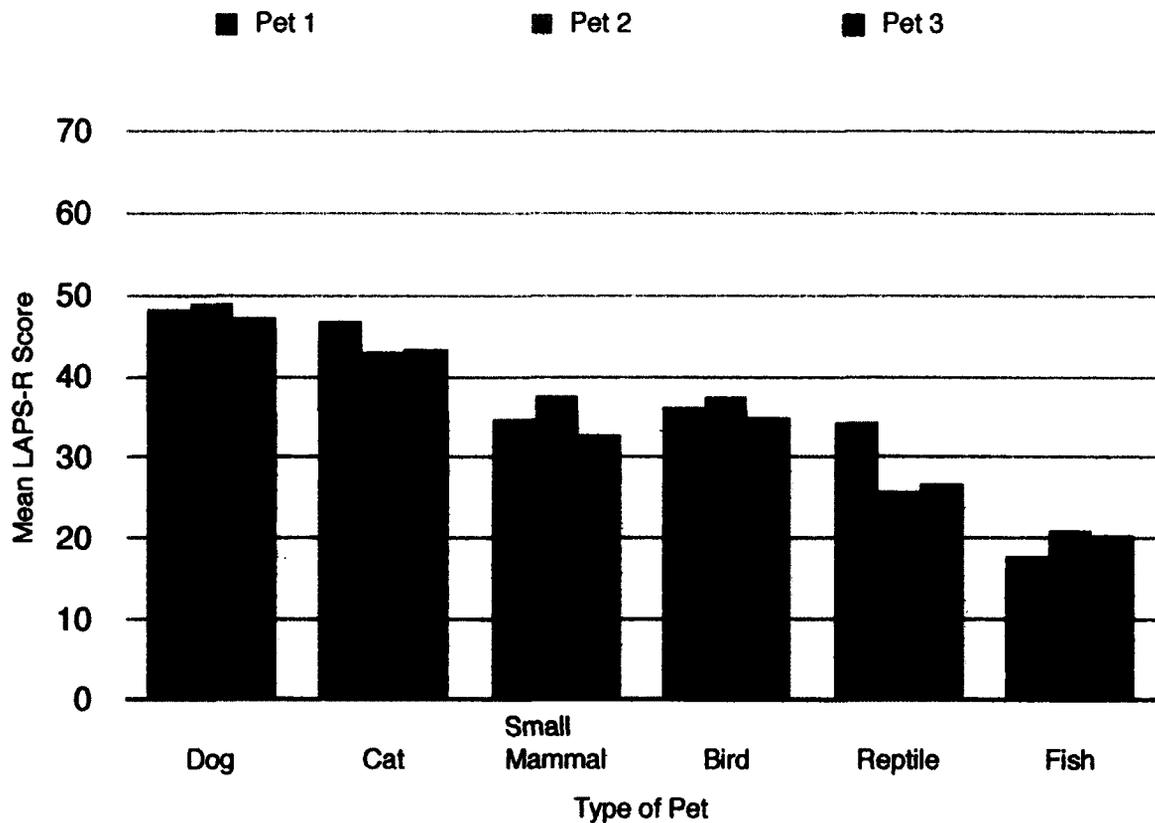


Figure 2. Mean pet bonding scores for the three favourite childhood pets for each pet type. Pet bonding was measured using a retrospective version of Lexington Attachment to Pets Scale (LAPS-R; Johnson et al., 1992). LAPS-R scores can range from zero to 69, with higher scores indicating stronger bonds with childhood pets. Pet 1 refers to the favourite childhood pet, Pet 2 refers to the second favourite childhood pet, and Pet 3 refers to the third favourite childhood pet.

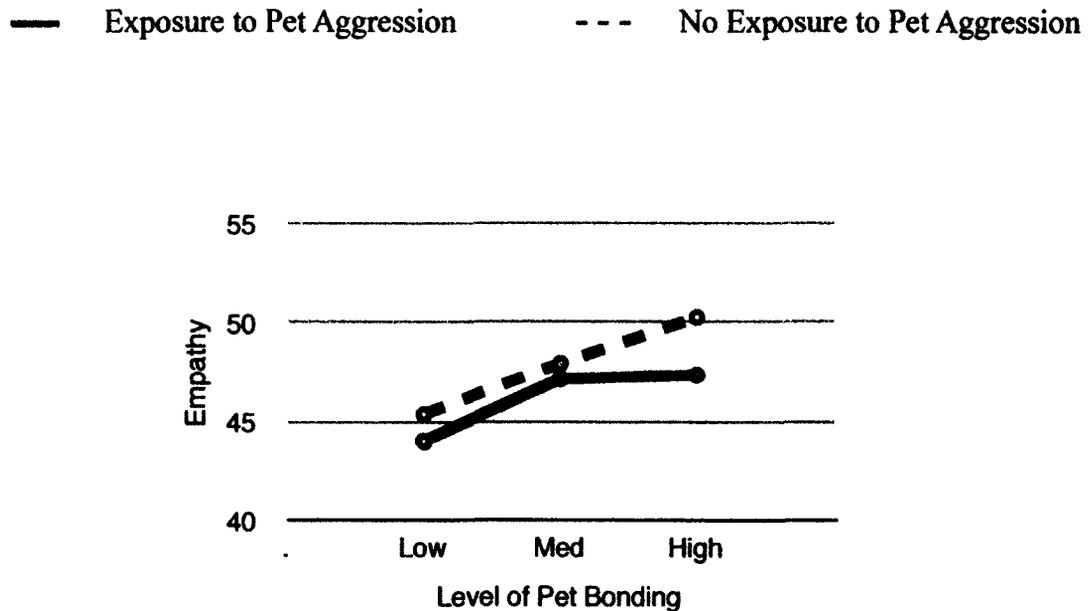


Figure 3. Mean empathy scores according to level of exposure to pet aggression and level of pet bonding. Empathy was measured using the Toronto Empathy Questionnaire (Spreng et al., 2009); scores can range from zero to 64 with higher scores indicating greater levels of empathy. The solid line represents participants who witnessed aggression toward their favourite childhood pets, and the dashed line represents participants who did not witness aggression toward any of their three childhood pets. Bonding with childhood pets was measured using a retrospective version the Lexington Attachment to Pets Scale (Johnson et al., 1992); participants were divided into three groups of equal size according to the level of pet bonding. Empathy scores are adjusted for the emotional neglect covariate, as measured by the Childhood Trauma Questionnaire (Bernstein & Fink, 1998).

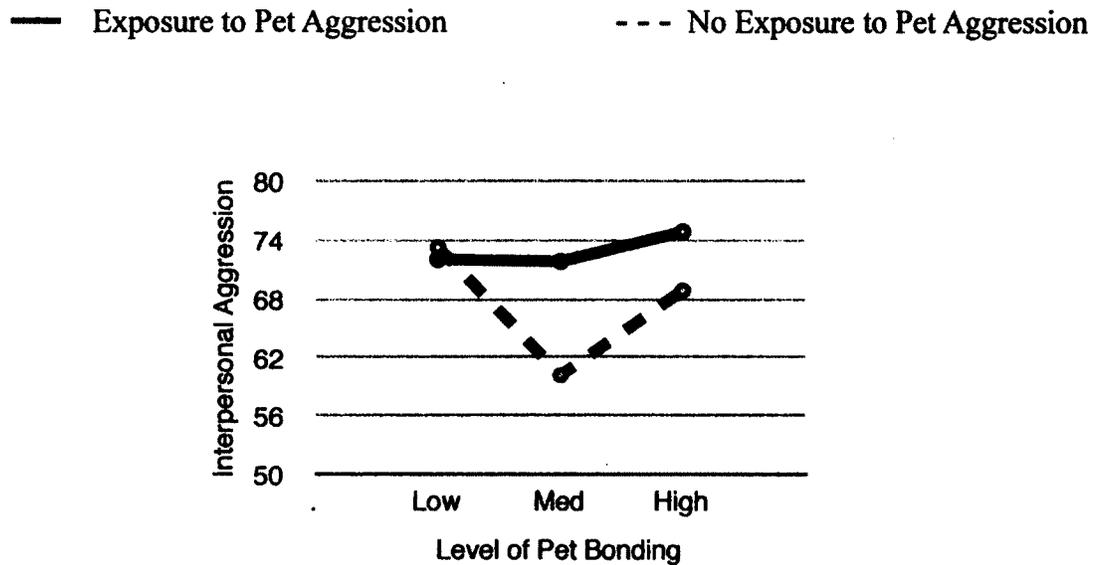


Figure 4. Mean interpersonal aggression scores according to level of exposure to pet aggression and level of pet bonding. Interpersonal aggression was measured using the Aggression Questionnaire (Buss & Perry, 1992). Scores can range from 29 to 145 with higher scores indicating greater levels of aggression. The solid line represents participants who witnessed aggression toward their favourite childhood pets, and the dashed line represents participants who did not witness aggression toward any of their three childhood pets. Bonding with childhood pets was measured using a retrospective version the Lexington Attachment to Pets Scale (Johnson et al., 1992); participants were divided into three groups of equal size according to the level of pet bonding. Interpersonal aggression scores are adjusted for the emotional abuse covariate, as measured by the Childhood Trauma Questionnaire (Bernstein & Fink, 1998).

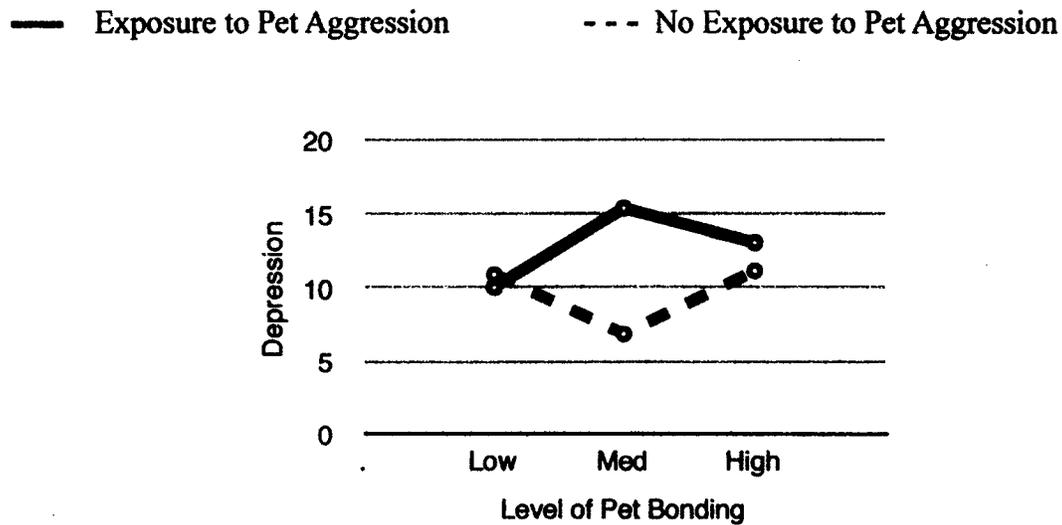


Figure 5. Mean depression scores according to level of exposure to pet aggression and level of pet bonding. Depression was measured using the Beck Depression Inventory (Beck et al., 1996). Scores can range from zero to 60 with higher scores indicating greater levels of depression; the item referring to suicidal ideation was omitted. The solid line represents participants who witnessed aggression toward their favourite childhood pets, and the dashed line represents participants who did not witness aggression toward any of their three childhood pets. Bonding with childhood pets was measured using a retrospective version the Lexington Attachment to Pets Scale (Johnson et al., 1992); participants were divided into three groups of equal size according to the level of pet bonding. Depression scores are adjusted for the emotional abuse covariate, as measured by the Childhood Trauma Questionnaire (Bernstein & Fink, 1998).

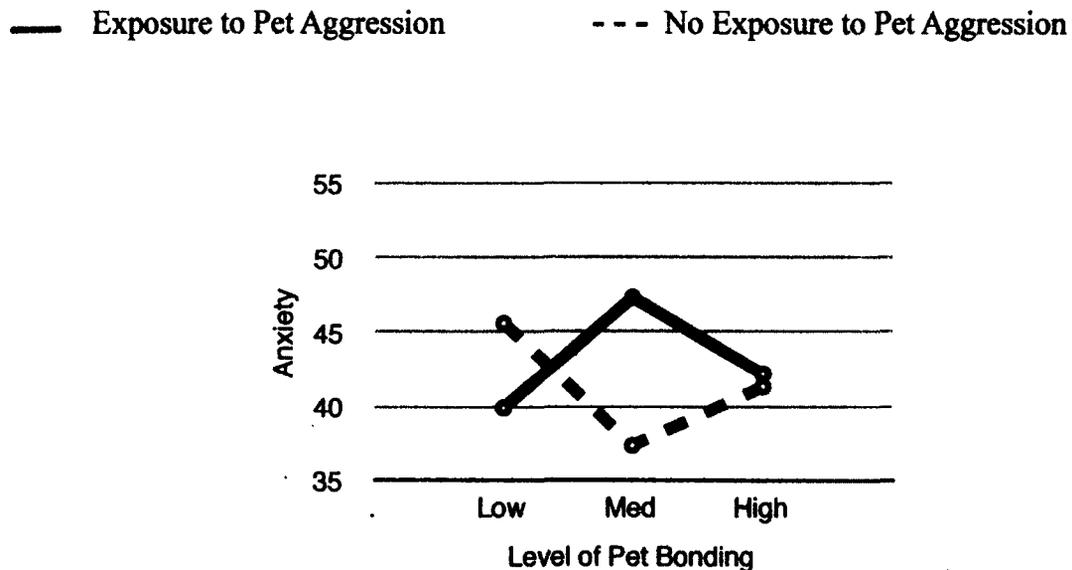


Figure 6. Mean anxiety scores according to level of exposure to pet aggression and level of pet bonding. Anxiety was measured using the trait version of the State-Trait Anxiety Inventory (Spielberger, 1983); scores can range from 20 to 80 with higher scores indicating greater levels of anxiety. The solid line represents participants who witnessed aggression toward their favourite childhood pets, and the dashed line represents participants who did not witness aggression toward any of their three childhood pets. Bonding with childhood pets was measured using a retrospective version the Lexington Attachment to Pets Scale (Johnson et al., 1992); participants were divided into three groups of equal size according to the level of pet bonding. Anxiety scores are adjusted for the emotional abuse covariate, as measured by the Childhood Trauma Questionnaire (Bernstein & Fink, 1998).

Appendix A

Please provide the following information about you.

1. Age:

2. Gender: female male

3. Ethnicity: (Optional)

Please indicate which ethnic group(s) you would consider yourself to belong to

- First Nations, Métis, or Inuit
 - White (e.g., European)
 - Black (e.g. African, African American, African Canadian, Caribbean)
 - East Asian (e.g. Chinese, Japanese, Korean, Polynesian)
 - South Asian (e.g. Indian, Pakistani, Sri Lankan, Bangladeshi)
 - Southeast Asian (e.g. Burmese, Cambodian, Filipino, Laotian, Malaysian, Thai, Vietnamese)
 - West Asian (e.g. Armenian, Iranian, Israeli, Lebanese, Palestinian, Syrian, Turkish)
 - Latin American (e.g. Mexican, Indigenous Central and South American)
 - Other (please specify): _____
4. Do you currently have a pet, or did you have one in the past year? no yes
5. Did you have a pet in childhood (i.e., when you were 6 to 12 years old)? no yes

Appendix B

Childhood Pet Ownership History

1. How many pets did you (or your family) have when you were a child (i.e., when you were between 6-12 years old)? _____

2. Please provide information for ALL the pets that you had when you were a child. If you had more than 10 pets in childhood, describe the pets that were most important to you, or that you had for the longest period of time.

			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:
			yes	no	Code Number:

3. Please select your three favourite pets and write their names in the spaces below. If you are unable to select a favourite pet, or if you did not like pets, select the pets that you (or your family) had for the longest period of time.

Favourite pet: _____

2nd favourite pet: _____

3rd favourite pet: _____

Codes for reasons why you no longer have your childhood pet.

- 1 - pet died (or was euthanized) due to illness or old age
- 2 - pet died in an accident
- 3 - pet was killed by someone on purpose
- 4 - pet was euthanized for non-medical reasons
- 5 - pet ran away or was lost
- 6 - pet was given to a friend or relative
- 7 - pet was sold or given away to an unknown individual
- 8 - pet was brought to the humane society or SPCA
- 9 - pet was released to the wild or not allowed back in the house
- 10 - other (please specify on the back of the pet ownership history chart)

Appendix C

Items on the Exposure to Pet Aggression Scale (EPAS).

Pet's name: _____

1. Did this pet have enough food, water, and appropriate shelter?

- a) always
- b) usually
- c) often
- d) sometimes
- e) rarely
- f) never

2. Please consider ALL the times that you observed another person being physically aggressive toward this pet (e.g., pushing, hitting with hands or objects, kicking, hanging, throwing, using a weapon, punishment for 'bad' behaviour). These instances may range in severity from mild (e.g., pushing) to severe (e.g., death). The person may have been aggressive with your pet only once, or the aggression may have been ongoing. In the following sections you will have an opportunity to describe the frequency and severity of the physical aggression for each person. If you observed more than one person in a category being physically aggressive with your pet (e.g., two brothers), indicate the number of individuals in that category instead of using a checkmark.

Check ALL individuals who you observed being physically aggressive with your pet:

father	uncle	peer (friend)
mother	aunt	peer (acquaintance)
step-father	grandmother	adult family friend
step-mother	grandfather	teacher
parent's boyfriend	neighbour (child)	other (specify)
parent's girlfriend	neighbour (adult)	
brother		
sister		

____ check here if you did not observe anyone being physically aggressive with this pet

3. In as much detail as possible, please describe the *most severe* instance of physical aggression to this pet that you observed. If you need more room, please use an extra piece of paper.

(e.g., include your age at the time, the identity of the person who harmed the pet, what the person did to your pet and the type of injuries that resulted, how you felt about it then and how you feel about it now)

4. Please use the scale below to rate your perception of the severity of the most severe instance of physical aggression to your pet that you just described in detail above.

1 - mild (e.g., physical aggression with no serious harm, teasing, poking, pushing)

2 -

3 - moderate (physical injuries causing pain or visible harm - e.g., burns, bruises, cuts)

4 -

5 - severe (e.g., multiple painful injuries, shooting, death, torture)

Person (e.g., brother) who was physically aggressive with your pet: _____

1. Approximately how often did you observe this person being physically aggressive with your pet? (e.g., hitting with hands or objects, kicking, hanging, throwing, using a weapon)

- a) only once or a few times over a period of several years
- b) a few times a year
- c) a few times a month
- d) a few times a week
- e) daily

2. Please rate the severity of the physical aggression to your pet by this person *on a typical occasion*.

- 1 - **mild** (e.g., physical aggression with no serious harm, teasing, poking, pushing)
- 2 -
- 3 - **moderate** (physical injuries causing pain or visible harm - e.g., burns, bruises, cuts)
- 4 -
- 5 - **severe** (e.g., multiple painful injuries, shooting, death, torture)

3. Please rate the severity of physical aggression to your pet for the *most severe* instance of physical aggression that you observed by this person.

- 1 - **mild** (e.g., physical aggression with no serious harm, teasing, poking, pushing)
- 2 -
- 3 - **moderate** (physical injuries causing pain or visible harm - e.g., burns, bruises, cuts)
- 4 -
- 5 - **severe** (e.g., multiple painful injuries, shooting, death, torture)

4.a. How old were you the first time you saw this person being physically aggressive with your pet? _____

b. How old were you the last time you saw this person being physically aggressive with your pet? _____

5. Did the person harm this pet more or less than most of your other childhood pets?

- a) this pet was harmed *a lot more* than most other pets
- b) this pet was harmed *a little more* than most other pets
- c) this pet was treated about the same as most other pets
- d) this pet was harmed *a little less* than most other pets
- e) this pet was harmed *a lot less* than most other pets
- f) depends on the pet - some pets were harmed more, some pets were harmed less

Comments: (optional)

Appendix D

Interview Questions

1. How did you find the length of the questionnaires?
2. How challenging was it for you to remember some of the details about your experiences with animals in childhood?
3. Which questions did you find to be confusing, irrelevant, or difficult to answer?
4. You were asked to respond to questions about your experiences with three of your favourite family pets. How similar were your experiences with these three pets to your experiences with other childhood pets?
5. Did you have any other positive or negative experiences with family pets, or other animals, that you think may have had an impact on your mental health or well-being?
6. Was there anything that I didn't ask that you think I should have asked about?
7. Do you have any other comments or suggestions?

Appendix E

INFORMED CONSENT

The purpose of informed consent is to provide people with enough information about what they will be asked to do for a study, so that they can make an informed decision about whether they want to participate.

PURPOSE: To investigate the effects of various childhood experiences.

DESCRIPTION: You will be asked to respond to a number of questions about your family during childhood, including who you lived with, the level of conflict within your family, and positive and negative experiences with family pets. Furthermore, you will respond to questions about your current attitudes and feelings, and your relationships with other people. It will take approximately 60 minutes to answer the questions.

COMPENSATION: 0.5% will be added to your final grade in one psychology course.

CONFIDENTIALITY/ANONYMITY: All of your responses will be provided anonymously and will be kept strictly confidential. You will not provide any identifying information (e.g., your name) in the online questionnaire. Questionnaire responses will be stored in a secure location, and will only be available to the research personnel associated with this study. We have a record of all participants' names and participant numbers to help us accurately assign SONA credits. This document will be destroyed within 2 months after the study.

PARTICIPATION IS VOLUNTARY: You have the right to decide not to participate in this study, or to withdraw from the study at any time without penalty (i.e., you can just stop answering the questions). You can also skip any questions that you do not want to answer. If you decide that you do not want to continue answering the questions, please click "Exit this Survey" in the top right corner of any page, and read the information provided.

POTENTIAL RISK/DISCOMFORT: You may be asked to complete the same questionnaire several times, so this may become boring for you. You may experience some emotional distress when you are answering some of the questions, especially those about family violence, recent feelings of sadness or anxiety, or any aggression you observed towards your childhood pets. If you think that answering these questions will be too upsetting for you, we encourage you to skip them. If you become upset while you are completing the questionnaires, you may decide to withdraw from the study without penalty. If you experience emotional distress after participating in this study, please contact the **Ottawa Distress Centre (613-238-3311)** or **Carleton University Counseling Services (613-520-6674)**.

*** Due to the highly sensitive and personal nature of the questions in this survey, you are encouraged to complete this survey in a private location (i.e., not a public computer lab or internet café).**

ETHICS: This study has received clearance by the Carleton University Psychology Research Ethics Board (ethics file #10-117), and will follow the code of ethics of the Canadian Psychological Association. If you have any questions or concerns about the ethics associated with this project, please contact the Chair of the ethics committee, Dr. Monique Sénéchal at (613) 520-2600 x.1155 or monique_senechal@carleton.ca.

OTHER CONCERNS: If you have any other concerns about this study, you can contact the Chair of the Department of Psychology, Dr. Janet Mantler, at (613) 520-2600 x.4173 or psychchair@carleton.ca.

RESULTS OF THE STUDY: Although the responses of individual participants will be anonymous and confidential, a report with the combined responses of all participants will be prepared. The results of the study may be published (e.g., in a newsletter, book, or academic journal) and/or presented at professional meetings or conferences. Your name will never appear in any report or presentation. In the case that comments of individual participants are included in the reports, care will be taken to ensure that no identifying information is included. Please feel free to request a summary of the results.

RESEARCH PERSONNEL: If you have any questions, please contact the following individuals at any time.

Alberta Girardi, Ph.D. Candidate
Principal Investigator
(613) 520-2600 x. 3695
agirardi@connect.carleton.ca

Joanna Pozzulo, Ph.D., C. Psych.
Faculty Advisor
(613) 520-2600 x. 1412
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Appendix F

DEBRIEFING

Thank-you very much for participating! This page will answer questions that you might have about participating in the study. Please print this page and contact us if you have any other questions.

Why is this research important?

Because pet ownership is so common around the world, it is important to understand how pets affect our physical and mental health. A growing amount of research suggests that people's experiences with animals in childhood may have a long term effect on their mental health. For example, people who witness frequent or severe animal cruelty may be at an increased risk of developing mental health problems, such as depression or anxiety. Furthermore, people who have strong bonds with their pets may be protected from the development of mental health problems in a way that is similar to the effects of having good relationships with other people.

What results are expected?

We expect that childhood experiences with animals are related to childhood family functioning, as well as individual psychological and social functioning in early adulthood. For example, one questionnaire was a measure of empathy, which refers to an ability to understand and experience the emotions of others. We expect that people who have observed severe harm to their pets will show lower levels of empathy than people who have not observed others harming pets, and that people who had strong bonds with their pets will show higher levels of empathy than those who were less strongly bonded with their pets. We also expect to find an association between family violence and aggression toward family pets. Please feel free to request a copy of the results, if you would like to learn more about this study.

Who can I contact for help, if I feel upset after participating in the study?

Ottawa Distress Centre: 613-238-3311

Carleton University Counseling Services: 613-520-6674

Where can I learn more about the psychology of human-animal interactions?

Book: Children and Animals: Exploring the Roots of Kindness and Cruelty, by Frank R. Ascione

Websites: www.anthrozoology.org www.latham.org

Who can I contact if I want to report animal cruelty?

Ottawa Humane Society: 613-725-3166 x. 224 or e-mail timb@ottawahumane.ca

Your message should include your name, address, and telephone number, the date, time and place of the offense, and a description of any vehicle involved. An investigator will contact you to ask additional questions. You can also make an anonymous complaint, just be sure to provide detailed information for investigators.

What if I have questions or concerns later on?

You are welcome to contact one or more of these individuals at any time.

For questions about the study:

Alberta Girardi, Ph.D. Candidate
Principal Investigator
(613) 520-2600 x. 3695
agirardi@connect.carleton.ca

Joanna Pozzulo, Ph.D., C. Psych.
Faculty Advisor
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For ethical concerns:

Monique Sénéchal, Ph.D.
Chair, Ethics Committee
(613) 520-2600 x. 1155
monique_senechal@carleton.ca

Other concerns:

Janet Mantler Ph.D.
Chair, Dept. Psychology
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