

# Adult Separation Anxiety Disorder: The Human-Animal Bond

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*This report is submitted in partial fulfillment of the degree of Master of Psychology  
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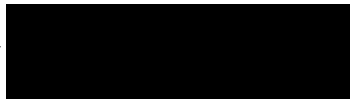
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**Elisha Dowsett**

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## ACKNOWLEDGEMENTS

I would like to thank....



This collage contains a sample of the animal images uploaded by survey participants.

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## Literature Review

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## **Abstract**

Separation anxiety has traditionally been considered a psychological disorder with an onset in childhood or adolescence. The introduction of an adult onset Separation Anxiety Disorder in the DSM-5 recognises that separation anxiety can occur at any stage across the lifespan.

Although researchers have principally focused on adult separation anxiety associated with separations from home or attachment figures, limited literature exists concerning whether this attachment figure must, in fact, be human. This review examines separation anxiety with a focus on diagnostic reclassification, epidemiological studies, nosologic implications, and psychometric measurements. Attachment is conceptualised as extending to companion animals with discussion directed towards the potential implications.

## Introduction

During the past 20 years, a growing body of literature has contributed to understanding the clinical significance of Adult Separation Anxiety Disorder (ASAD) which has led to its categorisation as a disorder that can manifest throughout the lifespan. According to the DSM-5, separation anxiety involves developmentally inappropriate and excessive fear or anxiety concerning separation from attachment figures (American Psychiatric Association, 2013). The evolutionary significance of attachment to other humans is said to serve the biological function of sharing mutually beneficial alliances (Archer, 1997). However, whether people form similar attachments to other species is less clearly defined. By considering attachment literature in the context of companion animals, it can be demonstrated that humans *can* form attachments to dogs, and consequently, that dogs may represent attachment figures within ASAD, a finding which may extend to other companion animals. An increased understanding of attachment relationships with companion animals may assist in developing more effective treatments for ASAD as a complex disorder with bonds which can span many aspects of human and animal relationships. As yet, existing treatments for other anxiety disorders have been shown to be mostly ineffective for ASAD (Kirsten et al., 2008; Miniati et al., 2012b). Understanding how companion animals can contribute or be detrimental to human wellbeing may assist clinicians to develop more comprehensive treatment plans with client conceptualisations involving companion animals. Within the clinical setting it is important to understand how separation from companion animals affects people and to be aware of the significance of animals in the life of a client (Chandler et al., 2015).



## **Diagnostic reclassification of separation anxiety disorder**

### *Definition of separation anxiety*

Separation anxiety is characterised by an irrational fear concerning separation and abandonment from home or major attachment figures (American Psychiatric Association, 2013). Anxiety during separation from attachment figures is part of the normal human developmental process and may indicate secure attachment in relationships with caregivers. However, the essential feature of this clinical pathology is the presence of anxiety which exceeds an expected developmental level and causes severe distress or impairment in important areas of functioning (American Psychiatric Association, 2013).

### *Diagnostic reclassification*

Prior to 2013, separation anxiety was recognised as a psychological disorder with an onset in childhood or adolescence (American Psychiatric Association: DSM-IV-TR, 2000). This age-related restriction confined diagnosis to the category of juvenile anxiety which contrasted with the classification of many other anxiety subtypes acknowledged to have onsets throughout the lifespan (Kessler et al., 2005). Separation anxiety in childhood was thought to be related to adult anxiety disorders such as panic disorder and agoraphobia (American Psychiatric Association, 2000); however, research suggested that separation anxiety in childhood may persist and can manifest as an adult form of the same disorder (Manicavasagar et al., 2010).

The age-at-onset criteria for separation anxiety disorder was removed in the most recent edition of the Diagnostic and Statistical Manual (American Psychiatric Association, DSM-5, 2013) which aligns with other anxiety subcategories and removes the need for a special child-onset section of anxiety (Manicavasagar et al., 2010). Notwithstanding the

different age of onset, both adult and childhood separation anxiety are thought to be similar, although some symptom descriptions have been modified to facilitate their application to adults and this includes describing children as potential attachment figures (Pini et al., 2014) and defining the time period for the disorder as four weeks for children and adolescents, and six months for adults. Recognising this disorder in dyadic relationships is essential to understanding mutual reinforcement of symptoms, especially concerning parent-child dyads, and to develop more accurate treatment protocols (Silove and Rees, 2014).

### *Epidemiological studies*

Although there is a dearth of epidemiological data on separation anxiety across the lifespan, the World Health Organisation surveyed nearly 40,000 participants and found separation anxiety to be a common and highly co-morbid disorder (Silove et al., 2015). Higher prevalence of the disorder was significantly predicted by being female, experiencing childhood adversity, undergoing lifetime traumatic events, and as a comorbidity with other anxiety disorders (Silove et al., 2015). Lifetime prevalence rates averaged 4.8%, of which 43.1% occurred after the age of 18 years (Silove et al., 2015). The study also found a large discrepancy between lifetime rates and 12-month prevalence rates which suggested a pattern of exacerbation and remission dependent on whether an individual reaches clinically significant symptomology (Manicavasagar et al., 2010). Both environmental and genetic factors have been implicated in the development of the disorder. Heritability is estimated at 73% in children, while environmental triggers may include stressful life events such as parental divorce, immigration, illness, death of a relative and, most pertinently for this review, death of a pet (American Psychiatric Association, 2013).

*Nosologic or clinical implications*

Recognition of adult-onset separation anxiety may aid in understanding the developmental psychopathology of anxiety itself, and may clarify nosologic implications for existing disorders such as agoraphobia and panic disorder (Manicavasagar et al., 2010). Adults with panic disorder and ASAD have been shown to experience greater severity of panic symptomology and reduced quality of life as compared to those diagnosed solely with panic disorder (Pini et al., 2014). This symptomology suggests the need to diagnose both conditions in order to improve treatment outcomes. While adults previously diagnosed with panic disorder may require reclassification as experiencing ASAD, the relationship between ASAD, panic disorder, and agoraphobia is not yet well understood (Mian et al., 2012; Pini et al., 2014).

There is also the view that anxiety disorders should be understood using a more dimensional as opposed to categorical approach (Krueger, 1999). While a categorical model assumes separate or distinct classifications, a dimensional approach considers anxiety disorders as existing along a continuum. For example, taxometric studies have demonstrated that adult anxiety subcategories such as obsessive compulsive disorder and posttraumatic stress disorder conform to a dimensional pattern of symptomology (Haslam et al., 2005; Ruscio et al., 2002). This finding has been replicated in adult separation anxiety which was shown to be best represented as a continuously distributed construct, suggesting that categorical symptoms alone may not be sufficient for diagnosis (Silove et al., 2007). It has been argued that an expansion of criteria to include onset, family history, course of illness, salience of separation anxiety compared to other anxiety symptoms, and severity of dysfunction should all be considered during diagnosis and treatment of separation anxiety (Silove et al., 2007). Shear et al. (2002) proposed that separation anxiety, together with other

mood and anxiety disorders, form part of a panic-agoraphobic spectrum disorder. This proposal has important clinical implications for treating anxiety on a continuum of severity while addressing the indistinct boundaries between overlapping, often comorbid disorders. Nevertheless, while diagnostic taxonomies like the Diagnostic and Statistical Manual of Mental Disorders remain discrete (American Psychiatric Association, 2013), the diagnoses of mood and personality disorders will continue to co-occur with various forms of anxiety (Manicavasagar et al., 2010). It is important to note that, while anxiety disorders share similar characteristics, recognised psychological and pharmacological interventions which have predominantly worked for other anxiety disorders, have shown to be ineffective when treating ASAD (Kirsten et al., 2008; Miniati et al., 2012a).

### *Measurement*

During the past 20 years, a growing body of literature has contributed to understanding the clinical significance of Adult Separation Anxiety Disorder (ASAD) and its potential existence at different phases of the lifespan. The development of psychometric measures of ASAD, such as *The Adult Separation Anxiety Structured Interview* (ASA-SI), (Manicavasagar et al., 1997), and the self-report *Adult Separation Anxiety-27* (ASA-27), (Manicavasagar et al., 2003) have allowed validated and reliable identification of the disorder. The inclusion of ASAD in the DSM-5 prompted creation of the *Severity Measure for Separation Anxiety Disorder – Adult*, designed to measure the severity of symptoms of ASAD and monitor patient progress (American Psychiatric Association, 2013).

## **Applying attachment theory to companion animals**

### *Definition of attachment*

The primary psychological construct of attachment is conceptualised as an enduring emotional bond with a meaningful person, beginning with an infant's relationship with a primary caregiver, and serving evolutionary functions of security and survival (Bowlby, 2008). This empirically supported model of attachment was developed to conceptualise early bonding behaviours of infants, and applied ethological principles to the human need for interpersonal connection (Bowlby, 1958). The concept of attachment addressed a specific subset within relationships, focusing on the maintenance of proximity or closeness, and reactions to separation, reunion, and perceived threat (Ainsworth, 1989, 1991; Bowlby, 1958; Waters et al., 2005). Bowlby (1958) conceptualised the term 'monotropy' to emphasise the importance of instinctual responses of attachment directed from an infant towards a primary parental attachment figure. The quality of this attachment was said to act as an enduring internal working model for the self, the world, and a prototype for future social relationships (Bowlby, 2008).

Within research communities, conjecture existed over whether the term 'attachment' should be extended beyond defining a child's relationship with their parental figure. Ainsworth (1989) conceptualised the term 'affectional bonds' to describe long-term ties with significant others in a more general sense, and attachment became one form of social provision inherent in adult relationships. Weiss (1974) described five social functions in coexistence with attachment including; social integration (sense of belonging); reassurance of worth (recognition of value by others); opportunity for nurturance (feeling needed by others); guidance (counsel or advice); and, reliable alliance (counting on others for assistance). This is important because different social provisions may be more crucial in particular relationships

and during certain stages of the life cycle. In the late 1980s, the term ‘attachment’ began to gain acceptance as a theory with applications in adult relationships (Archer, 1997; Hazan and Shaver, 1987). It was determined that core components of attachment shared similarities across age groups, including a desire for physical closeness, distress at separation, comfort at reunion, and confidence from a secure base (Ainsworth, 1989, 1991; Hazan and Shaver, 1987).

### *The application of attachment theory to companion animals*

The evolutionary significance of attachment to other humans is said to serve the biological function of sharing mutually beneficial alliances (Archer, 1997). Whether people form similar attachments to other species is less clearly defined. A literature review by Archer (1997) proposed a Darwinian interpretation of human-to-animal attachment. Archer suggested that features of attraction in dogs and cats developed as an evolutionary adaptation to manipulate the human response. Such adaptation included the development of neotenous characteristics (juvenile qualities, such as enlarged head, and large eyes) adapted to elicit caregiving responses. These responses mimicked emotional ties similar to attachment within a parent-child relationship. Archer also concluded that, in the case of dogs, the bond may contain an element of reassurance and a source of security, representing aspects of substitute companion or parental attachment. In answer to the title of Archer’s review, ‘Why do people love their pets?’, he proposed that humans derived satisfaction from the nature of their interaction with companion animals as unconditional, an interaction which may not be as consistent, nor unconditional, from human beings. Archer described neotenous manipulations, as serving domesticated dogs and cats, who could be considered, in evolutionary terms, “the equivalent of social parasites” (Archer, 1997).

The bond between humans and dogs formed thousands of years ago. The adaptive nature of this bond may have evolved to serve humans due to the protective value of dogs, who were relied on for survival (Gerwolls, 1990). Evidence for Darwinian adaptation was recently supported by findings of paedomorphism in domesticated dogs (Kaminski et al., 2019). When comparing dogs with their evolutionary predecessors, wolves, it was found that domestication had transformed the facial anatomy responsible for raising the inner eyebrow. This movement resembled an expression that humans produce when sad, and which in dogs, makes their eyes appear larger, giving them a child-like appearance. Although this study is limited by the comparison of only four wolves and six dogs of different breeds, these preliminary findings demonstrate the importance of facial expression for social interaction and more theoretically, one aspect of reciprocal development in the relationship between humans and dogs.

The prevalence of animal ownership is significant with an estimated 24 million companion animals in Australia, a statistic similar to the human population of 24.6 million (Animal Medicines Australia, AMA, 2016). More than 62% of Australian households include an animal, and of these, 38% are dogs and 29% are cats (AMA, 2016). With the prevalence of dogs as companion animals, Kurdek (2008) sought to apply the principles of attachment theory to assess human relationships with dogs. He explored the extent to which dogs represented the following four features of attachment; proximity maintenance (desire for physical closeness); secure base (dependable source of comfort and security); safe haven (sought to alleviate distress); and, separation distress (missed when absent) (Ainsworth, 1989, 1991; Hazan and Shaver, 1987). Results demonstrated support for all four features of attachment, but the most salient features of attachment were demonstrated to be secure base and proximity maintenance.

Focusing on young adults' attachment to dogs as attachment figures, Kurdek (2009a) utilised the four features of attachment (safe haven, proximity maintenance, secure base, and separation distress) to assess young adult attitudes towards humans and dogs. This phase of life usually represents a transitional period of attachment, with decreasing ties from family members (parents and siblings) and increasing ties to friends and romantic partners. Kurdek hypothesised that, in negotiating the process of gaining independence, young adults may perceive dogs as a consistent source of unconditional affection, thereby increasing feelings of attachment towards them. Kurdek asked participants to rank attachment figures based on eight questions (two for each attachment feature) as developed by Doherty and Feeney (2004). Results of a one-way multivariate analysis demonstrated that the most salient feature of attachment towards dogs was separation distress. Results also showed that, in times of distress, young adults would likely turn to their mothers, friends and romantic partners, but they were more likely to turn to their dogs or sisters, than their fathers and brothers. The study was limited by the application of a ranking system to obtain a hierarchical structure of attachment. By ranking attachment figures, participants were prohibited from assigning equal standing to their relationships. Furthermore, the study generalised perceptions of behaviour without qualifying the relevancy of a certain attachment characteristic or the situation or purposes in which the attachment figure was most relevant. With regard to separation distress, questions were "Who do you not like to be away from?" and "Who do you miss the most during separations?" These questions may account for retrospective self-reported perception, but may not generalise to actual attachment. Bowlby (1958) described attachment as a biologically rooted behaviour which can be seen in reactions to threatened or actual separation from a significant other. Without the development of a 'strange situation' experiment in which observation of attachment is measured based on responses to separation, it is difficult to draw conclusions of attachment by ranked comparison with others, who may



be equally non-representative of attachment figures. As an extension of his previous work, Kurdek (2009b) adjusted his study to focus on an adult population. He discovered that proximity maintenance was the most significant feature of dogs as attachment figures. Results from Kurdek (2008, 2009a, 2009b) demonstrate the relevance of secure base, proximity maintenance, and separation distress as the most salient features of attachment to dogs.

## **Separation anxiety from, and attachment to, companion animals**

### *The application of separation anxiety*

Extensive veterinary literature has indicated the presence of separation anxiety in dog behaviour (Parthasarathy and Crowell-Davis, 2006), however limited research has investigated whether humans experience separation anxiety towards companion animals (Quinn, 2005; Zilcha-Mano et al., 2011). Research on the reciprocal relationship between humans and dogs has recently uncovered interspecies correlations, showing that human traits of neuroticism, conscientiousness, and openness, significantly affect dog stress levels. Such findings indicate that dogs are able to mirror human attributes (Sundman et al., 2019).

### *Animals as attachment figures*

It appears that attachment theory is a valid framework for considering human-animal relationships (Zilcha-Mano et al., 2012). Findings from Kurdek (2008, 2009a, 2009b) demonstrated that secure base, proximity maintenance, and separation distress were the three most relevant features of human attachment towards dogs. Desire for closeness, and distress at absence, could be considered representative for attachment within separation anxiety, as concern about the proximity and safety of attachment figures is crucial to ASAD (Pini et al.,

2014). Zilcha-Mano et al. (2012) demonstrated that both secure base and safe haven were also relevant attachment features attributed to dogs, illustrating that all four commonly acknowledged features of attachment show relevancy for dogs as attachment figures.

According to the DSM-5, separation anxiety involves developmentally excessive anxiety concerning separation from those to whom the individual is attached (American Psychiatric Association, 2013). By demonstrating that humans can form attachments to dogs, it is hypothesised that dogs may represent attachment figures within ASAD, a finding which may extend to other companion animals. As dogs and cats represent the majority of companion animals, instruments for assessing attachment predominantly reflect interactions with these animals (Smolkovic et al., 2012).

In attachment studies, it is often documented that humans who live with dogs are significantly more attached to their companion animals than those who live with cats (Smolkovic et al., 2012). However, when items specifically pertaining to interaction with dogs were removed, the emotional aspects of attachment showed no difference between dogs and cats (Zasloff, 1996).

### *Separation anxiety and attachment styles*

There is limited literature concerning the relationship between ASAD and attachment style. Attachment styles may be conceptualised as a continuum from anxious to avoidant, both considered insecure styles, with people scoring low on those polarities experiencing a secure attachment style. Location on the continuum is said to indicate the degree of worry a person experiences when thinking that an attachment figure will not be available in times of need (Zilcha-Mano et al., 2012). Literature has shown that different attachment styles (i.e.,

anxious versus avoidant) found in human relationships are similar to those found in human-companion animal relationships (Zilcha-Mano et al., 2011). However, the nature of the relationship between attachment style and separation anxiety is not well understood, and in fact, ASAD has been shown to occur in people with secure attachment style (Pini et al., 2014).

## **Clinical implications**

### *Clinical consideration of companion animals*

Within the clinical setting it is important to understand how separation from companion animals affects people directly, as a source of separation distress, and indirectly, through inability to draw upon a companion animal as a source of comfort (Adams et al., 2017). As a clinician, it is vital to be aware of the significance of companion animals in the life of a client (Chur-Hansen, 2010; Rynearson, 1978), in order to develop an holistic account of a person and a more inclusive treatment protocol (Sable, 1995). The effects of leaving home, friends, and family can cause anxiety, loneliness, depression, and general distress, however less is known about the impact of leaving companion animals (Adams et al., 2017). Clients may be embarrassed when discussing companion animals as sources of attachment, distress, or comfort, and should be encouraged to include animals in the construction of genograms or inventories of family history (Rynearson, 1978).

### *Animal ownership versus animal attachment*

While humans have been shown to miss their dogs when they are away from them (Stallones, 1994), it is important to distinguish between natural responses to absence, and clinically significant implications to mental health. Pini et al. (2014) argued that, unlike dependence, which is the indiscriminate tendency to rely excessively on others, ASAD

represents significant concern about the proximity of key attachment figures. Thus, when considering companion animals as attachment figures, it is important to make the distinction between animal ownership and animal attachment. While the human-companion animal relationship has been conceptualised as an attachment bond (Zilcha-Mano et al., 2012), animal attachment (not simply animal ownership) has been shown to have distinct correlations with human emotional wellbeing (Garrity et al., 1989).

Research suggests that attachment to companion animals, in particular dogs and cats, can reduce loneliness and contribute to a general sense of emotional and social wellbeing throughout the life cycle (Sable, 1995). There are also a variety of claimed health benefits for humans, including; increased exercise and physical activity, improved general and cardiovascular health, and improved opportunity for communication (with dogs functioning as facilitators for human interaction), (Brown and Rhodes, 2006; Friedmann and Krause-Parello, 2018; McNicholas et al., 2005). However, there can also be some potential negative effects. Such effects may include; allergies, increased risk of falls and fractures in the elderly, and zoonotic illnesses and infections (Guay, 2001; Pluijm et al., 2006). Alternatively, some studies have shown no difference to human psychological or physical wellbeing (Parslow et al., 2005; Winefield et al., 2008). While the effects of animal ownership and attachment vary widely, the loss of an animal can also affect people in a variety of ways and can lead to separation anxiety, grief, and mourning, and may intensify feelings of anxiety, depression, and anger (Chur-Hansen, 2010; Field et al., 2009; Rynearson, 1978). Companion animals may also be utilised as a substitute for human companionship, which may be construed as both negative and positive (Miltiades and Shearer, 2011).

*Further considerations*

Increased understanding and research into the possibility of human separation anxiety generated through attachment relationships with companion animals may assist in developing more effective treatments for ASAD as a complex disorder with bonds which can span many aspects of human relationships. Vulnerable people may refuse hospital treatments, display hesitance in moving into supported living accommodation and may even neglect work or social engagements and activities if these are seen as taking them away from their animal.

Inclusive policies that encourage greater acceptance of companion animals in nursing homes, retirement communities, and individual apartments may be an important step in the lives of humans and companion animals. Animal restriction policies should allow for and accommodate the changing dynamics of family life and an aging population's needs. Recognition of companion animals as sources of attachment may enable clinicians to incorporate animals as a way to reduce loneliness, increase comfort and security, and develop inclusive policies which allow for companion animals to be considered attachment figures (Sable, 1995).

**Conclusion**

Attachment experiences of infancy and childhood can influence relationships throughout life and this includes interactions with companion animals. A person's wellbeing may be significantly affected by the positive or negative influences of an attachment relationship with their companion animal. While the presence of a companion animal may provide comfort and security, distress to the attached owner may result if the animal is absent. If such distress causes severe dysfunction, it may indicate the presence of a yet unidentified form of Adult Separation Anxiety Disorder.

While symptoms of ASAD have become more commonly recognised by researchers and clinicians, complexities within the disorder need to be more thoroughly understood for effective treatments to be developed. Clinicians should be aware and inclusive of companion animals as potentially significant influences on emotional and psychological wellbeing. Investigation will be essential for Adult Separation Anxiety Disorder in human-animal relationships to progress into an established diagnostic category in psychological nomenclature.

### References

- Adams, A. C., Sharkin, B. S., & Bottinelli, J. J. (2017). The Role of Pets in the Lives of College Students: Implications for College Counselors. *Journal of College Student Psychotherapy, 31*(4), 306-324. doi:10.1080/87568225.2017.1299601
- Ainsworth, M. (1989). Attachments beyond infancy. *American Psychologist., 44*(4), 709-716.
- Ainsworth, M. (1991). Attachments and other affectional bonds across the life cycle. In C. M. Parkes, J. Stevenson-Hinde, & P. Marris (Eds.), *Attachment across the life cycle* (pp. 33-51). New York: Routledge.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders : DSM-IV-TR* (4th ed., text revision. ed.). Washington, DC: American Psychiatric Association.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders : DSM-5* (5<sup>th</sup> ed.). Arlington, VA, US: American Psychiatric Publishing
- Archer, J. (1997). Why do people love their pets? *Evolution and Human Behavior, 18*(4), 237-259. doi:<http://dx.doi.org/10.1016/S0162-3095%2899%2980001-4>
- Bowlby, J. (1958). The Nature of the Child's Tie to his Mother. *The International Journal of Psycho-Analysis, 39*, 350-373.
- Bowlby, J. (2008). *Attachment Second Edition*. New York: Basic Books.
- Brown, S. G., & Rhodes, R. E. (2006). Relationships Among Dog Ownership and Leisure-Time Walking in Western Canadian Adults. *American Journal of Preventative Medicine, 30*(2), 131-136. doi:10.1016/j.amepre.2005.10.007
- Doherty, N. A., & Feeney, J. A. (2004). The composition of attachment networks throughout the adult years. *Personal Relationships, 11*(4), 469-488. doi:10.1111/j.1475-6811.2004.00093.x

Field, N. P., Orsini, L., Gavish, R., & Packman, W. (2009). Role of attachment in response to pet loss. *Death Studies*, 33(4), 334-355.

doi:<http://dx.doi.org/10.1080/07481180802705783>

Friedmann, E., & Krause-Parello, C. (2018). Companion animals and human health: benefits, challenges, and the road ahead for human-animal interaction. *Revue scientifique et Technique (International Office of Epizootics)* 37(1), 71-82.

doi:10.20506/rst.37.1.2741

Garrity, T. F., Stallones, L. F., Marx, M. B., & Johnson, T. P. (1989). Pet Ownership and Attachment as Supportive Factors in the Health of the Elderly. *Anthrozoos*, 3(1), 35-44. Retrieved from <https://doi.org/10.2752/089279390787057829>.

Gerwolls, M. K. (1990). *Effects of Confiding, Emotional Expression, and Additional Pet Ownership on Adult Adjustment to the Death of a Companion Animal*. Unpublished thesis: University of Toledo School of Psychology.

Guay, D. R. P. (2001). Pet-assisted therapy in the nursing home setting: Potential for zoonosis. *American Journal of Infection Control*, 29(3), 178-186.

doi:10.1067/mic.2001.115873

Haslam, N., Williams, B. J., Kyrios, M., McKay, D., & Taylor, S. (2005). Subtyping obsessive-compulsive disorder: A taxometric analysis. *Behavior Therapy*, 36(4), 381-391. doi:10.1016/S0005-7894(05)80120-0

Hazan, C., & Shaver, P. (1987). Romantic Love Conceptualized as an Attachment Process. *Journal of Personality and Social Psychology*, 52(3), 511-524. doi:10.1037/0022-3514.52.3.511

Kaminski, J., Waller, B. M., Diogo, R., Hartstone-Rose, A., & Burrows, A. M. (2019).

Evolution of facial muscle anatomy in dogs. *Proceedings of the National Academy of Sciences*, 116(29), 14677-14681. doi:10.1073/pnas.1820653116



- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62(6), 593-602. doi:10.1001/archpsyc.62.6.593
- Kirsten, L. T., Grenyer, B. F. S., Wagner, R., & Manicavasagar, V. (2008). Impact of separation anxiety on psychotherapy outcomes for adults with anxiety disorders. *Counselling and Psychotherapy Research*, 8(1), 36-42. doi:10.1080/14733140801892620
- Kurdek, L. A. (2008). Pet dogs as attachment figures. *Journal of Social and Personal Relationships*, 25(2), 247-266. doi:<http://dx.doi.org/10.1177/0265407507087958>
- Kurdek, L. A. (2009a). Young adults' attachment to pet dogs: Findings from open-ended methods. *Anthrozoos*, 22(4), 359-369. doi:10.2752/089279309X12538695316149
- Kurdek, L. A. (2009b). Pet dogs as attachment figures for adult owners. *Journal of Family Psychology*, 23(4), 439-446. doi:<http://dx.doi.org/10.1037/a0014979>
- Manicavasagar, V., Marnane, C., Pini, S., Abelli, M., Rees, S., Eapen, V., & Silove, D. (2010). Adult separation anxiety disorder: a disorder comes of age. *Current Psychiatry Reports*, 12(4), 290-297.. doi:10.1007/s11920-010-0131-9
- Manicavasagar, V., Silove, D., & Curtis, J. (1997). Separation anxiety in adulthood: a phenomenological investigation. *Comprehensive Psychiatry*, 38(5), 274-282.
- Manicavasagar, V., Silove, D., Wagner, R., & Drobny, J. (2003). A self-report questionnaire for measuring separation anxiety in adulthood. *Comprehensive Psychiatry*, 44(2), 146-153. doi:10.1053/comp.2003.50024
- McNicholas, J., Gilbey, A., Rennie, A., Dono, J.-A., Ormerod, E., & Ahmedzai, S. (2005). Pet ownership and human health: A brief review of evidence and issues. *British Medical Journal*, 331(7527), 1252-1254.

- Mian, N. D., Godoy, L., Briggs-Gowan, M. J., & Carter, A. S. (2012). Patterns of anxiety symptoms in toddlers and preschool-age children: Evidence of early differentiation. *Journal of Anxiety Disorders, 26*(1), 102-110.
- Miltiades, H., & Shearer, J. (2011). Attachment to pet dogs and depression in rural older adults. *Anthrozoos, 24*(2), 147-154.  
doi:<http://dx.doi.org/10.2752/175303711X12998632257585>
- Miniati, M., Calugi, S., Rucci, P., Shear, M. K., Benvenuti, A., Santoro, D., . . . Cassano, G. B. (2012). Predictors of response among patients with panic disorder treated with medications in a naturalistic follow-up: the role of adult separation anxiety. *Journal of Affective Disorders, 136*(3), 675-679. doi:10.1016/j.jad.2011.10.008
- Parslow, R. A., Jorm, A. F., Christensen, H., Rodgers, B., & Jacomb, P. (2005). Pet Ownership and Health in Older Adults: Findings from a Survey of 2,551 Community-Based Australians Aged 60–64. *Gerontology, 51*(1), 40-47. doi:10.1159/000081433
- Parthasarathy, V., & Crowell-Davis, S. L. (2006). Relationship between attachment to owners and separation anxiety in pet dogs (*Canis lupus familiaris*). *Journal of Veterinary Behavior: Clinical Applications and Research, 1*(3), 109-120.  
doi:<http://dx.doi.org/10.1016/j.jveb.2006.09.005>
- Pini, S., Abelli, M., Troisi, A., Siracusano, A., Cassano, G. B., Shear, K. M., & Baldwin, D. (2014). The relationships among separation anxiety disorder, adult attachment style and agoraphobia in patients with panic disorder. *Journal of Anxiety Disorders, 28*(8), 741-746. doi:10.1016/j.janxdis.2014.06.010
- Pluijm, S., Smit, J., Tromp, E., Stel, V., Deeg, D., Bouter, L., & Lips, P. (2006). A risk profile for identifying community-dwelling elderly with a high risk of recurrent falling: results of a 3-year prospective study. *Osteoporosis International, 17*(3), 417-425. doi:10.1007/s00198-005-0002-0

- Quinn, A. C. (2005). An examination of the relations between human attachment, pet attachment, depression, and anxiety. *Retrospective Thesis and Dissertations*. 1851.
- Ruscio, A. M., Ruscio, J., & Keane, T. M. (2002). The Latent Structure of Posttraumatic Stress Disorder: A Taxometric Investigation of Reactions to Extreme Stress. *Journal of Abnormal Psychology, 111*(2), 290-301. doi:10.1037/0021-843X.111.2.290
- Rynearson, E. K. (1978). Humans and pets and attachment. *The British journal of psychiatry: the journal of mental science, 133*, 550-555.
- Sable, P. (1995). Pets, Attachment, and Well-Being across the Life Cycle. *Social Work, 40*(3), 334-341. doi:10.1093/sw/40.3.334
- Shear, M. K., Cassano, G. B., Frank, E., Rucci, P., Rotondo, A., & Fagiolini, A. (2002). The panic-agoraphobic spectrum: development, description, and clinical significance. *Psychiatric Clinics of North America, 25*(4), 739-756.
- Silove, D., Alonso, J., Bromet, E., Gruber, M., Sampson, N., Scott, K., . . . Kessler, R. C. (2015). Pediatric-Onset and Adult-Onset Separation Anxiety Disorder Across Countries in the World Mental Health Survey. *American Journal of Psychiatry, 172*(7), 647-656. doi:10.1176/appi.ajp.2015.14091185
- Silove, D., & Rees, S. (2014). Separation anxiety disorder across the lifespan: DSM-5 lifts age restriction on diagnosis. *Asian Journal of Psychiatry, 11*, 98-101. doi:10.1016/j.ajp.2014.06.021
- Silove, D., Slade, T., Marnane, C., Wagner, R., Brooks, R., & Manicavasagar, V. (2007). Separation anxiety in adulthood: dimensional or categorical? *Comprehensive Psychiatry, 48*(6), 546-553. doi:10.1016/j.comppsy.2007.05.011
- Smolkovic, I., Fajfar, M., & Mlinaric, V. (2012). Attachment to pets and interpersonal relationships: Can a four-legged friend replace a two-legged one? *Journal of European Psychology Students, 3*(1), 15-23. doi:10.5334/jeps.ao

- Stallones, L. (1994). Pet Loss and Mental Health. *Anthrozoos*, 7(1), 43-54.  
doi:10.2752/089279394787002087
- Sundman, A.-S., Van Poucke, E., Svensson Holm, A.-C., Faresjö, Å., Theodorsson, E., Jensen, P., & Roth, L. S. V. (2019). Long-term stress levels are synchronized in dogs and their owners. *Scientific Reports*, 9(1). doi:10.1038/s41598-019-43851-x
- Waters, E., Corcoran, D., & Anafarta, M. (2005). Attachment, other relationships, and the theory that all good things go together. *Human Development*, 48(1-2), 80-84.  
doi:10.1159/000083217
- Weiss, R. (1974). The Provisions of Social Relationships. . In Z. Rubin (Ed.), *Doing unto Others* (pp. 17-26). Englewood Cliffs: Prentice Hall.
- Winefield, H. R., Black, A., & Chur-Hansen, A. (2008). Health effects of ownership of and attachment to companion animals in an older population. *International Journal of Behavioral Medicine*, 15(4), 303-310.  
doi:<http://dx.doi.org/10.1080/10705500802365532>
- Zasloff, R. (1996). Measuring attachment to companion animals: A dog is not a cat is not a bird. *Applied Animal Behaviour Science*, 47(1-2), 43-48.  
doi:<http://dx.doi.org/10.1016/0168-1591%2895%2901009-2>
- Zilcha-Mano, S., Mikulincer, M., & Shaver, P. R. (2011). An attachment perspective on human-pet relationships: Conceptualization and assessment of pet attachment orientations. *Journal of Research in Personality*, 45(4), 345-357.  
doi:<http://dx.doi.org/10.1016/j.jrp.2011.04.001>
- Zilcha-Mano, S., Mikulincer, M., & Shaver, P. R. (2012). Pets as safe havens and secure bases: The moderating role of pet attachment orientations. *Journal of Research in Personality*, 46(5), 571-580. doi:<http://dx.doi.org/10.1016/j.jrp.2012.06.005>

## Research Report

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Adult Separation Anxiety Disorder:

The Human-Animal Bond

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### Abstract

*Background:* The introduction of an adult onset Separation Anxiety Disorder in the DSM-5 recognises that separation anxiety can occur at any stage across the lifespan. While researchers strive to develop a thorough understanding of adult separation anxiety in relation to excessive fear when separating from home or attachment figures, limited literature exists concerning whether this attachment figure must, in fact, be human.

*Methods:* Participants ( $N = 313$ , aged 18-76,  $M = 41.89$  years), completed demographic information and questionnaires measuring; separation anxiety from companion animals and humans, attachment towards companion animals and humans, and social support.

*Results:* Significant positive relationships were identified between separation anxiety from humans, people substitution and separation anxiety from animals. Participants with greater separation anxiety from animals also reported less social support and greater attachment anxiety involving humans. People substitution was also positively related to greater animal-related separation anxiety. Associations were generally weaker when cats were identified as the principal companion animal. Participants without children reported significantly less attachment-related avoidance (human), less perceived social support, greater people substitution, and greater separation anxiety towards companion animals. Separation anxiety from humans, attachment avoidance, and attachment anxiety accounted for 41% of variance in separation anxiety from animals.

*Limitations:* The correlational design does not allow the investigation of causal associations.

*Conclusions:* A strong, positive relationship was observed between human-related separation anxiety and animal-related separation anxiety, which was significantly stronger for people with lower levels of social support.

*Keywords:* Anxiety, Separation anxiety, Attachment, Companion animal.

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## Introduction

### *Separation Anxiety*

Separation anxiety is characterised by a fear that arises when individuals are separated from, or abandoned by, major attachment figures (American Psychiatric Association, 2013). Prior to 2013, separation anxiety was recognised as a disorder with an onset in childhood or adolescence (American Psychiatric Association: DSM-IV-TR, 2000). However, subsequent classifications removed the age criterion (American Psychiatric Association, 2013) which aligned it with other anxiety subcategories (Manicavasagar et al., 2010; Pini et al., 2014). Although there is a dearth of epidemiological data on separation anxiety across the lifespan, based on a study of nearly 40,000 participants, the World Health Organisation reported that separation anxiety disorder was common and highly comorbid (Silove et al., 2015). Lifetime prevalence rates have been found to average 4.8%, of which 43.1% occurred after the age of 18 years (Silove et al., 2015). Adult Separation Anxiety Disorder (ASAD) is thought to have both an environmental and genetic cause and often develops in childhood, with heritability estimated at 73% in children (American Psychiatric Association, 2013). Important environmental triggers can include the experience of childhood adversity; exposure to traumatic events such as immigration; serious illness; death of a relative; and, even death of a companion animal (American Psychiatric Association, 2013).

### *Attachment*

The primary psychological construct of attachment was developed to conceptualise the early bonding behaviours of infants and applied ethological principles to the human need for interpersonal connection (Bowlby, 1958). The concept of attachment related to a particular subset of social relationships concerning the maintenance of proximity or closeness, and how infants reacted to separations, reunions, and perceived threat (Ainsworth,



1989, 1991; Bowlby, 1958; Waters et al., 2005). There remained, within the research community, some conjecture as to whether the term ‘attachment’ should be extended beyond defining a child’s relationship with their parental figure. In response, Ainsworth (1989) conceptualised the term ‘affectional bonds’ to describe long-term ties with significant others in a more general sense, and attachment became one form of social provision inherent in adult relationships. In the late 1980s, the term ‘attachment’ began to gain acceptance as a theory with applications in adult relationships (Archer, 1997; Hazan and Shaver, 1987). It was argued that core components of attachment could be applied across age groups and this included: a desire for physical closeness; distress at separation; comfort at reunion; and, confidence from a secure base (Ainsworth, 1989, 1991; Hazan and Shaver, 1987).

The evolutionary significance of attachment to other humans is said to serve the biological function of sharing mutually beneficial alliances (Archer, 1997). Whether people form similar attachments to other species is less clearly defined. Archer (1997) proposed a Darwinian interpretation of human-to-animal attachment and suggested that features of attraction in dogs and cats developed as an evolutionary adaptation to manipulate the human response through selective breeding. Such adaptation included the development of neotenous characteristics (juvenile qualities, such as enlarged head, large eyes) adapted to elicit caregiving responses. These responses mimicked emotional ties similar to attachment within parent-child relationships (Chur-Hansen, 2010).

### *Companion animals*

The prevalence of animal ownership is significant with an estimated 24 million companion animals in Australia which is similar in magnitude to the human population of Australia (Animal Medicines Australia, AMA, 2016). More than 62% of Australian

households include an animal and of these, 38% are dogs and 29% are cats (AMA, 2016). Given the prevalence of dogs as companion animals, research has therefore examined whether companion animals serve important needs, similar to those provided by other humans. Kurdek (2008) explored the extent to which dogs represented the following four features of attachment: proximity maintenance (desire for physical closeness); secure base (dependable source of comfort and security); safe haven (sought to alleviate distress) and separation distress (missed when absent), (Ainsworth, 1989; Hazan and Shaver, 1987). Results from Kurdek's studies (2008, 2009a, 2009b) demonstrated that the most salient features of attachment to dogs were proximity maintenance and separation distress. Similarly, Zilcha-Mano et al. (2012) demonstrated that both secure base and safe haven were also relevant attachment features observable in owner relationships with dogs. Other researchers have examined whether similar relationships are observable in humans who live with cats (Zasloff, 1996). Such studies generally show that humans who live with dogs are significantly more attached to their animals than those who live with cats (Smolkovic et al., 2012), although it has also been found that, when items specifically pertaining to interaction with dogs were removed, the emotional aspects of attachment showed no difference between dogs and cats (Zasloff, 1996).

### *Health and Wellbeing*

Literature suggests that attachment to companion animals, in particular dogs and cats, can reduce loneliness and contribute to a general sense of emotional and social wellbeing throughout the life cycle (Sable, 1995). Further research has shown a variety of claimed health benefits for humans, including; increased exercise and physical activity, improved general and cardiovascular health, and improved opportunity for communication (with dogs functioning as facilitators for human interaction), (Brown and Rhodes, 2006; Friedmann and

Krause-Parello, 2018; McNicholas et al., 2005). At the same time, there can be situations where wellbeing may also be negatively affected by the presence of a companion animal. Such affects may include allergies, increased risk of falls and fractures in the elderly, and zoonotic illnesses and infections (Guay, 2001; Pluijm et al., 2006). Studies indicate mixed results concerning the effects of companion animals, with some studies indicating no positive impacts on human psychological or physical wellbeing (Parslow et al., 2005; Winefield et al., 2008). However, given the potential psychological benefits of companion animals, there is continued interest in exploring the therapeutic and clinical implications within human-animal relationships (Sable, 1995). More specifically, there is interest in whether certain people may benefit more greatly from the presence of companion animals than others, e.g., if they have limited social supports or difficulties in relationships with other people.

#### *Aims and Hypotheses*

Whilst extensive veterinary literature has indicated the presence of separation anxiety in dogs (Parthasarathy and Crowell-Davis, 2006), relatively little research has investigated whether humans experience separation anxiety in relation to their companion animals (Quinn, 2005; Zilcha-Mano et al., 2011). Accordingly, the aim of this research was to examine separation anxiety in humans and the factors relating to this anxiety. This study examined several characteristics of participants, including; their experience of separation anxiety; attachment-related problems; perception of social support; and the extent to which they saw their animals as a substitute for humans. Included in the study were analyses based on whether people identified cats or dogs as their predominant animal companion and whether they had children living with them at home.

Several hypotheses were investigated: Hypothesis 1: human-related separation anxiety and animal-related separation anxiety would be positively correlated. Hypothesis 2: greater people substitution (animal attachment) would be positively correlated with greater animal-related separation anxiety. Hypothesis 3: animal-related separation anxiety would be negatively correlated with perceived social support. Hypothesis 4: animal attachment would be greater in participants who preferred dogs than participants who preferred cats. Hypothesis 5: participants without children living at home would demonstrate great animal-related separation anxiety than participants with children living at home. The study also investigated a 6<sup>th</sup> hypothesis, to explore whether the strength of the relationship between human- and animal-related separation anxiety would be moderated by the level of social support available to the person. In particular, the relationship was expected to be stronger when the person reported having lower levels of social support from other people.

## **Method**

### Participants

The sample comprised 313 participants (279 women and 34 men) aged 18 to 76 ( $M = 41.89$  years,  $SD = 14.02$ ). To be eligible for participation, respondents needed to be aged 18 years or older, able to read and understand English, and currently live with a dog or cat. Seventy-eight percent of participants reported living with at least one dog ( $M = 2.28$ ,  $SD = 1.02$ ), while forty-seven percent lived with at least one cat ( $M = 2.03$ ,  $SD = 1.50$ ). Participants who lived with more than one animal were requested to select the companion animal to which they felt the closest. Of all participants, 70.6% selected a dog, while 29.4% selected a cat.

## Measures

### *(a) Demographics*

Participants provided details of their gender and age; primary language spoken; country of birth; country of residence; employment and relationship status; family structure in the household; details concerning the number of the dogs and cats in their household; primary person responsible for care of the animal; age of the animal; and the length of ownership.

### *(b) Separation anxiety*

Separation anxiety was measured in relation to both humans and companion animals with two administrations of the ‘Severity Measure for Separation Anxiety Disorder – Adult’ (SA-10; Craske et al., 2013). This self-administered questionnaire was designed for participants 18 years and older as a measurement tool for separation anxiety disorder. Items demonstrated similarity with DSM-5 diagnostic criteria. Participants were introduced to the survey with the statement, “*The following questions ask about thoughts, feelings and behaviours that you may have had about being separated from [home or from people who are important to you]/[the dog or cat who is most important to you] during the past seven days*”. Participants rated 10 items on a five-point Likert scale from 0 (*never*) to 4 (*all of the time*) with severity increasing with higher scores. In relation to companion animals, item three was altered from ‘people’ to ‘pets’ and all other items specified separation “from my pet”. Scores ranged from 0 - 40. Psychometric properties revealed high internal consistency, Cronbach’s  $\alpha = .95$  (Manicavasagar et al., 2003).

*(c) Attachment to companion animals*

Participants rated their strength of attachment to companion animals on one of the most widely used measures of affective attachment towards animals, the Lexington Attachment to Pets Scale (LAPS; Johnson et al., 1992). Participants responded to 23 brief statements on a four-point Likert scale from 0 (*strongly disagree*) to 3 (*strongly agree*), with higher scores indicating stronger attachment to animals. Calculation included two reverse-scored items, with totals ranging from 0 - 69. Questions were divided into three subscales; general attachment, people substitution, and animal rights/welfare. People substitution included 7 items ( $\alpha = .85$ ) and focused on social/relational aspects of animal attachment, for example, “*My pet means more to me than any of my friends*”. This measure was selected due to its suitability for both dog and cat owners and satisfactory psychometric properties, Cronbach’s  $\alpha = .93$  (Johnson et al., 1992).

*(d) Perceived social support*

The Social Provisions Scale (SPS) assessed the degree to which an individual perceived their relationships as providing social support (Cutrona and Russell, 1987). Twenty-four questions were rated on a four-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). Twelve items were reverse scored, and scores ranged from 24 - 96, with higher scores indicating greater perceived social support. This questionnaire contained six subscales; attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance, which represented social functions required for individuals to feel adequately supported (Weiss, 1974). Total scores on the SPS previously demonstrated satisfactory internal consistency, Cronbach’s  $\alpha = .915$  (Cutrona and Russell, 1987).

*(e) Attachment patterns*

The Relationship Structures Questionnaire (ECR-RS) was designed to assess attachment patterns in close relationships (Fraley et al., 2011). This nine-item questionnaire included two subscales; attachment-related avoidance and attachment-related anxiety. For brevity, before commencing the questionnaire, participants were asked, “*Which category best describes the most important person in your life?*”, and answers were divided into *romantic partner, parent, child, friend, and other (please specify)*. The latter category was mostly represented by *siblings*. The ECR-RS utilised a seven-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). After reverse-scoring the first four items, items one to six were averaged to compute an avoidance score, and items seven to nine were averaged to compute an anxiety score, with higher mean scores indicating more avoidance or anxious attachment. Both scales were previously demonstrated to have a satisfactory reliability, Cronbach’s  $\alpha = .81$  (Fraley et al., 2011).

Procedure

This study was designed and conducted in accordance with the Australian Code for the Responsible Conduct of Research (National Health and Medical Research Council, 2007, updated 2018) and approved by the School of Psychology Human Research Ethics Subcommittee (HREC 19/28). Recruitment was conducted via convenience sampling through social networks. Participants accessed the survey using a link to Survey Monkey™. After reading an information sheet concerning the study and its compliance with ethical guidelines, participants completed the 15-20 minute survey that contained the measures, demographic questions, opportunities to submit qualitative answers, and a photograph of their companion animal.

### Analytical methods

Analyses were conducted using SPSS v.25. Pearson correlational analyses were used to examine the strength and direction of association between principal variables. Group comparison, e.g., between people who had dogs versus cats as favoured companions, those with or without children, and low versus high levels of separation anxiety, were compared using t-tests (t-test values were selected based on the significance or non-significance of the Levene's test). Separation anxiety from companion animals was categorised into two levels of severity: low clinical (*none* and *mild*) and high clinical (*moderate*, *severe*, and *extreme*). The moderating effect of social support between human and animal-related separation anxiety was examined using hierarchical regression.

## **Results**

### *Descriptive statistics*

A summary of the descriptive statistics for the study is provided in Table 1. These results indicate that the sample generally reported low separation anxiety and low avoidant or anxious attachment in relation to both humans and companion animals. However, the range of scores indicates that moderate and severe levels of separation anxiety were present in some participants. Participants' scores averaged in the moderate-to-high range for people substitution and in the high range for perceived social support, which indicates that most people had good levels of human social support.



Table 1.

*Summary descriptive for principal measures*

	Overall	Actual	Possible
	<i>M (SD)</i>	range	range
Separation anx (human)	4.04 (5.86)	0-39	0-40
Attachment avoidance*	2.41 (1.23)	1-6.5	1-7
Attachment anxiety*	2.11 (1.46)	1-7	1-7
Social support (SS)	79.16 (11.38)	26-96	24-96
People substitution (PS)	15.20 (4.12)	0-21	0-24
Separation anx (animal)	5.61 (6.19)	0-39	0-40

\*Mean item to allow for easier clinical interpretation between human attachment subscales.  
Separation anxiety levels: *none* (0-8), *mild* (9-18), *moderate* (19-24), *severe* (25-32), *extreme* (33-40).

Pearson correlation analysis was conducted to examine the relationships between the principal variables (see Table 2). These results are separately presented for the overall sample and for those who identified dogs or cats as their dominant companion animal. Inspection of the overall results show that there were positive associations between separation anxiety (human), general attachment problems, and attachment avoidance. Consistent with hypotheses one and two, significant positive relationships were observed between human-related separation anxiety, people substitution, and animal-related separation anxiety. Participants with greater separation anxiety from animals also reported less social support and greater attachment anxiety involving humans which supported hypothesis three. In support of hypothesis four, a comparison of the correlations observed for those with dog or cat preferences indicated that (with the exception of the human and animal separation correlation), the relationships in support of the other hypotheses were generally weaker when cats were identified as the principal companion animal.

Table 2.

*Pearson correlations of principal study variables (overall)*

	Separation anxiety (human)	Attachment avoidance	Attachment anxiety	Social support	People substitution
Overall ( $N = 313$ )					
Attachment avoidance	.13*				
Attachment anxiety	.33**	.32**			
Social support	-.16**	-.48**	-.43**		
People substitution	.16**	.17**	.21**	-.34**	
Sep anxiety (animal)	.57**	.01	.32**	-.30**	.42**
Dog preferred ( $n = 221$ )					
Attachment avoidance	.15*				
Attachment anxiety	.39**	.34**			
Social support	-.19**	-.45**	-.47**		
People substitution	.23**	.18**	.21**	-.37**	
Sep anxiety (animal)	.57**	-.02	.34**	-.30**	.47**
Cat preferred ( $n = 92$ )					
Attachment avoidance	.06				
Attachment anxiety	.18	.24*			
Social support	-.10	-.56**	-.35**		
People substitution	.00	.12	.23*	-.29**	
Sep anxiety (animal)	.57**	.08	.25*	-.33**	.26*

\* $p < .05$  \*\*  $p < .01$

*Comparisons based on dog vs cat preferences*

T-test comparisons showed that scores significantly differed for only one of the principal measures. Participants indicating a preference for dogs reported significantly higher people substitution scores ( $M = 15.74$ ,  $SD = 4.04$ ) than participants with a preference for cats ( $M = 18.90$ ,  $SD = 4.02$ ),  $t(311) = 3.67$ ,  $p < .001$  ( $d = .78$ ) with a large effect size difference.

*Comparisons based on the presence or absence of children in the home*

It was predicted (hypothesis five) that participants without children living at home would demonstrate greater separation anxiety towards animals than participants with children living at home. Results indicated support for the hypothesis and demonstrated that participants without children living at home reported significantly less attachment-related avoidance (human), less perceived social support, greater people substitution, and greater separation anxiety towards companion animals (Table 3).

Table 3.

*Summary descriptive for principal measures for participants with children ( $n = 89$ ) and without children ( $n = 224$ )*

	With children	Without children	<i>t</i> -value	Cohen's <i>d</i>
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
Sep anxiety (human)	5.20 (7.43)	3.57 (5.04)	1.90	.26
Attachment avoidance	2.88 (1.43)	2.22 (1.09)	3.91**	.52
Attachment anxiety	2.10 (1.50)	2.11 (1.45)	0.02	.01
Social support (SS)	81.88 (10.89)	78.08 (11.42)	2.69*	.34
People substitution (PS)	14.29 (4.37)	15.56 (3.96)	2.48*	.30
Sep anxiety (animal)	3.74 (5.68)	6.35 (6.23)	3.56**	.44

\* $p < .05$  \*\*  $p < .01$

*Comparisons based on clinical classification of separation anxiety (human)*

Consistent with hypothesis six, results indicate that participants with high clinical separation anxiety (human) demonstrated significantly greater attachment-related avoidance and attachment-related anxiety towards humans, less perceived social support, and greater separation anxiety towards animals than participants with low separation anxiety (human), (Table 4).

Table 4.

*Comparisons of outcomes by clinical classification of separation anxiety (human) for participants with high anxiety (n = 15) and low anxiety (n = 298)*

	High clinical	Low clinical		
	<i>M (SD)</i>	<i>M (SD)</i>	<i>t-value</i>	Cohen's <i>d</i>
Attachment avoidance	3.36 (1.26)	2.36 (1.21)	3.10**	.81
Attachment anxiety	3.82 (2.49)	2.02 (1.34)	2.78*	.90
Social support (SS)	69.33 (12.69)	79.65 (11.11)	3.49**	.87
People substitution (PS)	17.00 (5.25)	15.11 (4.04)	1.74	.40
Sep anxiety (animal)	17.27 (10.66)	5.02 (5.26)	4.42**	1.46

\* $p < .05$  \*\*  $p < .01$

Social support as moderator

A multiple regression analysis was conducted to examine whether social support acted as a moderator between separation anxiety (human), human attachment avoidance and anxiety, and separation anxiety (animal) scores (see Table 5). In step one, three variables were included: separation anxiety (human), attachment avoidance, and attachment anxiety. These variables accounted for 41% of variance in separation anxiety (animals). Two-way interaction terms were entered on step two. The separation anxiety (x) social support interaction was found to be significant. To analyse the cause of this interaction, social support

was divided into high and low groups based on a median split. Separate human-animal separation anxiety regressions were run for the two levels of social support to generate two functions, plotted in Figure 1. Figure 1 illustrates that the relationship between human-related separation anxiety and animal related separation anxiety is significantly stronger for people who have lower levels of social support.

Table 5.

*Summary of multiple regression analysis for social support as moderator between human-related attachment problems and separation anxiety (animal), (N = 313)*

	Model 1			Model 2		
	<i>B</i>	$\beta$	<i>t</i> -value	<i>B</i>	$\beta$	<i>t</i> -value
<b>Step one</b>						
Sep anxiety (human)	.55	.52	11.25**			
Attachment avoidance	-.19	-.23	4.51**			
Attachment anxiety	.14	.10	1.87			
Social support	-.16	-.29	5.43**			
<b>Step two</b>						
Sep anxiety (human)				1.53	1.45	5.82**
Attachment avoidance				-.28	-.34	1.08
Attachment anxiety				-.16	-.12	.38
Social support				-.15	-.27	2.35*
Social support x Sep anx				-.01	-.92	3.83**
<b>(H)</b>						
Social support x Att				.00	.11	.40
avoidance						
Social support x Att anxiety				.00	.17	.61
Adjusted $R^2$		.40			.43	
Model <i>F</i>		53.93**			34.45**	

Note: Low/high social support was based on a median split

\* $p < .05$  \*\*  $p < .01$

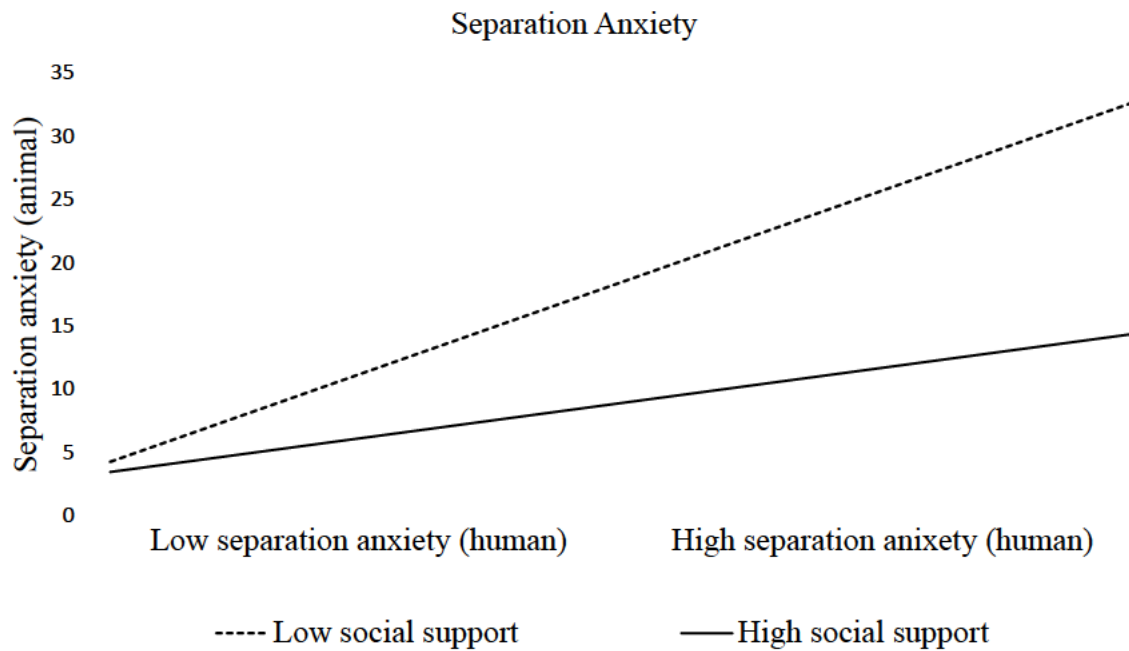


Figure 1.

*Moderating effect of social support on separation anxiety (human) and separation anxiety (animal)*

### Discussion

The purpose of this research was to determine whether people experience separation anxiety towards companion animals, and whether this concept is related to separation anxiety towards humans, human attachment, people substitution (animal attachment), and perceived social support. All principal hypotheses were generally supported. Findings suggest that human- and animal-related separation anxiety are strongly correlated. Participants with higher animal-related separation anxiety reported greater people substitution and higher avoidant and anxious attachment towards humans. Participants with a preference for dogs demonstrated higher people substitution scores than participants with a preference for cats. This finding was observed across measures with generally weaker associations between principal variables when cats were identified as the preferred companion animal. In addition, participants without children living at home reported significantly less attachment-related avoidance, less social support, greater people substitution, and greater animal-related

separation anxiety. High levels of human-related separation anxiety correlated significantly with greater attachment-related avoidance, less social support, and greater animal-related separation anxiety.

A number of the findings from this study have broader implications for how human concepts and processes are understood. The first implication concerns how attachment is understood. The DSM-5 (American Psychiatric Association, 2013) states that adults with separation anxiety disorder are normally over-concerned about their children and spouses. This conceptualises such relationships as significant areas of attachment. Attachment experiences of infancy and childhood, project onto our relationships throughout life, and this study, among those previously reported, expands the concept of attachment to include companion animals as significant attachment figures (Kurdek, 2009b; Rynearson, 1978; Sable, 1995; Zilcha-Mano et al., 2012). Human relationships with companion animals can be considered as ‘attachment bonds’ and elicit similar responses with regard to separation. While humans have been shown to ‘miss’ their dogs when they are away from them (Stallones, 1994), the current findings provide preliminary data on the experience of ‘anxiety’ due to separation. By measuring anxiety regarding humans and animals on a scale designed to relate to diagnostic criteria, theory-based comparisons may be drawn between human-related separation anxiety and animal-related separation anxiety.

The second implication for this study provides insight into whether the type of companion animal might be important. For example, results from this study are consistent with previous findings, that people living with dogs are significantly more attached to their companion animals than those with cats (Johnson et al., 1992; Smolkovic et al., 2012; Zasloff, 1996). Participants who selected dogs as their preferred companion animal showed

significantly greater people substitution (animal attachment), than participants who preferred cats. However, it should be noted that some questionnaire items referred to ‘friendship’ and ‘loyalty’, which, it could be argued, relate more strongly to attributes of interaction observed between dogs with humans. Further research is needed to determine whether the removal of more dog-specific items, may result in similar levels of attachment (Zasloff, 1996). Within this study, 47% of participants lived with a cat, while 78% lived with a dog, therefore many participants lived with both species. As groups were thus not strictly independent, the results should be interpreted cautiously.

A third implication is that the study shows how a person’s wellbeing may be significantly affected by both positive and negative influences of an attachment relationship with a companion animal (Garrity et al., 1989). While the presence of a companion animal may provide comfort and security, absence of an animal may result in distress to the attached human. If such distress causes severe dysfunction, it may indicate the presence of an unidentified form of Adult Separation Anxiety Disorder (ASAD). Recognition of the prevalence of adult-onset separation anxiety challenged the long-established criteria of only childhood and adolescent onset (Silove et al., 2015). Similarly, expanding separation anxiety to apply to companion animals, acknowledges the diversity of the evolving family unit and recognises the important role of companion animals, particularly in the lives of people with limited social support.

Another important finding related to the role of social support. The association between human-related separation anxiety and animal-related separation anxiety was significantly stronger for people with lower levels of social support. This may suggest that companion animals act as ‘people substitutes’ when individuals are lacking human social



support. This finding is consistent with a previous study by Black (2012) who demonstrated that participants who lived with the most companion animals reported the least satisfaction with their social networks. Social support from other people has also been shown to reduce the grief-related symptoms that follow the death of a companion animal (King and Werner, 2012). In addition, anthropological and historical accounts have likened human associations with companion animals to parent-child relationships (Archer, 1997). In this context, humans are said to be the providers of food, shelter, and care, while animals reciprocate with dependent companionship. This theory is grounded in a 'care-giving behavioural system' framework in which parent/child dyads are seen as providing protection, stress reduction, and care, designed to keep offspring close and safe (Solomon and George, 2008). Consistent with this view, findings from this study suggest that companion animals may play a surrogacy role in human lives, with results demonstrating less social support, greater people substitution, and greater animal-related separation anxiety in participants without children living at home.

### *Limitations*

The correlational design of this research does not allow for the investigation of causal associations. In addition, the study is based on a self-report methodology. As attachment is generally considered to be a biologically-rooted behaviour which can be seen in reactions to threatened or actual separation from a significant other (Bowlby, 1958), it is difficult to capture the true nature of attachment relationships without observational methods measuring responses to separation. Nevertheless, scales used in this research have been well validated. Another potential limitation is that the study is based on a self-selected volunteer sample. Individuals who choose to participate in animal-related questionnaires may represent a bias, though the data does not indicate this.

*Implications and future directions*

While symptoms of ASAD have become more commonly recognised by researchers and clinicians, complexities within the disorder require further clarification for effective treatments to be developed. Recognised psychological and pharmacological interventions which have predominantly worked for other anxiety disorders, have shown to be ineffective when treating ASAD (Kirsten et al., 2008; Miniati et al., 2012b). Clinicians should be aware and inclusive of companion animals as potentially significant influences on emotional and psychological wellbeing (Chandler et al., 2015). Companion animals may be psychologically beneficial for people who have more limited social supports, but they can also become another source of separation anxiety.

Changing family dynamics, including an increase in single person households and couples without children, may indicate the need to consider the important roles of connection and security offered by companion animals. Vulnerable people may otherwise refuse hospital treatments, display hesitance in moving into supported living accommodation, and may neglect work or social engagements and activities if these are felt to be taking them away from their animal. Inclusive policies that encourage greater acceptance of companion animals in individual apartments, nursing homes, and retirement communities may be an important step in the lives of humans and companion animals. Animal restriction policies should allow for and accommodate this shift in family structure. An important part of this process will involve recognition of companion animals as sources of attachment. Such recognition may also encourage clinicians to incorporate animals into therapy as a method to reduce loneliness, increase purpose, and provide comfort (Sable, 1995).

*Conclusions*

This study supports the application of attachment theory to companion animals and highlights the importance of social support as a potentially protective factor against animal-related separation anxiety. In developing more effective treatments for ASAD it may be important to consider the influence of social support and the role of companion animals in providing significant attachment relationships.

### References

- Adams, A.C., Sharkin, B.S., Bottinelli, J.J., 2017. The Role of Pets in the Lives of College Students: Implications for College Counselors. *J. College Student Psychotherapy* 31, 306-324.
- Ainsworth, M., 1989. Attachments beyond infancy. *Am. Psychol.* 44, 709-716.
- Ainsworth, M., 1991. Attachments and other affectional bonds across the life cycle, In: Parkes, C.M., Stevenson-Hinde, J., Marris, P. (Eds.), *Attachment across the life cycle*. Routledge, New York, pp. 33-51.
- American Psychiatric Association, 2000. *Diagnostic and statistical manual of mental disorders : DSM-IV-TR, fourth ed., text revision*. Washington, DC.
- American Psychiatric Association, 2013. *Diagnostic and statistical manual of mental disorders : DSM-5, Fifth ed.*, American Psychiatric Publishing, Arlington, VA, US.
- Archer, J., 1997. Why do people love their pets? *Evolution and Human Behavior* 18, 237-259.
- Black, K., 2012. The Relationship Between Companion Animals and Loneliness Among Rural Adolescents. *Journal of Pediatric Nursing* 27, 103-112.
- Bowlby, J., 1958. The Nature of the Child's Tie to his Mother. *The International Journal of Psycho-Analysis* 39, 350-373.
- Bowlby, J., 2008. *Attachment Second Edition*. Basic Books, New York.
- Brown, S.G., Rhodes, R.E., 2006. Relationships Among Dog Ownership and Leisure-Time Walking in Western Canadian Adults. *American Journal of Preventive Medicine* 30, 131-136.
- Chandler, C.K., Fernando, D.M., Minton, C.A.B., Portrie-Bethke, T.L., 2015. Eight domains of pet-owner wellness: valuing the owner-pet relationship in the counseling process. *Journal of Mental Health Counseling* 37, 268-282.

- Chur-Hansen, A., 2010. Grief and bereavement issues and the loss of a companion animal: People living with a companion animal, owners of livestock, and animal support workers. *Clinical Psychologist* 14, 14-21.
- Cutrona, C.E., Russell, D.W., 1987. The provisions of social relationships and adaptation to stress. *Advances in personal relationships* 1, 37-67.
- Doherty, N.A., Feeney, J.A., 2004. The composition of attachment networks throughout the adult years. *Personal Relationships* 11, 469-488.
- Field, N.P., Orsini, L., Gavish, R., Packman, W., 2009. Role of attachment in response to pet loss. *Death Studies* 33, 334-355.
- Fraley, R.C., Heffernan, M.E., Vicary, A.M., Brumbaugh, C.C., 2011. The Experiences in Close Relationships-Relationship Structures questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment* 23, 615-625.
- Friedmann, E., Krause-Parello, C., 2018. Companion animals and human health: benefits, challenges, and the road ahead for human-animal interaction. *Rev. Sci. Tech. Off. Int. Epizoot.* 37, 71-82.
- Garrity, T.F., Stallones, L.F., Marx, M.B., Johnson, T.P., 1989. Pet Ownership and Attachment as Supportive Factors in the Health of the Elderly. *Anthrozoos* 3, 35-44.
- Gerwolls, M.K., 1990. Effects of Confiding, Emotional Expression, and Additional Pet Ownership on Adult Adjustment to the Death of a Companion Animal. Unpublished Thesis: University of Toledo School of Psychology.
- Guay, D.R.P., 2001. Pet-assisted therapy in the nursing home setting: Potential for zoonosis. *AJIC: American Journal of Infection Control* 29, 178-186.
- Haslam, N., Williams, B.J., Kyrios, M., McKay, D., Taylor, S., 2005. Subtyping obsessive-compulsive disorder: A taxometric analysis. *Behavior Therapy* 36, 381-391.

- Hazan, C., Shaver, P., 1987. Romantic Love Conceptualized as an Attachment Process. *Journal of Personality and Social Psychology* 52, 511-524.
- Johnson, T.P., Garrity, T.F., Stallones, L., 1992. Psychometric Evaluation of the Lexington Attachment to Pets Scale (Laps). *Anthrozoos* 5, 160-175.
- Kaminski, J., Waller, B.M., Diogo, R., Hartstone-Rose, A., Burrows, A.M., 2019. Evolution of facial muscle anatomy in dogs. *Proceedings of the National Academy of Sciences*, 29, 14677-14681.
- Kessler, R.C., Berglund, P., Demler, O., Jin, R., Merikangas, K.R., Walters, E.E., 2005. Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry* 62, 593-602.
- King, L.C., Werner, P.D., 2012. Attachment, Social Support, and Responses following the Death of a Companion Animal. *OMEGA - Journal of Death and Dying* 64, 119-141.
- Kirsten, L.T., Grenyer, B.F.S., Wagner, R., Manicavasagar, V., 2008. Impact of separation anxiety on psychotherapy outcomes for adults with anxiety disorders. *Counselling and Psychotherapy Research* 8, 36-42.
- Krueger, R.F., 1999. The Structure of Common Mental Disorders. *Archives of General Psychiatry* 56, 921-926.
- Kurdek, L.A., 2008. Pet dogs as attachment figures. *Journal of Social and Personal Relationships* 25, 247-266.
- Kurdek, L.A., 2009a. Pet dogs as attachment figures for adult owners. *Journal of Family Psychology* 23, 439-446.
- Kurdek, L.A., 2009b. Young adults' attachment to pet dogs: Findings from open-ended methods. *Anthrozoos* 22, 359-369.

- Manicavasagar, V., Marnane, C., Pini, S., Abelli, M., Rees, S., Eapen, V., Silove, D., 2010. Adult separation anxiety disorder: a disorder comes of age. *Curr Psychiatry Rep* 12, 290-297.
- Manicavasagar, V., Silove, D., Curtis, J., 1997. Separation anxiety in adulthood: a phenomenological investigation. *Comprehensive psychiatry* 38, 274-282.
- Manicavasagar, V., Silove, D., Wagner, R., Drobny, J., 2003. A self-report questionnaire for measuring separation anxiety in adulthood. *Comprehensive psychiatry* 44, 146-153.
- McNicholas, J., Gilbey, A., Rennie, A., Dono, J.-A., Ormerod, E., Ahmedzai, S., 2005. Pet ownership and human health: A brief review of evidence and issues. *British Medical Journal* 331, 1252-1254.
- Mian, N.D., Godoy, L., Briggs-Gowan, M.J., Carter, A.S., 2012. Patterns of anxiety symptoms in toddlers and preschool-age children: Evidence of early differentiation. *Journal of Anxiety Disorders* 26, 102-110.
- Miltiades, H., Shearer, J., 2011. Attachment to pet dogs and depression in rural older adults. *Anthrozoos* 24, 147-154.
- Miniati, M., Calugi, S., Rucci, P., Shear, M.K., Benvenuti, A., Santoro, D., Mauri, M., Cassano, G.B., 2012a. Predictors of response among patients with panic disorder treated with medications in a naturalistic follow-up: the role of adult separation anxiety. *Journal of affective disorders* 136, 675-679.
- Miniati, M., Calugi, S., Rucci, P., Shear, M.K., Benvenuti, A., Santoro, D., Mauri, M., Cassano, G.B., 2012b. Predictors of response among patients with panic disorder treated with medications in a naturalistic follow-up: The role of adult separation anxiety. *Journal of affective disorders* 136, 675-679.
- National Health and Medical Research Council, 2007, updated 2018. Australian Code for the Responsible Conduct of Research., in: Commonwealth of Australia, C. (Ed.).

- Parslow, R.A., Jorm, A.F., Christensen, H., Rodgers, B., Jacomb, P., 2005. Pet Ownership and Health in Older Adults: Findings from a Survey of 2,551 Community-Based Australians Aged 60–64. *Gerontology* 51, 40-47.
- Parthasarathy, V., Crowell-Davis, S.L., 2006. Relationship between attachment to owners and separation anxiety in pet dogs (*Canis lupus familiaris*). *Journal of Veterinary Behavior: Clinical Applications and Research* 1, 109-120.
- Pini, S., Abelli, M., Troisi, A., Siracusano, A., Cassano, G.B., Shear, K.M., Baldwin, D., 2014. The relationships among separation anxiety disorder, adult attachment style and agoraphobia in patients with panic disorder. *Journal of Anxiety Disorders* 28, 741-746.
- Pluijm, S., Smit, J., Tromp, E., Stel, V., Deeg, D., Bouter, L., Lips, P., 2006. A risk profile for identifying community-dwelling elderly with a high risk of recurrent falling: results of a 3-year prospective study. *Osteoporosis International* 17, 417-425.
- Quinn, A.C., 2005. An examination of the relations between human attachment, pet attachment, depression, and anxiety. *Retrospective Thesis and Dissertations*. 1851.
- Ruscio, A.M., Ruscio, J., Keane, T.M., 2002. The Latent Structure of Posttraumatic Stress Disorder: A Taxometric Investigation of Reactions to Extreme Stress. *Journal of Abnormal Psychology* 111, 290-301.
- Rynearson, E.K., 1978. Humans and pets and attachment. *The British journal of psychiatry : the journal of mental science* 133, 550-555.
- Sable, P., 1995. Pets, Attachment, and Well-Being across the Life Cycle. *Social Work* 40, 334-341.
- Shear, M.K., Cassano, G.B., Frank, E., Rucci, P., Rotondo, A., Fagiolini, A., 2002. The panic-agoraphobic spectrum: development, description, and clinical significance. *The Psychiatric clinics of North America* 25, 739-756.



- Silove, D., Alonso, J., Bromet, E., Gruber, M., Sampson, N., Scott, K., Andrade, L., Benjet, C., Caldas de Almeida, J.M., De Girolamo, G., de Jonge, P., Demyttenaere, K., Fiestas, F., Florescu, S., Gureje, O., He, Y., Karam, E., Lepine, J.P., Murphy, S., Villa-Posada, J., Zarkov, Z., Kessler, R.C., 2015. Pediatric-Onset and Adult-Onset Separation Anxiety Disorder Across Countries in the World Mental Health Survey. *Am J Psychiatry* 172, 647-656.
- Silove, D., Rees, S., 2014. Separation anxiety disorder across the lifespan: DSM-5 lifts age restriction on diagnosis. *Asian J Psychiatr* 11, 98-101.
- Silove, D., Slade, T., Marnane, C., Wagner, R., Brooks, R., Manicavasagar, V., 2007. Separation anxiety in adulthood: dimensional or categorical? *Comprehensive psychiatry* 48, 546-553.
- Smolkovic, I., Fajfar, M., Mlinaric, V., 2012. Attachment to pets and interpersonal relationships: Can a four-legged friend replace a two-legged one? *Journal of European Psychology Students* 3, 15-23.
- Solomon, J., George, C., 2008. The caregiving system. A Behavioral systems approach to parenting, In: Cassidy, J., Shaver, P.R. (Eds.), *Handbook of attachment: Theory, research and clinical applications*, New York: Guilford, pp. 833-856.
- Stallones, L., 1994. Pet Loss and Mental Health. *Anthrozoos* 7, 43-54.
- Sundman, A.-S., Van Poucke, E., Svensson Holm, A.-C., Faresjö, Å., Theodorsson, E., Jensen, P., Roth, L.S.V., 2019. Long-term stress levels are synchronized in dogs and their owners. *Scientific Reports* 9, 7391.
- Waters, E., Corcoran, D., Anafarta, M., 2005. Attachment, other relationships, and the theory that all good things go together. *Hum. Dev.* 48, 80-84.
- Weiss, R., 1974. The Provisions of Social Relationships. , In: Rubin, Z. (Ed.), *Doing unto Others*. Prentice Hall, Englewood Cliffs, pp. 17-26.

Winefield, H.R., Black, A., Chur-Hansen, A., 2008. Health effects of ownership of and attachment to companion animals in an older population. *International Journal of Behavioral Medicine* 15, 303-310.

Zasloff, R., 1996. Measuring attachment to companion animals: A dog is not a cat is not a bird. *Applied Animal Behaviour Science* 47, 43-48.

Zilcha-Mano, S., Mikulincer, M., Shaver, P.R., 2011. An attachment perspective on human-pet relationships: Conceptualization and assessment of pet attachment orientations. *Journal of Research in Personality* 45, 345-357.

Zilcha-Mano, S., Mikulincer, M., Shaver, P.R., 2012. Pets as safe havens and secure bases: The moderating role of pet attachment orientations. *Journal of Research in Personality* 46, 571-580.