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UNIVERSITY OF SOUTHAMPTON  
FACULTY OF MEDICINE, HEALTH AND LIFE  
SCIENCES

SCHOOL OF PSYCHOLOGY

Dog Owner Interaction Style: The  
Transmission of Working Models in  
Human/Non-Human Caregiving  
Relationships

By

Jill Monica Taggart

Thesis for the degree of Doctor of Philosophy  
October, 2010

UNIVERSITY OF SOUTHAMPTON  
ABSTRACT  
FACULTY OF MEDICINE, HEALTH AND LIFE SCIENCES  
SCHOOL OF PSYCHOLOGY  
Doctor of Philosophy

DOG OWNER INTERACTION STYLE: THE TRANSMISSION OF WORKING  
MODELS IN HUMAN/NON-HUMAN CAREGIVING RELATIONSHIPS

By  
Jill Monica Taggart

A model of parental sensitivity in caregiving informs later romantic relationships and is transmitted in caregiving behaviours to children. Differences in parental caregiving contribute to individual differences in infant attachment style. The owner/dog bond mirrors this relationship as dog careseeking activates owner caregiving. The aim of this thesis was to investigate the role of individual differences in owner caregiving on dog attachment style.

The first study defined dog attachment style in the Strange Situation Test (Ainsworth & Wittig, 1973) in a sample of 52 self-selected owner/dog dyads. Dogs seek proximity, show evidence of distress when separated and use owners as safe havens for exploration. Individual differences in attachment security and insecurity were found. *Secure* dogs achieve attachment system deactivation through owner contact. *Insecure* dogs' attachment systems remains activated with: excessive focus on the owner but otherwise behaviourally *passive*; excessive owner *avoidance* focussing on evading the owner; or *anxiety*, consisting of high distress which could not be pacified by owner.

The second and third studies tested the effects of owner behaviour on individual differences in dog attachment style and exploratory system activation in a task-solving experiment. Behaviours assessed were talk and touch durations in the Strange Situation and owner "frightening" behaviours (threatening; owner showing fear; dissociation; disorganised; highly submissive; and sexualised behaviours). Owner behaviours significantly related to dog attachment style: owners of Avoidant dogs petted them less, talked to them more and used frightening behaviours, whereas, owners of Secure dogs used moderation in talk and touch and few frightening behaviours. Secure dogs task-solved longer and their owners were significantly less invasive and controlling (grabbing paws, restraining dogs) than owners of Avoidant dogs. Owner sensitivity is therefore related to dog attachment security which enables exploratory system activation. Self-reports of owner attachment style in the fourth study found a trend towards a dismissive style in adult relationships and dog avoidance.

Parent/child studies have linked parental frightening behaviours to subsequent infant disorganisation (due to the secure base or safe haven also being the source of fear), and to parental unresolved loss, trauma or abuse. Using interview protocols, studies five and six found relationships between owners Unresolved in loss, a Dismissive owner working model, invasive owner task solving behaviour, frightening owner behaviours and Avoidant dog attachment, indicating of a web of interaction between working models and behaviour.

The results indicate the potential effects of owner behaviour on the human/dog bond. The results could be used in assessing owner dog relationships that may indicate risk of animal/human abuse; assist dog shelters in the successful re-homing of Insecure dogs by identifying Secure households; and to enable greater owner understanding of dog behaviour and appropriate responding leading to more satisfying human/dog bonds, and thus fewer relinquishments to shelters.

# Declaration of authorship

I, Jill Monica Taggart declare that the thesis entitled Dog Owner Interaction Style: The Transmission of Working Models in Human/Non-Human Caregiving Relationships, and the work presented in the thesis are both my own, and have been generated by me as the result of my own original research. I confirm that:

- this work was completed wholly or mainly while in candidature for a research degree at this University;
- where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
- where I have consulted the published work of others, this is always clearly attributed;
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- where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
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Dedicated to:

my husband Steve - with all my love and enormous gratitude for his encouragement every step of the way on this long journey

and “Tiggy”, my endlessly fascinating Dobie, to whom I am unabashedly “attached”

## Conference Proceedings Arising from this Thesis

- Data from Chapter 4, The Relationship of Owner Behaviour and Dog Attachment Security in the Strange Situation, were presented in poster format at the International Veterinary Behaviour conference (IVBM) in Edinburgh, October, 2009.
- Oral presentation summarising data from Chapter 4, The Relationship of Owner Behaviour and Dog Attachment Security in the Strange Situation was given at the University of Southampton Faculty of Medicine, Health, and Life Sciences annual postgraduate conference, June 2009.
- Oral presentation summarising data from Chapter 4, The Relationship of Owner Behaviour and Dog Attachment Security in the Strange Situation was given at the International Association of Human-Animal Interaction Organisations conference (IAHAIO) Stockholm, Sweden, July, 2010.
- Oral presentation summarising data from Chapter 5, The Relationship of Owner Behaviour in Task Solving and Dog Attachment Security in the Strange Situation was given at the International Association of Human-Animal Interaction Organisations (IAHAIO) conference Stockholm, Sweden, July, 2010.

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## **Glossary of Terms**

### **Abbreviations**

AAI:	The Adult Attachment Interview
CAR:	Caregiving in Adult Relationships Scale
DCS:	Dog Caregiving Scale
ECR:	The Experience in Close Relationships Scale
POI:	Pet Owner's Interview
SST:	The Strange Situation Test

### Strange Situation Sessions:

D	Dog Alone
DO	Dog/Owner
ODS	Owner/Dog/Stranger
DS	Dog/Stranger

### **Attachment Categories**

#### Infants in the Strange Situation Test:

A	Avoidant
B	Secure
C	Ambivalent/Resistant
D	Disorganised

#### Adult Attachment Interview

E1	Preoccupied (Angry)
E2	Preoccupied (Passive speech)
E3	Preoccupied (Overwhelmed)
F1	Secure (Some mild setting aside of attachment)
F2	Secure (mild avoidance)
F3	Prototypically Secure
F4	Secure (slight Preoccupation)
Ds1	Dismissing (idealising negative parenting)
Ds2	Dismissing (unemotional, uninvolved)
Ds3	Dismissing (evident of rejection, neglect)
Ds4	Dismissing (fearful of future loss)
U/d	Unresolved/Disorganised
CC	Cannot Classify

FR:	Parental Frightening Behaviours
TS:	Task Solving

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## Literature Review, Part I: Attachment

### Introduction

The relationship between dogs (*Canis familiaris*) and humans that has evolved over 10,000 years is unique and arguably symbiotic. Dog ownership has a number of health and social benefits for owners (Bonas, McNicholas & Collis, 2000) and being owned improves dog health and longevity as compared with feral dogs (Daniels & Bekoff, 1989). However, dogs can also develop behaviour problems (Lund & Jorgensen, 1999). Implicit in development of behaviours is the role of the pet/owner bond in maintaining and activating emotional responses.

For many, dog ownership mirrors the child-rearing experience. The paedomorphic appearance of dogs activates the caregiving system (Serpell, 2003). Several studies have suggested that dogs develop psychological attachments to owners similar to infants and parents, and visa versa. Dogs seek out owners when distressed and use them as safe havens for exploration. The caregiving owners provide to dogs could parallel human attachment/caregiving relationships. The aim of this thesis is to explore the emotional connection between owner and dog by asking how the owner responds to the dog's attachment need and whether aspects of owner experience of attachment relationships can explain their caregiving style in the same way a parent's early attachment experience informs parental caregiving (Main, Kaplan & Cassidy, 1984). Chapter 1 explores human attachment literature, including measurement tools and Chapter 2, the human/dog bond in relation to attachment. Chapter 3, the first experimental study, measures individual differences in dog attachment style using the Strange Situation Test (Ainsworth, Blehar, Waters & Wall, 1978). Chapter 4 explores the relationship between dog attachment style and owner behaviour in the Strange Situation. Chapter 5 investigates the dog/owner bond in terms of owner sensitivity and support in task-solving. Chapter 6 explores the owner's attachment style using a self-report survey. Chapter 7 investigates other factors influencing the owner/dog bond.

Chapter 8 uses the Adult Attachment Interview (Main & Goldwyn, 1984) to explore relationships between owner and dog attachment style. Chapter 9 contains a final discussion and conclusion.

The first hypothesis is that the dog's attachment system will activate the owner's caregiving system and that differences in dog attachment style will relate to owner caregiving style. The second hypothesis is that owner caregiving style will emanate from early attachment relationships. The third hypothesis is that owner caregiving sensitivity in task-solving will be related to dog attachment style. It is important to note that the focus of this study is not the *owner's* attachment to the dog but the attachment relationship of the dyad. Based on the results a model of the effects of owner caregiving on dog attachment style will be proposed.

### *Outline of Literature Review*

This literature review begins with a summary of attachment theory as it pertains to the infant/parent relationship, with reference to empirical work. It then considers adult attachment styles in intimate relationships as an example of the transmission of attachment working models. A discussion of methodologies measuring attachment in children and adults follows, including observational studies, self-reports and qualitative protocols. Finally, there is a discussion of the effects of "nature" and environment on attachment relationships.

### Attachment Theory

Attachment is an evolutionary construct enhancing an individual's survival by maintaining proximity to a fitter individual through the performance of behaviours which elicit caregiving (Bowlby, 1969). Dogs also exhibit attachment behaviours to owners (Palmer & Custance, 2008; Topal, Miklosi, Csanyi & Doka, 1998). Although human attachment behaviours are universal in nature, individual variations in intensity indicate attachment security or insecurity, and an organised or disorganised pattern of relating (Ainsworth, 1989; Ainsworth, Blehar, Waters & Wall, 1978; Main & Hesse, 1990; Topal et al. 1998).

"Attachment" is often applied to any affective relationship, described as "an affection or fondness: an affectionate relationship" (Oxford Dictionary, 2001) which could apply to human/non human relationships. Attachment theorists define it as a

specific type of affectional bond (Ainsworth, et al. 1978) that elicits a psychological and physiological reaction. The primary attachment humans experience is between mother and infant, although as adults, attachment to another individual occurs within romantic relationships.

In parent/infant relationships, the attachment object is the parent, as the individual better able to cope with the environment. This object is often irreplaceable, with affective responses to separation and reunion that are unique to this bond. The attachment figure(s) also serves as a secure base from which the infant can explore its environment (Bowlby, 1969).

The attachment figure's availability and responsiveness to the infant's communications during the sensitive period up to 18 months old, has an important effect on confidence levels. The infant experiences less overall fear and anxiety if caregiver responsiveness is consistent and sensitive. Such parenting during this sensitive period creates a mental representation, an internal *working model* of the attachment relationship (Bowlby (1969/1982)). This is transmitted through caregiving to the next generation, although variations may occur over the lifespan (Shaver & Fraley, 2000).

Tinbergen (1951), Hinde (1963), Lorenz (1957) and Harlow (1953) researched animal imprinting and maternal deprivation which stimulated Bowlby's (1969/1982) attachment research. Many species show similarities in attachment to a Darwinian fitter individual, with infants displaying proximity restoring behaviours. These behaviours Bowlby terms as *attachment behaviours* and the reciprocated response by parents are *caregiving behaviours*. He suggests that this is a good evolutionary strategy to ensure survival by alerting the caregiver to the infants needs, protecting it from predation or other fatal conditions such as hypothermia. Even short absences from caregivers can threaten survival. Infants monitor their whereabouts to maintain proximity even in non-aversive situations. The central behaviours seen in infant attachment are aimed to restore proximity if separation occurs.

### *The Normative Theory of Attachment*

The normative theory of attachment refers to universal patterns of attachment behaviours and stages at which they occur within species. Human and *canid* infants are altricial. Immediately postpartum, altricial and precocial infants attempt to suckle,

which stimulates maternal oxytocin release facilitating reciprocal emotional bonding (Langercraatz & Slotkin, 1986).

During the first year, the human infant attachment system behaviours are motivated by internal (hunger, cold, pain) and external stimuli (absence of mother). The attachment figure's sensitivity in responding to these signals (e.g. crying) and reducing anxiety (e.g. by providing contact) is key in creating the infant's sense of security. If the attachment figure is inconsistent or unpredictable, this sense of security is absent leading to attachment insecurity and associated behaviours (Ainsworth, 1989; Bowlby, 1969/1982).

Bowlby (1969/1982) suggests that there are four stages in the development of the attachment system, with three occurring within the first 12 months of life, and the fourth at approximately 36 months. These are summarised in Appendix A.

### *Separation and Loss*

In response to separation the *protest-despair-detachment sequence* occurs (Bowlby, 1969/1982). The infant first responds with protest behaviours, such as crying, agitation, anxiety and resistance to comfort by any individual other than the attachment figure. In the despair stage active behaviours recede and are replaced by lethargy (the inability to eat, sleep), and general despair. This is an evolutionary strategy ensuring the infant avoids actions that may alert predators. If prolonged or permanent separation occurs, the infant becomes detached, acting in a highly independent manner. This functions to disengage the affective bonds for the departed caregiver, allowing affective relationships to form with new caregivers which would enable long-term survival (Bowlby, 1969/1982).

Responses to loss include angry feelings directed at oneself, the departed (possibly deceased) or other individuals, an initial denial that the loss has occurred, and an unconscious desire to regain proximity to the departed. The final stage of mourning occurs with resolution as the individual accepts the loss as permanent. They can then alter their life-role. A characteristic of unresolved loss is the lack of resolution, continuing the search process and not accepting the finality of the separation (Bowlby, 1969/1982).



### *The Individual Differences Theory of Attachment*

Ainsworth and Wittig (1969) uncovered individual differences in attachment security upon activation of the attachment system. An infant with a secure sense of attachment feels able to rely on their caregiver being consistently responsive when they need reassurance, comfort or protection. In contrast, infants who are not confident in their caregiver's responsiveness or consistency perceive this as rejection. They develop less confidence in their ability to elicit caregiving (Bowlby, 1973). As internal working models are based on an accumulation of interaction history, inconsistent or unresponsive caregiving informs insecure models (Ainsworth et al. 1978).

### *The Caregiving System*

The caregiver's role is to provide security and protection (George & Solomon, 1999a). Caregiving is activated by the infant's behaviour and by the parent sensing fear or danger. Behaviours associated with caregiving system activation are calling out to, retrieving/or holding the child. Caregivings become deactivated when proximity is re-established through physical, verbal or signalling contact (George & Solomon, 1999a).

The caregiver's behaviour is based on both internal and external evaluations, both conscious and unconscious (George & Solomon, 1999a) and selecting the most appropriate response (Ainsworth et al. 1978). However, caregiving is not entirely innate. Bowlby (1998) suggests that emotions associated with caregiving are innate but the behaviours are a product of an individual's personal beliefs and experiences of their own parents as caregivers.

Parental sensitivity is the link between working models and infant attachment (Main & Hesse, 1990). Ainsworth et al. (1978), described sensitivity as caregiver attentiveness to the child's signals. A failure to respond could be indicative of preoccupation with her/his own needs. They must respond in an appropriate and timely fashion to not cause the child undue stress and interpret the child's signals correctly (i.e. hunger versus fear), whilst exercising care not to distort or overreact.

Caregiving behaviour and sensitivity will be influenced by individual attitudes. Some may consider that caregiving should foster individuality and are thus more distant. Others may believe in more vigilance and close care. Both these patterns are associated with ambivalence and avoidant attachment security in children, whereas a

more flexible caregiving approach is associated with attachment security (George & Solomon, 1999a).

### *Working models of attachment*

*Working models* are representations of the external environment (social relationships) and the self based on expectations of others, memories and personal goals (Bowlby, 1969/1982). Infant/parent interaction quality such as caregiver sensitivity, determines the mental representations of relationships (Bretherton & Munholland, 1999) and affects the subsequent expression of attachment behaviours.

Adult caregiving behaviours are believed to be inter-generationally transmitted or communicated through working models (Bowlby, 1998; George & Solomon, 1996; George & Solomon, 1999b; Solomon & George, 1996) developed during the infant's first year (Bowlby, 1969/1982). Bowlby (1973) suggested that the family micro-culture represented through day to day interactions is to a large extent responsible for the inheritance of mental health. For example, parents who themselves experienced responsive and accepting attachment relationships were better able to respond to their own children with the same responsiveness and acceptance. Not only would their children feel loved, supported and competent but they would construct functional working models of the caregiver which would then be communicated to the next generation through the family micro-culture. In contrast, parents who were less sensitive or responsive communicate that the child is less worthy of responding to. In this case, the child would construct dysfunctional working models of caregivers and a negative pattern of relating would characterise their working models of attachment relationships. These positive or negative patterns of relating are therefore inherited by subsequent generations (Main & Goldwyn, 1984).

Much family development research (Simpson & Rholes, 1998) has investigated the transmission or communication of individuals' working models of attachment using the Adult Attachment Interview and their child's attachment style using the Strange Situation Test (AAI; Main & Goldwyn, 1984; SST; Ainsworth et al. 1978).

## The Strange Situation Test (SST) (Ainsworth et al 1978)

### *Development*

Ainsworth and Wittig (1973) developed the laboratory Strange Situation procedure to test an infant's attachment indicative of the protest/despair/detachment pattern (Bowlby (1969/1982)). The moderate stressor of a novel environment, the departure and return of the mother, and the arrival of an unknown individual activated the attachment system. It highlighted individual differences in infants' responses to separation and stress and in attachment behaviours such as proximity seeking. The eight episode procedure measured two maternal departures and reunions, two episodes in which the infant was alone, and two episodes with a stranger. The infant's ( $n = 23$ ) reactions were filmed and separation and reunion behaviours analysed.

The infant's responses to the mother's departure were classified as *secure* ( $n = 12$ ), *avoidant* ( $n = 6$ ) or *ambivalent/resistant* ( $n = 4$ )<sup>1</sup>. *Secure* infants cried when the mother departed, but once reunited, were comforted and returned to play. *Avoidant* infants did not seek out the mother upon her return, but controlled their negative emotions independently by ignoring her and if held, stiffened in her arms.

*Ambivalent/resistant* infants appeared anxious from the onset, in other words the attachment system was activated before the experiment began. These infants exhibited anger or fear and could not be comforted by the mother upon reunion. They displayed low levels of play and exploration.

Main (1995) proposed that the SST categories of Secure, Ambivalent/resistant and Avoidant be labelled *organised*. Behaviour and attention is flexible in Secure infants, who alter their focus as the situation changes and operate a consistent strategy for maintaining proximity to the caregiver. Ambivalent/resistant infants focus entirely on the parent and do not play or explore. Avoidant infants shift attention away from the source of distress (the parent) focussing on play and exploration. These two categories offer an organised, albeit maladaptive strategy in dealing with stress. These are also termed *Insecure Attachments*.

A fourth category of *Disorganised* evolves when a conflict in behaviour motivation occurs as a result of the infant being markedly frightened by its primary safe haven or attachment figure (Main & Hess, 1999). For example, infants innately search out the caregiver when unsure or fearful. However, if the caregiver is the source of the

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<sup>1</sup> One participant was not rated

fear, the infant will initiate approach behaviour and then hesitate or flee. The infant's behaviours appear contradictory. Behaviours associated with disorganisation are sudden freezing in mid-movement, gazing around the room, repetitive behaviours such as rocking, and generally appearing confused. They may lean away when being held by the parent, or suddenly claw or strike his/her face, show direct indices of fear such as placing their hands over their mouths in a fearful expression when the parent enters the room (Hesse & Main, 2006).

#### *Parental attachment and infant behaviour in the Strange Situation Test*

Individual differences in SST behaviours are therefore linked to parental behaviour. Londerville and Main (1981) observed 35 children aged 21 months in a laboratory play session. Previously at 12 months they had been categorised in the SST, where 22 infants were rated Secure, 10 Avoidant and 3 Ambivalent. In the 30-minute play session, mothers were told to respond to the child as necessary but not to initiate interaction or direct play. Maternal behaviour was scored on the number of verbal commands, the amount and degree of force used in physical interventions and tone of voice. Child behaviour was scored on compliance with mothers' commands, cooperation and evidence of internalised control.

No differences were found between Secure and Insecure children in the number of commands or physical interventions. However, Secure children were more compliant and cooperative and their mothers were more soft-spoken and gentle when making comments or physically intervening. Children who were Avoidant or Ambivalent showed more active disobedience and less internalised control. Their mothers scored significantly lower on interaction quality (Londerville & Main, 1981).

Further studies have also found that caregivers of securely attached children are more sensitive to their infant's signals, providing appropriate responses in a warm, involved fashion (Pederson, Gleason, Moran, & Bento, 1998; Slade, Belsky, Aber, & Phelps, 1999) and interacting more frequently (Isabella & Belsky, 1990). Caregivers of Ambivalent children are inconsistent (Belsky, Rovine & Taylor, 1984) and those of Avoidant children rejecting (Ainsworth et al. 1978), unresponsive (Crockenberg, 1981) overly involved (Belsky et al. 1984) and are not tactile (Ainsworth et al. 1978).

### *Linking Infant Attachment Security with Parental Working Models*

Using qualitative methodologies, Main Kaplan and Cassidy (1985) found that infant SST behaviour differences at one year predicted corresponding scores from the pictures of their families drawn by these same children at 6 years old.

In addition, Strage and Main (1985) developed a coding system for child discourse. How children of 6 years old discussed their parents reflected their SST behaviour at 1 year. Thus, not only were there individual differences in behaviour, but also individual differences in *representations* of parent/child interactions.

### *Assessing Adult Attachment Style: the Adult Attachment Interview (AAI)*

In semi-structured interviews Main & Goldwyn (1984) asked adults to describe their early childhood experiences of separation, rejection, and loss in relation to primary attachment figures. Patterns in the adults responses were related to observed patterns of their children during the SST. It was not necessarily the events in a person's childhood that related to their child's SST behaviours, but rather representations of their childhood relationships that had the most relation to infant SST style (Main & Goldwyn, 1984).

This protocol became the Adult Attachment Interview (AAI), which contains 20 questions and taps into working models of attachment relationships through an analysis of patterns and coherency of speech. Interviewees are asked about early childhood memories with each parent, separations from parents, early salient experiences (including loss, trauma and abuse), reasons why they feel their parents acted as they did, and the nature of their current relationship with parents (Appendix B).

Unlike other qualitative methodologies, the AAI does not look for exact meaning in the text, but for evidence of current mental states through transcript coherency based on Grice's (1975) four maxims of *quality*, *quantity*, *relation* and *manner* in conversation. The AAI classifies individuals into three attachment styles. *Secure-autonomous* adults are able to explain patterns and distressing events in their childhood in a clear and communicative manner and have children rated Secure in the SST. *Dismissing* adults can not explain events coherently, idealise relationships or describe events in a detached manner (George, Kaplan & Main, 1985) and have Avoidant children. *Preoccupied* adults seem emotionally overwhelmed by the events of their childhood and their children are Resistant/ambivalent.

These AAI styles can be categorised as resolved and unresolved. Individuals who have experienced early loss, trauma or abuse may be able to discuss these events in

a measured and coherent fashion, indicating resolution of the issues surrounding these events. Individuals who are *Unresolved* show lapses in monitoring when discussing prior trauma or loss, for example, referring in the present tense to the deceased, confusions between the deceased and self, long gaps of silence in transcripts, or an inability to complete thoughts (Goldwyn et al. 1984). This may occur in spite of the rest of the transcript appearing coherent. Therefore those Unresolved in respect of specific trauma or loss will be either Secure, Dismissive or Preoccupied in the rest of their transcript.

Appendix C provides descriptions of each AAI category and corresponding SST category.

#### *Frightening parental behaviour and child disorganisation.*

Main and Hesse (1990) suggested that unresolved parents perform frightening behaviours (FR) in the presence of their infants that are unconsciously associated with their own earlier traumatic experiences. They intermittently display varying degrees of threatening behaviours uncharacteristic of their routine caregiving (Table 1.2).

Therefore a caregiver could still be sensitive and responsive, yet engage in occasional frightening behaviours. Humans and primates are biologically predisposed when frightened to seek proximity to another individual and thus, the attachment system activates when an infant is faced with threat or danger (Bowlby, 1969/82). If the parent then exhibits frightening behaviour, the normal functioning of the attachment system becomes disorganised as described above. The infant is placed in a conflict scenario unable to resolve the paradox of the parent being both the source of fear and haven of safety, a situation of *fright without solution* (Hesse & Main, 2006).

Several studies report this association between parental unresolved trauma/loss and subsequent child disorganisation (see Lyons-Ruth & Jacobvitz, 1999; Madigan et al. 2006), although some have failed to find this link (Dickstein et al. 2009). George and Solomon (1999a) found that Disorganised children had mothers who had abdicated caregiving to another due to unresolved issues, suggesting the disabling of the caregiving system.

Jacovitz, Leon and Hazen (2006) also found effects of unresolved status on maternal caregiving. The study began with pregnant women in their third trimester and ended when the children were 2 years old. During a prenatal session the mothers were administered the AAI and scored as being resolved or unresolved and for Secure or

Insecure attachment. Maternal frightening behaviour was video recorded in the home environment when the child was 8 months during caregiving situations of changing nappies, feeding and playing. Frightening behaviour was rated on a 9-point scale developed by Main and Hesse (1995) (See Table 4.1, Chapter 4). Mothers classified as Unresolved in the AAI were more likely to engage in frightening behaviour with their infants at 8 months old. A negative correlation with the frequency and strength of frightening behaviours was found for resolved mothers and some unresolved mothers who scored high for coherence of mind, indicating a Secure/Autonomous profile.

Hesse (1999) also found that some interview texts could not be classified in any of the four categories because of largely inconsistent and contradictory transcripts. These were coded *Cannot Classify*. Hesse & Main (1999) found that both Unresolved and Cannot Classify parents in the AAI were associated with Disorganised infants in the SST.

In summary, many parents who exhibit frightening behaviour are suffering Unresolved loss, trauma or abuse. For them this becomes a first generation effect, but the impact of their disorganised caregiving strategy results in a second generation effect in the child.

#### *Population Distribution of AAI classifications*

In a meta-analysis of clinical and non clinical AAI studies representing 10,500 AAI interviews over the last 25 years, van IJzendoorn and Bakermans-Kranenburg (2009) found a slight over-representation of fathers in Dismissing classifications, and under-representation in the Preoccupied category. Similarly, adolescents were underrepresented in Ud/CC and E categories but over-represented in Ds. They also found that family violence correlated with Preoccupied attachments, primarily as a result of unresolved, trauma, loss or abuse. This contrasts with violence outside the family, which was associated with Dismissing (and Unresolved) strategies (Table 1.1)

Table 1.1

*Summary of van IJzendoorn and Bakermans-Kranenburg (2009) meta-analysis of AAI studies with a breakdown of AAI categories for non-clinical mothers, non-clinical fathers, non-clinical adolescents, and an at-risk sample.*

	Secure/ Autonomous (F)	Preoccupied (E)	Dismissing (Ds)	Unresolved (Ud) or Cannot Classify (CC)
non-clinical mothers (n = 748)	58%	19%	23%	
with Ud/CC (n = 700)	56%	9%	16%	18%
non-clinical fathers (n = 439)	58%	15%	28%	
with Ud/CC (n = 374)	50%	11%	24%	15%
non-clinical adolescents (n = 617)	52%	13%	35%	
with Ud/CC (n = 503)	44%	11%	34%	11%
at risk sample (both genders) <sup>1</sup> (n = 1433)	41%	17%	42%	
with Ud/CC (n = 1368)	30%	7%	32%	32%
Violence within family (both genders) (n = 139) <sup>2</sup>	14%	53%	32%	
with Ud/CC	19%	25%	19%	38%
Violence outside family (n = 195)	11%	35%	54%	
with Ud/CC (n = 190)	14%	14%	36%	36%

#### *Reliability of SST/AAI Agreements*

Main & Goldwyn (1984) found a relationship between parental AAI and infant SST classifications. In the initial study, which included 32 mothers and 35 fathers, 48% were Secure, 39% Dismissing and 13% Preoccupied. There was a 75% agreement between secure and insecure scores and 46% of SST sub-classifications matching the adult sub-classifications (see Appendix C) (17% would be expected by chance). In a more recent study of 39 Japanese mothers Behrens, Hesse and Main (2007) found a 49% match of maternal sub-classifications.

There are disagreements regarding SST/AAI predictive reliability (Rosen & Rothbaum, 1993), with some finding associations (Cowan, Pape & Mehta, 2009; Dickstein, Seifer & Albus, 2009; van IJzendoorn, 1992; van IJzendoorn & Bakermans-Kranenburg, 2008), mixed associations (Belsky et al. 1984; Londerville & Main, 1981; Dickstein et al. 2009) or no association (Frodi, Bridges, & Grolnick, 1985; Goldberg, Perrota, Minde, & Corter, 1986; Rosen & Rothbaum, 1993).

High risk samples represent the greatest reliability discrepancy. Zimmermann, Fremmer-Bombik, Spangler and Grossman (1997) failed to find a relationship between AAI scores for at risk German mid-adolescents and their SST classification in infancy.

<sup>1</sup> ages not specified

<sup>2</sup> ages not specified



Weinfield, Sroufe, Egeland and Carlson (1999) in a longitudinal study of 57 high-risk young adults, found discontinuity over the course of the study, suggesting the fluidity of representation models in situations of high conflict or distress. Current AAI research is investigating the continuity of representations over the life span, and differences between those rated continuously secure and coherent and those rated *earned-secure* (secure, despite negative life events). Roisman, Padron, Sroufe and Egeland, (2002) have found that “earned secures” have initially insecure working models, which change enabling them to form successful close relationships.

### *The AAI and Adoption Studies*

Relationships found in adopted toddler SST and parent AAI classification studies suggest no difference between biologically related and adopted dyads. Dozier, Stovall, Albus & Bates (2001) found a 72% match between parent/child Secure and Insecure styles across in 7854 dyads, which does not differ from the 75% match in biologically related dyads (IJzendoorn, 1995) . Dozier et al (2001) assessed neglected or abused infants prior to adoption at 12 and again at 24 months in the SST and foster mothers through the AAI. They found that children placed with Secure foster mothers were Secure in the SST. Furthermore, only 21% showed evidence of disorganised attachment, compared with 62.6% of children placed with Dismissive or Preoccupied (non-autonomous) caregivers. Although they quickly adapted to new environments using the new caregiver as a secure base, Dozier et al. found that some toddlers “miscued” their caregivers by appearing not to need nurturing when they actually needed them. Secure caregivers were sensitive to this need despite the negative signals and provided care nonetheless. This type of caregiving predicted attachment security in fostered toddlers.

Steele, Hodges, Kaniuk, Steele, Hillman et al. (2008) investigated attachment relationships in maltreated school age children ( $n = 58$ ) who underwent late adoption (between 4 and 8 years of age). All had suffered serious trauma, neglect, physical or sexual abuse. Forty adoptive mothers and 34 adoptive fathers took the AAI. Their toddlers’ attachment security was assessed using attachment narratives involving human doll and animal figures (Hodges, Steele, Hillman & Henderson, 2003). They found that the presence of one or both parents as Secure was more likely to relate to Secure toddler narratives within three months of the child’s placement in the new home. When neither parent was Secure in the AAI, 86% of children scored high in disorganisation, results

that were replicated at follow-up two years later. The results suggest that adoptive parental security predicts secure attachment representations in adopted high risk children after just three months in Secure adoptive families. Secure parents were more attuned to their child's emotions, providing secure base effects in exploration and play, and also being attuned to signs of distress without becoming overwhelmed or derogating by the child's negative emotional displays (Steele et al. 2008).

Caspers, Yucuis, Troutman, Arndt and Langbehn (2007) in a study of 126 adopted sibling pairs (age mean = 39) investigated the concordance in attachment between non-related siblings raised in the same family and found significant correlations. They also investigated the genetic pre-disposition towards alcohol and antisocial behaviours from biological parent data. They found no association between biological parental behaviour and attachment profile of the adoptee in adulthood. Their findings point to an influence of environment on representation model development in non-related siblings. In a similar finding, Sagi et al (1995) reported that 70% of unrelated children sharing the same caregiver in Israeli kibbutzim shared the identical attachment profile, suggesting the role of the environment in shaping attachment outcomes.

### *The Role of Nature versus Nurture*

Molecular genetics can explain the link between environmental factors responsible for child attachment security (see Rutter, Moffitt & Caspi, 2006 for a review). Neurotransmitter activity involving both dopamine and serotonin receptor alleles interact with environmental influences. Bakermans-Kranenburg and van IJzendoorn (2007) found a relationship between the dopamine D4 receptor (DRD4) 7-repeat allele and disorganised attachment. Individuals with this allele have lower dopamine reuptake, which results in deficits in the attentional, motivational and reward systems (Robbins & Everitt, 1999). In children this is manifested in attention deficits (Madigan et al. 2006).

Bakermans-Kranenburg and Van IJzendoorn (2007) tested four groups of children: those with long strands of the 7-repeat allele and Secure mothers, long strands of 7-repeat allele and Unresolved mothers, short strands of 7-repeat allele and Secure mothers, and finally short strands of 7-repeat allele and Unresolved mothers. They found that children with long DRD4 7-repeat allele variant had significantly higher levels of disorganised attachment if their mothers were Unresolved, versus those

children with long strands and Secure mothers. They also found that children with short DRD4 7-repeat allele and Secure *or* Disorganised mothers showed significantly more disorganisation than children with the long DRD4 and Secure mothers. Therefore, the long strand DRD4 allele while being highly sensitive to context does not automatically predict negative outcomes. When conditions are optimal (“Secure” mothers) they develop significantly fewer disorganised behaviours than those without a genetic sensitivity to context (with the short DRD4 7-repeat allele) (Bakermans-Kranenburg & Van Ijzendoorn, 2007).

Studies analysing the 5-HTTLPR serotonin transporter gene found similar results. The neurotransmitter serotonin is responsible for regulation of mood and emotion. The 5-HTTLPR polymorphism is a serotonin transporter which has a short(s) and a long allele (l). The short version has been associated with reduced serotonin reuptake (Barry, Kochanska, & Philibert, 2008) and heightened anxiety (Lesch et al. 1996). Barry et al. (2008) hypothesised that infants with short alleles would only develop secure attachment styles if the environment was characterised by optimal maternal care. Eighty-eight mother/child dyads were analysed to determine a relationship between child SST classifications and maternal responsiveness to child signals of distress, demands for attention, play, and general interaction requests. The mother’s empathy, the ability to comfort and enthusiasm for interaction at both 7 months and 14 months was scored, adapted from Ainsworth et al. (1978). They found that infants with a short allele and mothers who were responsive were more likely to be rated Secure, while short allele infants whose mothers were inconsistent were Insecure. Mother’s responsiveness was not associated with attachment style in infants with the longer allele, which is responsible for less sensitivity to context. Therefore, there is a genetic risk for insecure attachment development for those with a short version of the serotonin transporter gene when maternal care is poor (Barry et al. 2008).

Primate infants raised in highly nurturing environments are also better equipped to deal with fear, novelty or uncertainty. Suomi (1997) bred a captive colony of Rhesus female monkeys based on their genetic profile of high or normal reactivity. The infants were taken from their natural mothers within four days of birth and cross-fostered with one of two types of unrelated females: normal caregivers (the control) or high nurturing caregivers (the experimental group). Suomi (1997) found that normal reactivity monkeys’ behaviour did not differ between the extreme and normal nurturing mothers. The environment had no impact on the behaviour of monkeys with a genetic

predisposition towards normal levels of reactivity. However, highly reactive monkeys raised by control mothers exhibited high fear, anxiety and reactivity to minor stimuli. When highly reactive monkeys were fostered with highly nurturing mothers they explored more, displayed higher levels of curiosity and fewer behavioural disturbances suggesting that the highly nurturing environment tempered their reactivity. In follow-up, he found that highly reactive/highly nurtured monkeys became adept at social relationships, were often able to convince others to work for them, and as a result rose to the highest positions within the social unit. In contrast, highly reactive monkeys raised by control mothers showed no such effects and suffered behaviourally and emotionally from the effects of early maternal separation. These monkeys were then bred. When they became mothers they adopted the behaviour of their foster mother. Therefore, the benefits of extreme nurturing can be transmitted to the next generation even though they are not genetic in nature. Highly reactive monkeys have a more sensitive disposition, which makes them more sensitive to early rearing effects. Therefore there is evidence from primate studies that genetic behaviour differences can be modified by early environment (Suomie, 1997).

In rats the quality of maternal care is characterised by licking which activates genes that promote synaptic connection development. Caldji et al. (1998) hypothesised that a low density of synaptic connections would be found in the offspring of low nurturing rats. Two environments were manipulated: an optimum rearing environment which promoted maternal licking of offspring in rats; and a poor environment which produced low licking maternal behaviour. They found that the quality of the environment affected the quality of maternal care given to offspring (maternal licking). Rat mothers with low frequency licking, had infants with a low level density of synaptic connections and a higher density of fear neuro-connections. They suggested that the poor environment (decline in maternal care) caused stress which resulted in neurological change. In a good environment mothers were highly nurturing; in a poor environment they were low nurturing. The effects of low nurturing were then passed on to their offspring (Caldji et al. 1998).

The human equivalent to low licking and grooming occurs in families in which physical abuse and neglect are prominent. Nemeroff (2004) found that repeated stress in early life, such as trauma or physical abuse, resulted in changes in neurobiological systems, which increases victims' sensitivity to context. These children were at greater

risk of developing psychopathologies later in life. When they become parents, they were compromised in their ability to provide maternal care for their children.

These studies suggest that sensitive, consistent and responsive caregiving creates an internal buffer that protects individuals reared in poor environmental conditions, as well as those with a genetic predisposition to reactivity, that would otherwise put them at risk for poor developmental outcomes.

### *Exploratory Behaviour and Attachment*

Caregiver sensitivity is related to an infant's confidence in exploration. The infant perceives stability in the infant/parent bond and develops a "sense of competence" (Ainsworth, 1985, p. 782) which encourages exploratory behaviours. Interest and enthusiasm in exploration is therefore reflective of attachment security in infants (Grossman, Grossmann & Zimmerman, 1999).

Exploratory behaviour in Insecure infants is restricted in opposing ways although both are characterised by anxiety. Avoidant infants focus exclusively on the environment or toys as a means of disengaging the attachment system and defensively avoiding the anxiety source (the parent). Ambivalent/resistance infants are preoccupied with the attachment figure and as a result display few exploratory behaviours (Grossman et al 1999).

In spite of several studies showing a link between maternal sensitivity during infant play and infant attachment security (Beckwith, Cohen & Hamilton, 1999; Egeland & Farber, 1984), the SST does not code caregiver support in exploration.

In a study investigating parental behaviour, infant attachment style and confidence in problem solving, Matas, Arend and Sroufe (1978) first assessed attachment security of toddlers in the SST at 18 months. At 24 months the same children's play and exploratory behaviours were analysed along with a behavioural analysis of the mothers' support and provision of assistance. If play was interrupted (e.g. the child lost concentration) this was scored as the end of one play bout. The length of play bouts and interrupted play were recorded in seconds. Instances in which the mother attempted to control the child were counted. If the child displayed opposite behaviour to the desires of the mother, such as leaving the task, physical struggles with mother, tantrums, crying or whining, they were also scored per instance. Their results found that Secure toddlers exhibited more persistence, focus, competence and success in

problem solving. Their caregivers were more supportive, less invasive, were focussed on their activities and encouraged exploration. Caregivers of Insecure children were more invasive and less encouraging.

Grossman et al. (1999) found that caregivers of 18 month old Secure toddlers interfered less often with play when their children appeared content. When the children appeared discontent they helped them continue play which enabled exploration preventing activation of the child's attachment system. They pre-empted an escalation in distress behaviours by being alert to their children's emotional states. In contrast, caregivers of Avoidant toddlers became over-involved in their child's play and interfered with the pattern of play. These children became distressed and instead of addressing the distress, the caregiver withdrew and waited for the child to overcome their distress (Grossman et al. 1999). Cassidy and Berlin (1994) found that mothers of Ambivalent/resistant infants were inconsistent when faced with infant distress and interfered rather than assisted their child's exploration efforts in favour of their own needs (Cassidy & Berlin, 1994). Therefore toddler attachment security can be revealed through exploratory behaviours and task performance.

#### *Attachment in Adult Romantic Relationships*

Researchers have found patterns between adult romantic relationship style and their working models of early attachment relationships. Cowan, Cohn, Cowan and Pearson (1996) found that insecure working models of early attachment relationships predicted not only child behaviour problems, but interaction styles between parents, providing the important link between parents' attachment models, parental functioning and child attachment security. Hazen and Shaver (1987) also found evidence that attachment in early childhood influences romantic attachment relationships. Adults who had rated their early relationships with parents as secure (loving, affectionate and caring) were more likely secure in romantic relationships. Insecure individuals reported negative experiences of early relationships with parents and thus experienced shorter duration of and more self-doubt in romantic relationships (Feeney, 1999; Grau, 2002; Hazan & Shaver, 1987).

Romantic attachments proceed through similar stages of development as infant attachment: pre-attachment, attachment in the making, clear-cut attachment and goal-orientated partnerships (Hazen & Zeifman, 1999). In addition, the distress response found in infants is replicated in romantic attachments with a similar protest-despair-

detachment sequence of behaviours, particularly in bereavement (Hazen & Shaver, 1992; Hofer, 1996; Parkes & Weiss, 1983). It is suggested that adult attachment relationships require at least 2 years to develop the strength of bond which elicits this response at separation (Hazen & Zeifman, 1999; Weiss, 1988)

#### *Attachment styles in adulthood*

Adult attachment styles are related to an individual's beliefs about themselves and whether they are worthy of care and affection (positive), or unworthy of care and affection (negative) (Feeney, 1999; Grau, 2002). Romantic attachment characteristics mirror those of the parent/infant. Hazen and Shaver (1987) found that adults feel secure and safe when their partners were sensitive, accessible and responsive (providing a secure base). Individual differences also occur in romantic relationships. Using Ainsworth et al.'s (1978) categories as a framework for developing an adult model of attachment, Hazen and Shaver (1987) found three attachment types in romantic relationships: *secure* ("I find it easy to get close to others and am comfortable depending on them and having them depend on me"; *anxious* (I find others reluctant to get as close as I would like and worry that my partner doesn't really love me); and *avoidant* (I am uncomfortable being close to others and find it difficult to trust them completely) (Hazen & Shaver, 1987, p. 515).

Bartholomew and Horowitz (1991) developed a four category/two dimension model from two methodologies. First, they conducted 60 minute interviews in which participants described feelings about and the importance of romantic relationships. Interviews were rated as: *secure* (valuing friendships and close relationships); *dismissing* (deemphasising the importance of relationships, emphasising independence); *preoccupied* (relationship anxiety and over-involvement) and *fearful* (relationship avoidance due to distrust of others or fear of rejection) (Bartholomew & Horowitz, 1991). They developed this model further by dividing avoidance into fearful and dismissing avoidance. These four styles of attachment were placed within either a positive or negative working model of self and others (Figure 1).

		Models of Self (Anxiety/Dependence)	
		Positive (Low)	Negative (High)
Model of Other (Avoidance)	Positive (Low)	<b>Secure:</b> comfortable with intimacy and autonomy	<b>Preoccupied/Ambivalent</b> Overly anxious/dependent
	Negative (High)	<b>Dismissing</b> Denial of attachment	<b>Fearful</b> Socially avoidant/fearful of attachment

*Figure 1.1* Model of four adult attachment styles (secure, preoccupied, dismissing and fearful) derived from two dimensions of avoidant (model of other) and anxious/dependent (model of self) (Bartholomew & Horowitz, 1991).

Figure 1.1 shows that Bartholomew and Horowitz's (1991) four adult attachment styles are: *secure* (low anxiety and avoidance); *preoccupied* (high in anxiety and low in avoidance); *fearful* (high in both anxiety and avoidance) and *dismissing* (low in anxiety, high in avoidance) (Bartholomew & Horowitz, 1991). An Anxious individual is worried about rejection due to low perceived self-worth which results in hyper-vigilance towards the attachment figure. Avoidant attachment refers to independence in relationships and issues surrounding intimacy. Both styles stem from inconsistent or rejecting caregiving with Anxious individuals harbouring anger and Avoidant rejection of attachment figures.

Brennan, Clark and Shaver (1998) reviewed 320 items from 60 self report attachment scales and also defined attachment styles in terms of the anxious and avoidant dimensions. The resulting self-report measure (Experience in Close Relationships Scale (ECR); Brennan et al. 1998) has been used subsequently by many researchers as predicative of attachment style. The ECR scale was found to correlate to AAI attachment styles, particularly in relation to dismissing adult attachments (Crowell & Owens, 1998; George & West, 2001).

### *Caregiving in Adult Relationships*

There are three processes involved in adult caregiving. The attachment system in adults, as in children, becomes activated when adults are in distress, which was found to be the case after the 9/11 terrorist attacks (Feeney & Kirkpatrick, 1996; Feeney & Collins, 2004). The second component is exploration, which can only occur when the attachment system is not activated. In adults, this refers to the ability to have friends (Hazan & Shaver, 1990) or enjoy leisure activities independent from partners (Carnelley



& Ruscher, 2000). The third component is caregiving, which is the provision of a supportive secure base and safe haven in stressful times which reduces anxiety and ameliorates problem solving (Feeney & Collins, 2004).

In an investigation of the relationship between attachment styles, careseeking and caregiving, Simpson, Rholes and Nelligan (1992) found that Secure women were able to successfully attain both emotional and physical support from partners in times of stress, whereas Avoidant women did not communicate their needs to their partners. They withdrew and remained stressed (Feeney & Collins, 2004; Simpson et al. 1992). Interestingly, they found no relationship between Anxious attachment style and careseeking. The authors explain that this may be because, although Anxious individuals desire emotionally close relationships, they are ambivalent and not emotionally involved in the relationship, at times seeking support or alternatively withdrawing (Feeney & Collins, 2004; Simpson et al. 1992).

Kunce and Shaver (1994) inter-correlated ECR styles with caregiving in adult relationships (Table 1.2). They define caregiving as the ability to respond flexibly to other's needs, to empathise, to orientate oneself towards others, recognising their needs. In caregiving, an individual must be motivated to provide care (Kunce & Shaver, 1994).

Table 1.2

*Caregiving constructs in adult romantic relationship, relationship with infant attachment definitions and related items on adult caregiving self-report scale (Kunce & Shaver, 1994)*

Construct	Definition in Infant Attachment literature	Adult caregiving items
Sensitivity/Insensitivity	Child being ignored by mother Abrupt handling	"I'm not very good at tuning in to my partner's needs"
Acceptance/Rejection	Mother displays affection to infant during holding mother rejects child when child crying	"I sometimes push my partner away when s/he reaches out for me."
Cooperative/Uncooperative	Controlling and coercive Interfering	"I can help my partner work out his/her problems without taking control"
Accessible/Inaccessible	Less physical contact Adhering to routine caregiving	"I always make sure I am there for my partner"
Physical contact	Careful handling of child aversion to contact respond to distress by holding child	"When my partner seems to want or need a hug, I am glad to provide it."
Affective Expression	Silence/detached behaviour anger displayed positive emotional support	"I am less emotionally aware of my partner's distress than I should be."
Compulsive caregiving	Parent assuming child role intrusion and demands on child	"I create problems by taking on my partner's troubles as if they were my own"

Kunce and Shaver's (1994) 60-item self report scale was developed from interviews with couples regarding actual caregiving experiences based on their sensitivity and responsiveness to their partners' needs and cues for support and reassurance. They found that adults rated Secure in the ECR were more responsive and empathetic and low on impulsivity or compulsive caregiving. Preoccupied caregivers were low on sensitivity and responsiveness and high on providing physical proximity. Those with Ambivalent or Dismissive ECR styles were low on sensitivity and providing proximity, and highly compulsive caregiving (Kunce & Shaver, 1994) (Table 1.2).

### *The Convergence of Adult Attachment Measures*

Although some studies have pointed to convergence between AAI measures and self report measures of adult romantic relationships (Bartholomew et al., 1991; Griffin & Bartholomew, 1994; Shaver, Belsky, & Brennan, 2000), others have not (Crowell, Treboux, Geo, Fyffe, Pan & Waters, et al. 2002; Hazan et al., 1987; Shaver & Mikulincer, 2004; Simpson, Rholes, Orina, & Grich, 2002). There are two differences between self reports and the AAI. Firstly, self reports record conscious beliefs about relationships and the AAI uncovers unconscious defensive processes related to the coherency of discourse (George, 2009). Secondly, whereas self-reports of romantic attachment are in the social personality domain, the AAI is in the developmental domain.

The accuracy of the AAI in predicting representation models over self report methodologies is refuted by Shaver and Mikulincer (2004). Self-reports have been shown across a range of studies to be valid measures of attachment style (Shaver & Mikulincer, 2004). Mikulincer, Gillath and Shaver (2002) argue that self-reports can also uncover unconscious processes but as of yet, although there is evidence that concurrence between methodologies exists, it may not be as linear a transmission of working models as the current literature proposes. For example a third methodology, involving behavioural analyses of interactions may be the component that provides evidence of a link between caregiver working models, caregiving behaviours and infant attachment security.

Dickstein et al. (2009) found a correlation between adult attachment styles, couple attachment representations, and infant attachment security at 14 months. Using the AAI to measure adult attachment, the Marital Attachment Interview (Dickstein,

Seifer, St. Andre & Schiller, 2001) to measure romantic attachment and the SST, they did not find a significant relationship between adult and marital attachment representations and SST infant security at 1 year. However, in a home video assessment of family functioning with the child at 14 months, significant associations between measures were found, suggesting that the family functioning system was a better predictor of infant attachment security than the SST. Nonetheless, a significant relationship between parental marital attachment, maternal AAI classifications and child security was found. Therefore the parents' relationship style contributes towards the child's attachment security, findings also replicated in high risk samples by Cowan et al. (2009).

An investigation of the link between dog owner working models and dog attachment style should therefore contain not only self reports to uncover strategies of relating in romantic relationships, and interview methodologies to uncover unconscious mental processes, but behavioural interaction assessments to measure the dog/owner bond.

#### *Summary of theoretical concepts*

The provision of a secure base during infancy is crucial in developing both secure attachment internal working models and a positive model of self. With a parental safe haven nearby, Secure infants develop confidence in exploration, knowing parents are consistently available. Those without attachment security develop working models of insensitive and unresponsive caregiving, which has poorer developmental outcomes, including an increase in behaviour problems and psychopathologies. In addition, they risk the intergenerational transmission of attachment insecurity to future offspring through their caregiving style.

Environmental factors could account for 50% of child attachment security, with genetic factors influencing the rest. There is evidence that a genetic predisposition to sensitivity to context heightens anxiety and fear, but this has been shown to be moderated by environmental factors, with optimal nurturing having the greatest impact on attachment security. The impact of optimum nurturing is evident in non-related adoptive studies, in which attachment models of previously traumatised children reflect those of their adoptive parents, rather than biological parents, providing evidence of the importance of the environment (for high versus low nurturing caregivers) in the

intergenerational transmission of attachment models in both related and non-related parent/infant dyads.

In romantic relationships, insecure working models are associated with dismissing or fearful adult attachments, and are characterised by the lack of a safe haven and secure base, low sensitivity and low responsiveness to romantic partners. This affects the stability and therefore the long term viability of the relationship. There is a link between an individual's working model of parental attachment and attachment/caregiving styles in adult relationships.

The unique social and familial role of the domestic dog places it in a position to be influenced by primary caregiver attachment working models and behaviour. In addition, dogs have been found to exhibit attachment behaviours similar to pre-communicative children in studies cited in Chapter 2. Although some dog breeds may genetically be predisposed to higher reactivity and anxiety, optimal nurturing may reduce these genetic tendencies. Chapter 2 explores the owner-dog bond literature in relation to dog-to-owner attachment, as well as the social and emotional development of dogs, proposing experimental studies to explore the hypotheses that owner attachment and caregiving styles and behaviour impact dog attachment as they do in parental/child relationships.

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## Literature Review Part II: Attachment and the Domestic Dog

Chapter 1 discussed evidence of a transmission of attachment working models within families, both biological and adoptive, which affects infant attachment security. Dog attachment style may therefore be influenced by owner attachment working model and caregiving style. This chapter reviews literature on dog/owner attachment, including various methodologies, and the role of environmental/genetic effects as well as owner nurturing style on dog attachment style.

### Introduction: Defining Human/Dog Attachment

*Attachment* in this thesis, refers to the Bowlby (1969/1982) felt sense of security (secure base effect) and comfort that is obtained from the caregiver, who is generally better able to cope with the environment. Separation from this individual activates the attachment behaviour system, which is comprised of activities geared to restore proximity (Bowlby, 1973). An *attachment relationship* in the human/animal bond literature refers to a sense of satisfaction derived from the bond (Crawford, Worsham, & 2006; Hinde, 1963 Serpell, 1996; Zasloff, 1996), but owners are not attached to dogs in the same way infants are attached to parents. As it is hypothesised that the dog's attachment system activates the owner's caregiving system, the owner's attachment to the dog is not the subject of this investigation. The focus is on the dyad's attachment relationship. The aim of this thesis is to determine if and to what degree owner working models inform their sensitivity as dog caregivers, and whether that influences dog attachment security.

### *Measuring Attachment Styles in Dogs*

Measurement of dog attachment style has been investigated using an adaptation of the Strange Situation (see Appendix D)(Brown, 2002; Fallani, Previde, & Valsecchi,

2006; Fallani, Previde, & Valsecchi, 2007; Gacsi, Topal, Miklosi, Doka, & Csanyi, 2001; Naderi, Miklosi, Doka, & Csanyi, 2002; Palestrini, Previde, Spiezio, & Verga, 2005; Prato-Previde, custance, Spiezio & Sabatini, 2003; Prato-Previde, Fallani, & Valsecchi, 2006; Topal, Miklosi & Csanyi, 1997; Topal et al., 1998; Topal et al., 2005; Topal, Byrne, Miklosi, & Csanyi, 2006).

Topal et al. (1998) investigated if dogs displayed similar attachment behaviours to children and other animals such as chimpanzees (van IJzendoorn, Bard, Bakermans-Kranenburg & Ivan, 2009) using the Strange Situation Test (SST; Ainsworth et al. 1978). Over 8 episodes dogs were left alone, then alone with a stranger, and finally reunited with owners. Individual differences in attachment were found between dogs. Exploration, play and behavioural passivity duration between owner and stranger episodes provided evidence of attachment. They found that dogs displayed preference for the owner over the stranger, as evidence of secure base behaviours; they displayed distress upon separation, and a longer greeting duration for the owner.

Preference for owner over stranger may not be a reliable indicator of dog/owner bond strength. As the SST is an experimental procedure designed to create a stress reaction in dogs, it would therefore be expected that when stressed, the dog would choose to remain passive with the stranger (an unknown individual is unlikely to provide secure base effects that encourage play and exploration). Except for some reunion behaviours, dogs should feel secure base effects from their owner's presence and therefore higher play and exploration levels.

Obtaining comfort from a stranger during owner absence is due to genetic (shy/bold) qualities and human socialisation (Saetre, et al. 2006; Scott, 1962). Whilst behavioural reactivity thresholds are inherited (Scott & Fuller, 1965), early tendencies to withdraw or approach develop into behaviour patterns as dogs develop, with approach behaviours more prominent during neonatal periods and withdrawal occurring during the sensitive socialisation stage between 9-10 weeks (Lindsay, 2000). Shy/bold patterns are activated by the autonomic nervous system. Boldness is evoked by parasympathetic activity (low-level arousal) whereas shyness is a withdrawal pattern accompanied by activation of the sympathetic nervous system. In this state, arousal heightens the fight/flight response (Schneirla, 1965). While shyness and withdrawal can be modified through gradual desensitisation training, it can also be heightened, resulting in fear aggression or aversion to social contact (Lindsay, 2000). A dog who accepts the presence of a stranger may have either a genetic predisposition towards

approach (Saetre et al. 2006), or could have been successfully desensitised and/or counter-conditioned. Approach and acceptance of the stranger may therefore not be indicative of preference for an individual over another.

Topal et al. (1998) could be criticised for not grouping attachment behaviours into proximity-seeking (searching, vocalising, scenting under or scratching the door) and secure base effects (greeting owner, play and exploration) (Prato-Previde et al. 2003). These are categories employed in infant and toddler SST studies to match theoretical constructs (Bowlby, 1969/1982) of attachment. Without them, accurate appraisal of attachment relationships may be compromised.

In Topal et al. (1998), and other SST studies (Appendix D) there is a failure to address the procedure's inherent order effects. Dogs will scent and explore a new environment until the motivation to thoroughly assess it has been satisfied. This behaviour diminishes naturally upon habituation. Therefore, dogs would show less interest in a stranger or exploring over time. Without accounting for these order effects, an accurate interpretation of the dog's behaviour is hampered (Millott, 1994; Prato-Previde et al. 2003).

Palmer and Custance (2008) addressed inherent order effects by changing episode order. In the counterbalanced order, owners left their dog with the stranger, instead of remaining in the room. They hypothesised that dogs would remain calm, explore and play independently with the owner present, but not the stranger. Dogs displayed wariness with the stranger while waiting for the owner's reappearance. To control for place habituation, a partition was opened in episode 3 (dog and stranger condition) to reveal another room with new toys. Despite having access to novelty, the dog's exploration levels reduced significantly when alone and with the stranger. When the owner returned, secure base effects were seen in proximity seeking and play behaviour duration. Lower-level secure base effects were found with the stranger too (proximity seeking) revealing that well-socialised dogs were less wary of strangers than infants in the SST, although this did not extend to dog/stranger play, levels of which were low. When owners were absent, dogs orientated to the door and showed lower levels of independent play, exploration, and calm/relaxed behaviours. Exploration upon the owner's return significantly increased, which suggests that owners provided secure base effects (Palmer & Custance, 2008). Therefore, taking order effects into account in SST studies would have an effect on outcome. Unlike Topal et al. (1998), individual

differences in attachment security/insecurity between participants was not analysed in Palmer and Custance (2008).

In the current study to match Ainsworth et al.'s (1978) child definitions (see Chapter 1), it is hypothesised that *Secure* dogs would exhibit low proximity restoring (vocalisations, scratching the door, etc.) behaviours when alone. With the stranger, they would be moderately passive, but the stranger would successfully interrupt their orientation towards the door with some play, and some physical contact (e.g. petting). They would greet the owner upon reunion and settle down to play or explore.

When the owner departs, *Insecure-avoidant* dogs would display no reaction, and would continue to play and explore at moderate or high levels with the stranger. They would display low or nil owner greeting behaviours, and have little owner physical contact.

*Insecure-anxious* dogs would display high reactivity to the owner's departure, would greet them excessively upon return, and demand high levels of physical contact. They would have the slowest recovery to play and explore, both with the owner or stranger.

*Disorganised* dogs would appear to conform to one of the other three categories but in addition, would display evidence of dissociation, freezing or stereotypic behaviours in an otherwise organised behavioural display.

In many SST dog studies, differences in the dogs' early experiences were not assessed. Dogs exposed to trauma, poor socialisation to people or social referencing to novelty during the sensitive stages of development could react more strongly to owner separation (Appleby, 1993; Bradshaw, McPherson, Casey & Larter, 2002; Ley, Coleman, Holmes, & Hemsworth, 2007; Roen, 2000; Schwartz, 2003) which could confound the results. There may be differences in dog attachment security based on no known early trauma and early trauma. In addition, dogs obtained from rescue shelters, where they are exposed to unfamiliar humans could respond differently in the SST to home-reared dogs (Millott, 1994; Prato-Previde et al. 2003).

### *Attachment Development in Dogs*

Domestic dog attachment development, as in infants, proceeds through stages. The main socialisation stage occurs in puppies at approximately 5 weeks of age. This is the critical time for imprinting when puppies develop attachments to conspecifics,



humans, and places (Scott & Fuller, 1965). It is described as the sensitive period of socialisation (Bateson 1979) and lasts up until the age of 10-12 weeks.

When puppies are with their littermates they go through two important stages. In normal conditions (e.g. raised with littermates) up to 12 weeks of age they will experience homeostasis (a state of emotional regulation) in which they learn group cooperation (Dehasse, 1994). They learn to adapt their behaviour depending on the stimuli, as well as play fighting and bite inhibition (Dehasse, 1994). During this time (before adoption) they are exposed to an over-stimulating environment with several littermates (Bradshaw et al. 2002). As a result, they learn submissive signals (e.g. crawling towards an adult dog), appeasement signals (e.g. play bows or extending a paw towards a littermate) (Dehasse, 1994) and a pack hierarchy becomes established in which the strongest, largest or fastest in the litter becomes leader. This is seen more clearly at feeding time when puppies share and fight over food. Should a puppy steal food from the leader, they are bitten or threatened with nipping. In this scenario a puppy learns to inhibit its behaviour towards dominant individuals, behaviour which is generalised into play interaction (Dehasse, 1994).

According to Dehasse (1994) attachment to the mother begins at roughly 4 weeks and is restricted to parental care (Dehasse, 1994). Mixed imprinting (in which puppies become attached to other species) also occurs (Scott & Fuller, 1965). If puppies are not socialised to humans by the age of 16 weeks, they remain feral and untrainable (Scott & Fuller, 1965).

When puppies are adopted into the human home, human caregivers provide a high degree of care and attention, instead of their mothers' agonistic behaviour, intended to encourage autonomy. New owners are vigilant (Bradshaw et al. 2002), often treating a puppy like a neonate human which could encourage it to take on an assertive role (Dehasse, 1994). Predictability and expectation of high owner interaction, if not forthcoming, could lead to separation-related problems or later status-related issues with owners (displays of aggression, possessiveness over its toys, bed or food) (Appleby & Pluijmakers, 2003; Bradshaw et al. 2002).

### *Separation-related problems in dogs*

Separation-related problems are implicated in 16 per cent of cases referred for behavioural consultation, the second most prevalent behaviour problem after aggression

(APBC, 2007)<sup>1</sup>. They occur as a reaction to the departure of the owner and include destruction (ripping clothes, furnishings, doors, sofas, which bear the owner's scent), vocalisation (barking, howling or whining), urination or defecation in the home when the owner leaves, in an otherwise well house-trained dog (Lindsay, 2001). Separation symptoms indicating anxiety disorders include self-mutilation, incessant pacing or vocalising, hyperventilating, extreme salivation or destruction (APBC, 2007; Bradshaw et al., 2002).

Causation of separation-related problems in dogs has been thought to be genetically pre-disposed (Takeuchi & Houpt, 2003), initiated through environmental factors such as re-homing or early age trauma (Serpell & Jagoe, 1995), or the dog habituating to a high level of care from the owner (Bradshaw et al. 2002). Dogs can develop separation related problems after an enforced stay away from the owners (e.g. in the veterinary surgery or in a boarding kennel), followed by a period of intensive contact with the owner. These dogs are thought to develop insecure attachments because of the forced separation. Upon reunion they develop intense attachments to their owner (Scott & Fuller, 1965; Serpell & Jagoe, 1995). There is an identical model found in children separated from parents in, for example, forced hospital stays (Bowlby, 1969/1982). It has also been found that the death of the primary caregivers has resulted in separation related behaviours when the dogs were rehomed (Voith & Borchelt, 1985; McGrave, 1991) and this could be indicative of the protest/despair/detachment sequence seen in human separations from attachment figures.

Fox (1978) suggests that dog over-attachment to owners and subsequent separation-related problems, is due to selective breeding for dogs that are increasingly attached in a child-like fashion to owners. Others suggest that it is difficult to differentiate genetic behaviour from learned behaviour, with owners perhaps unconsciously reinforcing infantilised behaviours (Serpell & Jagoe, 1995).

### Nature versus Nurture: The Genetics of Dog Behaviour

Many factors influence individual differences in dog behaviour, such as early environment, ongoing rearing practices, and heredity. Recent discoveries of temperament genes in humans (see Chapter 1), has fuelled research on canine behaviour

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<sup>1</sup> This is most likely underestimated as separation problems are often treated by rescue organisations before re-homing

genes (Takeuchi & Houpt, 2003). Even though selective breeding for functional behaviours such as pointing, retrieving, guarding, or hunting has created homogeneous breeds of dogs, there is large temperament variability within breeds for reactivity, anxiety, or fear (Bradshaw, Goodwin, Lea & Whitehead, 1996; Hart & Hart, 1988) which neurologists are beginning to explain through genetic expression.

Bradshaw et al. (1996) in a UK study found differences in reactivity levels between 168 individual breeds of dogs in a questionnaire study to veterinarians and clinical animal behaviourists. Highest levels of reactivity (e.g. excessive barking, excitability, demand for affection and snapping) were found in Poodles (toy and miniature), Dachshunds, Yorkshire Terriers, King Charles Spaniels and Cavalier King Charles Spaniels, Shetland Sheepdogs, Shih-Tzus, Papillions, Pekinese, Pomeranians, Lhasa Apsos and Chihuahuas. Hart and Hart (1988) in an American study found high reactivity in English Springer Spaniels, Schnauzers and Scottish, Silky and West Highland and Yorkshire Terriers. Lowest levels of reactivity were found in Bassett Hounds, British Bulldogs, Airedales, Chows, Greyhounds, Great Danes, Pointers, and Whippets.

These findings contrast with a larger Swedish study (Svartberg, 2006) which used standardised behaviour test data from 13,097 dogs to categorise dogs by curiosity/fearlessness, playfulness, sociability and aggression. In a breed group analysis, they found that Gundogs were rated the highest in curiosity and fearlessness, whereas herding breeds such as Border Collies were rated the least curious and the most fearful. Gundogs scored the highest on sociability, followed by Terriers, Working dogs and Herding dogs as the least social. The assessment of sociability involved the arrival of a stranger, greeting duration, and interaction with a stranger (Svartberg, 2006).

Although criticism of the use of breed groups versus actual breeds can be made, the results suggest that Gundogs would exhibit higher levels of interaction with a stranger, whereas Herding dogs would show the least. Gundogs would also have lower levels of reactivity overall which contrasts with Bradshaw et al. (1996) in which individual gundog breeds, such as Labradors displayed moderate reactivity and others such as Pointers, low reactivity. Although Hart and Hart (1988) used American breeds, Bradshaw et al. (1996) British and Svartberg (2006) Swedish dogs, and the same breeds were not addressed between the studies, there is general consensus that reactivity is a highly predictable breed-specific behaviour: Terriers, some Spaniels, and toy breeds are more reactive; Herding and Guarding breeds are less reactive.

It would be expected therefore that reactivity to separation from owners would differ between dog breeds. Whether this can be moderated through owner care style is the focus of this research. Primate studies found that a highly nurturing environment offsets behavioural deficiencies (Suomi, 1997). In dogs, highly reactive breeds can be trained to a variety of tasks. The nature of this training would require high levels of dog/handler interaction, the use of positive reinforcement (Mackenzie, Oltenacu & Houpt, 1986) and characteristics of the environment. Therefore highly reactive breeds exposed to high nurturing can have a beneficial outcome.

In a study that looked at broad personality traits in dogs, Saetre, et al. (2006) found that 25% of the shy-boldness dimension was explained by heritability in 10,000 German Shepherds and Rottweilers. Takeuchi et al. (2009) looked at behaviour traits of 81 Labrador Retriever potential guide dogs and found differences in aggression and activity levels which were related to genetic polymorphism.

Similar neurological architecture responsible for temperament is found in humans and dogs (Takeuchi & Houpt, 2003). Several studies have looked at the effects of dopamine and serotonin receptor polymorphism in dogs, and have found similar neurogenetic profiles to primates and humans (Niimi et al. 2001; Takeuchi et al. 2009). For example, fearfulness is related to genetic variations in dopamine reuptake (Lee et al. 2008). In a study of the genetic basis of fearfulness in 458 dogs, Lee et al. (2008) found a significant genetic polymorphism in the dopamine receptor, which accounted for 20% of the variance in phenotype. Therefore, genes responsible for neurotransmitter expression may be similar between dogs and other mammals.

Human twin studies suggest that nature and nurture each contribute roughly the same with regards to behavioural expression (Plomin, DeFries & Loehlin, 1977). In dogs, early socialisation impacts the central nervous system, and in particular the emotional centre of the brain (the hypothalamus and limbic system) (Takeuchi & Houpt, 2003). Dogs with early deprivation in their social environments such as social isolation develop basal ganglia deficits (Takeuchi & Houpt, 2003).

Socialisation to people, objects and places aids neurodevelopment. Puppies exposed to minor stressors, such as human handling undergo a change in the pituitary-adrenocortical system that neurologically prepares them to adapt to minor stressors and novel stimuli later in life (Serpell & Jagoe 1995). Broad socialisation and social referencing therefore plays a key role in neurological development, which is expressed

in greater confidence and acceptance of novelty without an accompanying sympathetic nervous response (Serpell & Jagoe, 1995).

Therefore the quality of the early environment, in particular high nurturing and broad socialisation, may result in positive behavioural outcomes in dogs even when genetic deficiencies are present (Nemeroff, 2004) as found in primates (Suomi, 1997) and rodents (Caldji et al. 1998). Positive nurturing which includes broad socialisation, may reduce a genetic predisposition to behavioural reactivity, anxiety and fear in dogs.

### Dog Owners as Caregivers

Bowlby (1969) and Ainsworth et al. (1978) proposed that attachment relationships activate the caregiving system. Previous research suggests that dogs exhibit attachment behaviours towards owners. Therefore, if the relationship between a dog and owner conforms to attachment theory constructs, then owners' caregiving systems would be activated through the nurturing requirements of the relationship. Dogs express emotional moods similar to humans (Archer, 1997) which enable owners to recognise emotions in their dogs. As a result they become attentive to their needs (Smith, 1983). The lack of verbal communication does not limit an owner's tendency to project what their dog is feeling or thinking (Archer, 1977). This ability to project a mental state onto others, or to attribute a *theory of mind* (Baron-Cohen, 1992), is a feature of the owner/pet relationship. Most people accept that others have feelings, emotions and attitudes that are different from their own. Archer (1997) suggests that owners anthropomorphically over-attribute a theory of mind to dogs. Anthropomorphism combined with the human brain's need to construct coherent representations of the outside world by filling in gaps in reality, allows people to perceive their pets as humans and to form human-like relationships with them (Archer, 1997).

Some owners believe that their dogs love them unconditionally, a sentiment characteristic of anthropomorphism. The lack of a reference set for nonhuman animals within the family environment makes owners psychologically predisposed towards acceptance of them because of the human ability to empathise (Beetz, 2007). This ability to empathise and interpret other's emotions makes humans sensitive to others' feelings. According to Beetz (2007), our ability to empathise is why we accept and

nurture nonhuman animals in our households and ultimately form attachment/caregiving relationships with them similar to the parent/child model.

In addition, nonhuman animals are often perceived as children or surrogate children. They prolong parenthood by requiring nurturing and care (Albert & Bulcroft, 1988) and elicit caregiving behaviours from owners (Archer, 1997). The evolutionary basis of attachment in dogs is to elicit caregiving to ensure survival (Archer, 1997). Infants have evolved with paedomorphic features which elicit caregiving, such as large eyes and high forehead, a large round head and arm movements that demand attention, features found in neonates in other mammalian and bird species (Lorenz, 1957). Humans have selectively bred dogs for these paedomorphic traits such as the paedomorphic large eyes or brachycephalic heads of Pugs and Boston Terriers (Gould, 1977; Greenebaum, 2004; Serpell, 1996), which elicit owner caregiving behaviours. Physical features and perceived emotional need therefore activate an owner's caregiving system when they become dog carers.

#### *The Transmission of Owner Working Models*

As dog caregivers, it is possible that caregiving working models are transmitted in the owner/dog relationship. Beck and Madresh (2008) looked at the role of attachment in owner/dog relationships in a survey study which adapted measures from romantic attachment theory (ECR, Brennan et al. 1998). They adapted the ECR (replacing "partner" for "pet"), measuring the owner's attachment style in regards to their dog which was correlated with romantic attachment styles (using the original ECR). They found a significant but weak correlation between preoccupied and avoidant scores on the ECR, and preoccupied and avoidant scores on the revised pet attachment scale suggesting a tenuous link. However, it would seem logical that in a self-report study, scores for both scales would be similar. It would have been more informative to use the ECR and a behaviour measure to look for correlations between ECR and owner behaviour. They suggest that the relationship with pets could be predicted by the individual personality of the dog and to a lesser degree by an overall style of relating in adult romantic relationships. Their study provides an interesting application of human attachment research to the domain of the pet owning relationship which warrants further investigation.

## Pet Loss

When the pet/owner bond is broken due to pet death, owner grief mirrors the grief of human bereavement (Archer & Winchester, 1994). A characteristic of an attachment relationship is the activation of the protest/despair/detachment sequence as a result of loss (Bowlby, 1969). Those with a deep owner/pet bond suffer the deepest grief reactions at pet loss (Brown, Richards & Wilson, 1996; Gosse & Barnes, 1994). The severity differs based on the role of the pet (dog as “child” or “companion”), and the degree to which the owner relied on it for emotional support (McNicholas & Collis, 1995). Much pet bereavement research has focused on the owner’s strength of attachment to the pet and the intensity of loss (Brown et al. 1996). As the pet/owner bond is not technically an attachment, pet loss should be assessed by the loss’s psychosocial impact based on the role and function of the pet within the household (McNicholas & Collis, 1995). Pet death will cause emotional stress due to the disruption in the owner’s routines and lifestyle, and emotional distress will result from the absence of the social support provided by the pet (McNicholas & Collis, 1995). However, within this psychosocial framework, pet grief will differ in intensity between individuals largely as a result of existing social support, including a network of other individuals (versus social isolation) and other human or non-human companionship. Therefore, those living alone or with a limited social network would experience more extreme reactions to pet loss (Archer & Winchester, 1994; McNicholas & Collis, 1995).

In the AAI, individuals unresolved in grief suffer unconscious reminders of the impact of bereavement that is reflected through a momentary loss of conscious monitoring of discourse (Hesse & Main, 2000). Unresolved loss in respect of pet bereavement may be complicated by a high owner emotional dependency on the pet. McNicholas and Collis (1995) propose three levels of pet loss resolution based on psychosocial function. *Non-complicated loss* applies to owners with existing satisfactory social relationships, where the pet loss is unlikely to cause a significant disruption. Crying or other evidence of grief is present but the owner resolves the grief within their social network without professional help. *Complicated loss through stress overload* exacerbates the effects of pet loss because other social or emotional stressors (divorce, human illness, unemployment) combine with the emotional distress of pet loss to put further strain on relationships or routines. An increased risk for depression or anxiety may necessitate professional counselling. *Complicated loss through high pet*

*dependency* severely disrupts normal functioning and follows the normal states of human bereavement except in one area: there is a greater risk of clinical disturbance, social withdrawal and often requires professional counselling to resolve (Bonas et al. 2000; McNicholas & Collis, 1995). In a longitudinal study, Gerwolls and Labott (1994) found that the loss of a pet after 2, 4, 8 and 26 weeks was similar to that of a significant human loss. Stages of disbelief and shock gradually retreated to states of acceptance at 26 weeks.

Archer and Winchester (1994), in a questionnaire study completed by 88 respondents who had lost a pet in the previous year, found that 74% thought about the pet often, and 60% said they would often notice other animals that reminded them of their last pet. This was a smaller proportion of those who felt the same impact of loss from human bereavement. However, both Gage and Holcombe (1991) and Rajaram, Gararity, Stallones and Marx (1993) found that the death of pets resulted in lower levels of stress and depression than that of spouses or other immediate family members.

It is possible that in the AAI, those who suffer complicated grief after pet loss may reveal patterns of unconscious loss of discourse monitoring resulting in an Unresolved pet loss classification. Although Main et al. (2002) hypothesise that the AAI may uncover unresolved pet loss, this has not been the subject of research to date. As the infants of parents unresolved in human grief display disorganised attachment behaviours (Main & Hesse, 1999), unresolved grief may result in dog disorganised attachment behaviours.

The relationship between grief at pet loss and attachment style has recently been studied by Field, Orsini, Gavish and Packman (2009). They measured adult attachment security using the Relationship Scales Questionnaire (RSQ; Griffen & Bartholomew, 1994) which categorises subjects into secure, anxious or avoidant attachments, based on two dimensions of fear or anxiety in adult relationships. They found a significant positive relationship between insecure (anxious/avoidant) attachment models and the depth of pet loss. Anxious attachment referred to the concern over future abandonment or loss of the attachment object, whereas Avoidant attachment referred to a poor quality of interpersonal relationships characterised by emotional distancing. In human studies, when loss occurs for those with anxious attachment profiles, they are unable to resolve the loss (Field, Gao & Paderna, 2005). Field et al. (2009) found that individuals who scored high on fear (those who were both highly anxious and highly avoidant) were significantly more affected by the loss of their pet than those rated Secure. These



results indicate that the breaking of the owner/dog bond results in grief similar to human bereavement but the expression of the grief and its intensity may be influenced by an owner's experience of early attachment relationships.

### The Effects of Owner Interaction on Dogs

This thesis proposes that the owner/dog relationship is an attachment relationship which activates the owner's caregiving system. Although previous research has not investigated the link between owner interaction and dog attachment style, studies have looked at the effect of handler interaction styles on sympathetic activation. Horvath, Doka and Miklosi (2008) found elevated cortisol concentrations in dogs handled by individuals who continually disciplined them during play sessions. In contrast, dogs handled by empathetic and enthusiastic handlers not only had lower cortisol, but longer play session duration. They suggest that the behaviour of the handlers influenced play as well as stress levels of dogs (Horvath et al. 2008).

Interactions between dogs and owners have positive physiological effects (Friedmann, 1995) which strengthen the bond (McGreevy, Righetti & Thomson, 2005). Petting a dog has been shown to reduce dog blood pressure (Lynch & McCarthy, 1969; Gantt, 1971), as well as owner blood pressure (Friedmann, 1995). Gantt (1971) measured the effects of petting on the stress response in laboratory dogs who had evidence of behavioural neuroses (the performance of abnormal behaviours: repetitive behaviours or compulsive licking). The presence of a passive individual in the same room elevated heart rates in these dogs, but when this individual gently touched them, there was a significant reduction in heart and respiration rates. The dogs who had high levels of abnormal behaviours responded most favourably to petting.

Lynch and McCarthy (1969) found similar results with dogs who had previously been conditioned to associate an aversive shock with a previously neutral tone. The presence of a researcher who petted them was enough to reduce heart rate when they were presented with the tone. Hennessy, Williams, Miller, Douglas and Voith (1998) found that petting reduced blood cortisol response in dogs exposed to venipuncture. Although there is some evidence of gender differences, which they suggest are due to female caregivers' use of softer voices and manners, their results suggest that petting is effective in reducing sympathetic nervous system activation in dogs (Hennessy et al. 1998). More recently, Coppola, Grandin and Enns (2006), in a study of the cortisol

response of shelter dogs to human interaction, found that after 45 minutes of interaction involving play, grooming, petting and undertaking basic training, the cortisol response in dogs was significantly reduced (Coppola et al. 2006).

The above studies provide evidence of the positive effect of gentle petting on stress reduction in dogs. If touch is associated with pain, indices of stress increase. Lynch and Gantt (1968) found a relationship between positive punishment, petting and an increase in heart rate. In a between group analysis one group received positive punishment (was slapped on the rump) from the experimenter, and another did not. They found a decrease in heart rate through petting in the group that did not receive punishment and an increase in heart rate in those previously punished (Lynch & Gantt, 1968). In this case, petting by the same person who inflicted pain, was not stress reducing and could have been due to conflicting signals in which the source of previous comfort became a source of fear.

Owners frequently apply aversive techniques when disciplining dogs. The intention behind the application of positive punishment, such as slapping, is to make a particular behaviour less likely to occur through the application of an aversive stimulus. The avoidance response due to the application of aversive punishment is part of animal learning. There is much discussion for and against its use in dog behaviour modification, which is beyond the scope of this thesis; it nonetheless is an important aspect of the dog/owner bond. The application of positive punishment will alter behaviour if it is applied contingently with the behaviour but the dog must associate its behaviour with the punishment and the punishment must be salient, of appropriate intensity and delivered in the correct measure (Lindsay, 2005). Owners may not know the correct measure to use in applying punishment which may blur the boundaries between the application of positive punishment in behaviour modification and animal abuse.

Several studies have pointed to the dangers associated with excessive aversion techniques (Solomon & Wynn, 1953; Seligman, 1970). Voith and Borchelt (1996) found a positive correlation between owners who use abusive forms of punishment in puppies, such as routine hitting and slapping and later fear-related aggression problems. If this occurs in an unpredictable manner, long-term behaviour problems such as generalised anxiety, phobias, or learnt helplessness (Seligman & Maier, 1967; Seligman, 1970) could occur. Seligman and Maier (1967) coined the phrase *learnt helplessness* to describe a situation in which an animal learns that it has no control over an aversive

stimulus and stops attempting to flee. The hallmark of learnt helplessness is not the stimulus itself but the inability to control the source of pain or fear. In Seligman and Maier's (1967) classic study, dogs had first been trained on either how to avoid a shock (escape trained) or had been restrained by a collar and could not escape shock (yoked controlled). When they were then placed in a shuttle-avoidance box, out of which they could easily jump to escape shock, those who had been yoked controlled failed to jump to escape shock, whereas the escape dogs and controls readily escaped. While both the escape trained dogs and the yoke controls had been exposed to the same initial shock training, only the escape trained dogs had control over the shock. Therefore for a condition of learnt helplessness to occur, the trauma has to be associated with a lack of control over the environment (Seligman & Maier, 1967).

#### *When Positive Punishment Becomes Abuse*

The application of extreme positive punishment, combined with lack of control over traumatic events especially when the perpetrator is the dog owner could affect dog attachment security. A vivid example concerns non-contingent punishment (sometime after the behaviour) which occurs when an owner returns home and finds an offending behaviour has occurred (such as elimination or destruction). This creates an emotional conflict for the dog (McBride, 1995). The natural dog response to an owner returning home would be to enthusiastically greet the owner and expect a similar owner response. If the owner then responds instead with punishment, over time it can create behavioural neurosis (Lindsay, 2000). Lindsay (2000) points out that this is a similar scenario that induced behavioural neurosis such as learnt helplessness in laboratory studies. This is especially troubling for dogs performing destructive or elimination behaviours due to separation-related anxieties, who are then the target of harsh punishment methods.

Hiby, Rooney and Bradshaw (2004) found that owners who used positive punishment for destructiveness, inappropriate elimination, or stealing food or objects reported a significantly higher percentage of dogs exhibiting separation-related problems. Furthermore, they found that punishment as a training technique does not lead to greater obedience and leads to more behavioural issues (Hiby et al. 2004).

When owners become a source of fear, they could be displaying similar frightening (FR) behaviours seen in parent/child studies which result in child

disorganisation or *fright without solution* (Hesse & Main, 1999). Disorganisation therefore could be seen in dogs, which may be accompanied by maladaptive behaviours such as learnt helplessness, behavioural inhibition, social isolation, avoidance of the perpetrator or hyper-vigilance (Lindsay, 2000; Voith & Borchelt, 1996).

### *Family and Animal Abuse*

There is a link between disorganised/disrupted attachments in infancy and violence in adult and family relationships which could predict pet abuse and visa versa (Carlson, 1998; Hesse & Main, 2000; van IJzendoorn & Bakermans-Kranenburg, 2009; West & George, 1999). Gallagher, Allen and Jones (2008), in a sample of 23 women using a refuge services after domestic violence found that 57% reported witnessing pet abuse, while Ascione (1998) reported 71% of women in a shelter had also reported animal abuse. Women at a refuge service were 11 times more likely to report animal abuse than women without a history of domestic violence (Ascione & Shapiro, 2009). McPhedran (2009) also found that battered women appear to be significantly more likely to experience concurrent animal abuse than normative female samples. The perpetrators of domestic violence sometimes use violence against animals as a means of controlling or coercing their partners (Ascione et al. 2007; Faver & Strand, 2003).

Research on animal abuse tends to focus on extreme physical punishment or death of the companion animal, primarily by males in the household or by children as a predictor of externalising disorders leading to future violence. For example Edleson (1999) and Kolbo, Blakely and Engleman (1996) found that boys who witness domestic violence are more likely to have externalising disorders such as aggression towards other people and animals, whereas girls are more likely to development internalised disorders such as depression (Grych, Jouriles, Swank, McDonald & Norwood, 2000).

Family violence or dysfunction is a predictor of child behaviour problems which may or may not include animal abuse (Fendrick, Warner & Weissman, 1990; Guzder, Paris, Zelkowitz & Feldman, 1999; Lyons-Ruth, 1996; McCabe Hough, Wood & Yeh, 2001). Children who had abused animals were more than twice as likely to have experienced abuse, either physical or sexual themselves (Duncan, Thomas & Miller, 2005). In a study of 860 college students, 60% who had witnessed or perpetrated animal cruelty as children had also experienced maltreatment or domestic violence as children (Degue & BiLillo, 2009). In the United States, legislation which enables both child and animal welfare investigators to cross-refer families with reported child/animal

abuse, highlights the relationship between family violence and animal abuse (Degue & DiLillo, 2009).

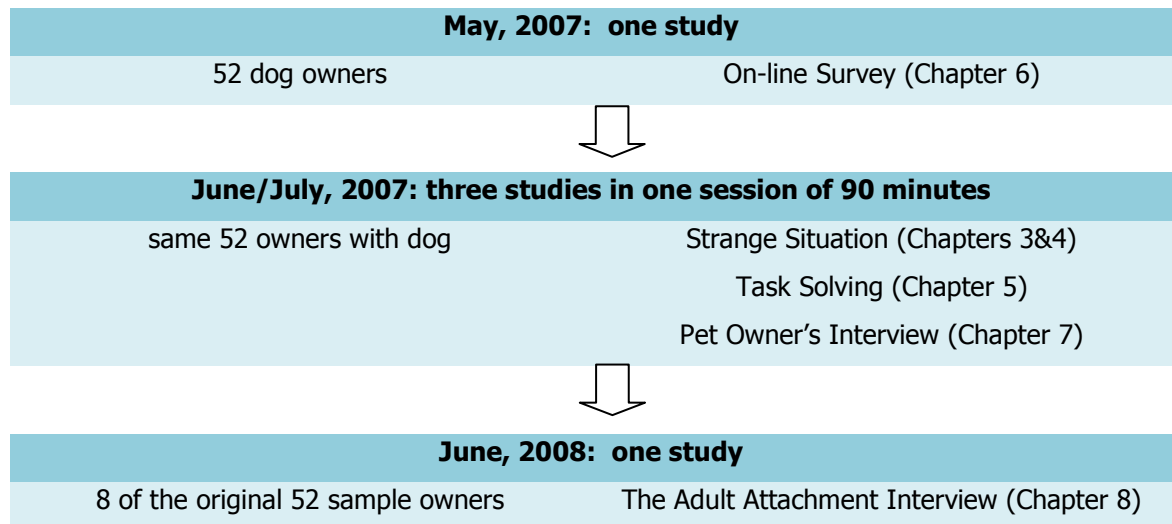
Abused children are powerless over their perpetrators and may use violence against animals as a means of restoring self-efficacy (Ascione, 1993). The fact that rates of animal abuse are significantly higher in samples of maltreated children supports this argument (Ascione, Friedrich, Heath & Hayaski, 2003). Therefore, the disorganising effect of extreme parental FR behaviours may be experienced by the companion animal as well as children. Furthermore, the unique role of the pet in the family may expose it to extremely punitive or violent environments, if family violence is a characteristic of the household. Dogs could be therefore in the unfortunate position of revealing families at-risk of domestic violence through their attachment behaviours. For example, strong owner avoidance may be reflective of either punitive training techniques or an overall style of relating to others. The aim of this thesis is to uncover whether a style of relating or caregiving impacts dog attachment security resulting in attachment security, avoidance, anxiety or learnt helplessness.

## Conclusion

The human/dog bond is a complex relationship, governed on the owner's part, by an anthropomorphic projection of infantile characteristics in which the caregiving system in response to the dog's attachment seeking behaviours is activated. The quality of owner caregiving (gentle and sensitive, or punitive) may be a reflection of early working models of relationships. The transmission of those models through caregiving behaviours could impact dog attachment security. Whilst dogs are genetically predisposed to reactivity, the impact of environmental conditions will also affect behavioural motivation and expression, especially defensive or protective responses to aversive conditions. Therefore, genetic and environment conditions (nurturing) will influence emotional activation in dogs.

The following chapters report a series of interlinked studies that aim to categorise individual differences in dog attachment style and its relationship with owner behaviour in the SST as well as in task solving. Figure 2.1 provides a flow chart of the data-gathering time points and experiments conducted in this thesis. The on-line survey was conducted by the participants in their homes approximately one month prior to their

presentation at the University of Southampton Animal Behaviour Clinic. At this time, three studies were conducted at once, over 90 minutes: the Strange Situation, Task Solving and the Pet's Owner's Interview. One year later the Adult Attachment Interview was conducted with 8 of the original 52 participants.<sup>1</sup>



*Figure 2.1* Flow chart of the data-gathering time-points and experiments in this thesis.

The first hypothesis is that individual differences in dog attachment style (Chapter 3) will be related to owner attachment style (Chapters 7 & 8), as well as to owner behaviour in the SST (Chapter 4) and in Task Solving (Chapter 5). It is also hypothesised that owner caregiving style to dogs will emanate from early attachment relationships, measured through self-reports (Chapter 6). The aim is to determine if a link exists between owner caregiving behaviours and dog attachment style which could be an important model in our understanding of effects of owner behaviour on dog welfare.

<sup>1</sup> See Chapter 3 for selection criteria and participant sampling, and Chapter 8 for AAI participant sampling.

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## Measuring Dog Attachment Style in the Strange Situation Test

### Introduction

The Strange Situation Test (SST) was designed to create an unpredictable minor stressor for toddlers (10-20 months) through the departure and reappearance of parent and arrival and interaction attempts of a stranger. The infant's behaviour provides an insight to their coping strategies and defines their bond with the caregiver (Ainsworth et al. 1978).

*Secure* infants showed evidence of using the parent as a secure base for play, moderate distress when separated but quick recovery to return playing when reunited with the parent. *Avoidant* infants displayed few distress indices when separated from the parent, continued to play throughout, and exhibited no greeting behaviour upon reunion. *Ambivalent/Resistant* infants appeared more anxious, clinging to the parent, with the longest recovery to play (Ainsworth et al. 1978). *Disorganised* infants were characterised by behaviours which, although appearing to correlate with one of the three other categories, were interspersed with freezing or stereotypical behaviours (Main & Solomon, 1990).

Several studies have adapted the SST in dog research (Appendix D). Topal et al. (1998) found individual differences in dog SST security/insecurity namely: proximity restoring behaviours (barking, scratching/jumping at the door); and separation distress (whining, whimpering, looking for owner, sitting on owner chair). The stranger's presence was associated with some comfort and safe haven seeking behaviour (jumping up on stranger; attention seeking, accepting petting by stranger) but at lower frequencies than in the dog/owner episodes. Topal et al. (1998) found a preference for the owner over the stranger which is a main feature of a human attachment relationship (Bowlby, 1969/1982) and is suggested to be a key indicator of dog attachment (Palmer & Custance, 2008). In addition, a possible confounding

variable in Topal et al. (1998) is the failure to address order effects (Millott, 1994; Prato-Previde et al., 2003).

As dog breeds are genetically isolated populations, it is expected that breed specific differences in behaviour reactivity would be seen in the SST, which activates the sympathetic nervous system (Bradshaw, Goodwin, Lea & Whitehead, 1996; Hart & Hart, 1988). The aim of this chapter therefore is to categorise individual differences in attachment security according to parent/child behavioural assessments (Ainsworth et al. 1978) (Table 3.1).

Table 3.1

*Strange situation categories of Secure, Avoidant, Ambivalent (Ainsworth et al. 1978) and Disorganised (Main & Solomon, 1990), and corresponding hypothesised dog behaviour categories.*

Strange Situation Classifications	Expected Dog Behaviour in the Strange Situation
Secure: Parental secure base for play and exploration. Signs of missing parent when separated and active greeting upon reunion. May cry requiring comforting, but soon settles to play again.	Secure: Exploration in room, playing with toys. Shows some distress behaviours upon separation. Greets owner actively, then return to play. At second separation, greeting behaviour declines. Dog returns quickly to explore/play.
Avoidant: Explores and plays without focussing on parent. Shows few behavioural responses to separation. Looks away or avoids parent upon reunion. Interested more in toys than parent and if picked up, will stiffen and wriggle free.	Avoidant Dog displays little behavioural response (low proximity restoring or proximity seeking) to owner departure. Ignores owner upon reunion, continuing to play/explore. Interacts with stranger with owner absent. No or little physical contact with owner.
Ambivalent/ Resistant: Evidence of distress throughout. Little interest in play or exploration, may appear angry, throw tantrums, or might be passive. The do not find comfort from the parent	Anxious Evidence of high distress prior to and during separation. Uninterested in playing/exploration. Would seek out owner throughout procedure, and require proximity upon reunion, not able to settle.
Disorganised May appear secure, avoidant or ambivalent, with a lack of behavioural coherence or contradictory behaviours. Incomplete movements such as freezing or repetitive behaviours, confusion and/or fear of parent.	Disorganised/disorientated Dog may appear to be in any of the other three categories, but on occasion freezes, performs repetitive behaviours and appears confused.

## Method

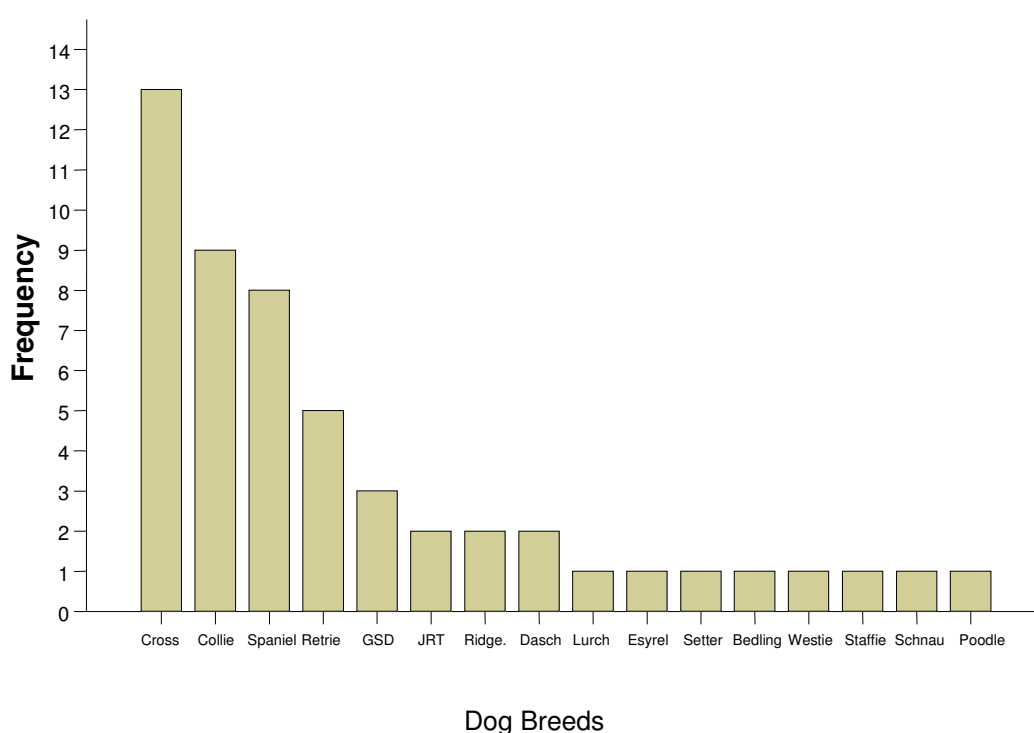
### *Participants*

There were 52 dog ( $F = 24$ ,  $M=28$ )/owner dyads, with dogs' ages ranging from 18 months to 14 years ( $M = 5.68$ ,  $SD = 3.40$ ). Of the female dogs, 21 were spayed (87.50%) and of the male dogs, 22 (78.57%) were neutered. Amongst the owners, 9



(17.3%) were male and 43 (82.7%) were female, with an age range from 25 to 72 years ( $M = 46.5$ ,  $SD = 11.59$ ).

Cross breeds ( $n = 13$ ) were the largest breed group followed by Border Collies ( $n = 9$ ), Springer Spaniels ( $n = 8$ ), Retrievers ( $n = 5$ ) German Shepherd Dogs ( $n = 3$ ) Jack Russell Terriers ( $n = 2$ ), and Dachshunds ( $n = 2$ ). There was one each of Lurchers, Estrella Mountain Dogs, Irish Setters, Bedlington Terriers, West Highland Terriers, Staffordshire Bull Terriers, Miniature Schnauzers, and Toy Poodles (Figure 3.1).



*Figure 3.1.* Participants by dog breed indicated more cross breed dogs ( $n = 13$ ) than recognised breeds of dogs.

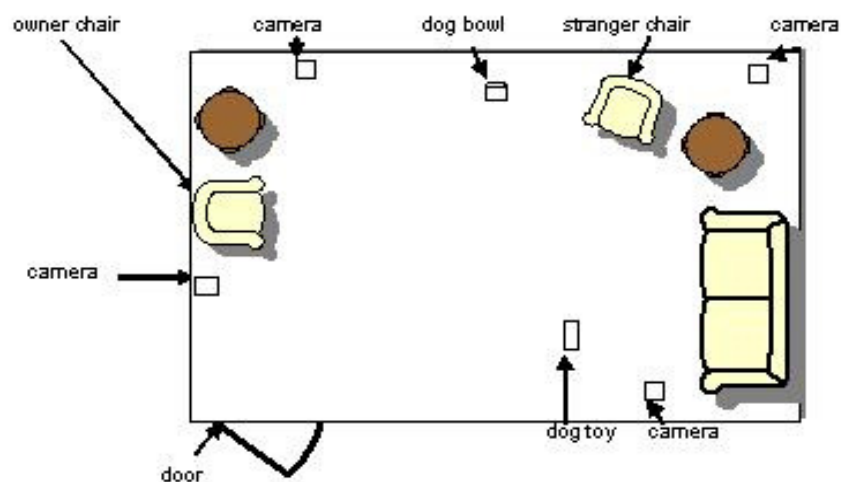
Participants were sourced through an article in the Southampton Daily Echo and the University of Southampton Bulletin (Appendix E). To conform to Health and Safety Criteria at the University of Southampton and to minimise risk to research staff, participants confirmed in writing that their dogs were not aggressive towards unknown individuals. It was also requested that dogs were over 18 months old, beyond the sensitive stages of puppy or adolescent development. It was also requested that they be

owned for a minimum of 18 months to ensure time for attachment bonds to develop and that the participating owner was the primary caregiver or attachment figure. Owners of more than one dog participated once with one dog. Thus all participating dyads were unique.

Sixty percent of the dogs were obtained under 14 weeks old, but 19% were obtained over one year. The mean time dogs had been with their current owners was 5.21 years ( $SD = 3.12$ ) with a range of 1.25 years to 12.37 years. More than half (51.9%) were obtained from a breeder, although seventeen dogs (32.75%) were obtained from rescue shelters. The other human participants were the researcher and two (unfamiliar) “strangers,” female and male who participated with 26 dyads each to control for stranger gender effects.

### *Materials*

Participants were requested to attend the University of Southampton’s animal behaviour clinic. Two locations were used: a 10 metre square reception area and the 16 square metre experimental room (Figure 3.2) which contained two chairs, a sofa, dog water bowl, two tables, a kong toy (small, medium or large as appropriate for the dog’s size) and 4 video cameras installed on walls and ceiling in the experimental room (Figure 3.2). Other materials included handouts (script, Appendix F) for the stranger and owners, a timer and walkie-talkies.



*Figure 3.2.* The Experimental room (4 x 4 metres) contained two chairs labelled “owner” and “stranger”, two tables, a sofa, dog water bowl and “kong” toy. There were three video cameras permanently fixed to the walls and one fixed on the ceiling.

Table 3.2

*The Strange Situation Test (SST) for groups A, B, C and D. Groups A and C used the standard SST order, and groups B and D used a reverse order to control for order effects. Groups A and B used a female stranger and groups C and D used a male stranger to control for gender effects.*

GROUPS: A (female stranger) and C (male stranger)		GROUPS: B (female stranger) and D (male stranger)	
Strange Situation order		Reversed Strange Situation order	
Owner and dog arrive. 5 minutes	Met by researcher in a waiting area who reads the script and gives owner the scarf.	Owner and dog arrive. 5 minutes	Met by researcher in a waiting area who reads the script and gives owner the scarf.
1. Owner and dog 3 minutes	Taken to experimental room. Researcher does not enter with owner. Owner sits on chair labelled "owner" and lets dog off lead.	1. Dog and Stranger 3 minutes	Owner walks dog to experimental room, removes the lead, and leaves the room. Stranger enters room and sits without interacting with dog. After one minute stranger begins interacting with the dog for two minutes.
2. Owner, dog and Stranger 3 minutes	Stranger enters room. Sits quietly, after 1 minute talks to owner, after another minute encourages dog to play for 2 minutes.	2. Owner, dog and stranger 3 minutes	Owner returns to room and greets dog. Stranger sits reading for one minute, then encourages dog to play for 2 minutes.
3. Stranger and dog 3 minutes	Owner leaves room. The stranger sits reading for one minute and then encourages dog to play for 2 minutes.	3. Owner and dog 3 minutes	Stranger leaves room. Dog is allowed to do what it wishes (play, explore), with owner responding as they would normally.
4. Dog and Owner (1 <sup>st</sup> reunion) 3 minutes	Stranger leaves the room. Owner returns to room and greets dog as they would normally. Dog is allowed to do what it wishes.	4. Dog alone (1 <sup>st</sup> solitary session) 3 minutes	Owner leaves room. Dog is observed alone in room for 3 minutes.
5. Dog alone (1 <sup>st</sup> solitary session) 3 minutes	Owner leaves room. Dog is observed alone in room .	5. Stranger and Dog 3 minutes	Stranger returns, only interacting with dog if the dog initiates. The stranger leaves the scarf on the floor and leaves the room.
6. Stranger and Dog 3 minutes	Stranger returns and interacts with dog if the dog initiates it. The stranger leaves the scarf on the floor and leaves the room	6. Owner and dog (1 <sup>st</sup> reunion) 3 minutes	Owner returns to room. They are instructed to interact with the dog should the dog initiate it (i.e. play with or touch the dog). Before leaving the room, owner leaves scarf on floor
7. Owner and dog (2 <sup>nd</sup> reunion) 3 minutes.	Owner returns to room. They are instructed to interact with the dog should the dog initiate it (i.e. play with or touch the dog). Before leaving the room, owner leaves scarf on floor	7. Dog alone (2 <sup>nd</sup> solitary session) 3 minutes	Dog is observed alone in room.
8. Dog (2 <sup>nd</sup> solitary session) 3 minutes	Dog is observed alone in room. Researcher enters the room to signal end of experiment.	8. Owner/Dog: (2 <sup>nd</sup> reunion) 3 minutes	Owner returns to room. They are instructed to interact with the dog should the dog initiate it (i.e. play with or touch the dog). Researcher enters room.

### *Procedure*

Dog/owner dyads were randomly assigned to one of four experimental groups: Group A (Strange Situation order/female stranger); Group B (Strange Situation order/male stranger); Group C (Reversed Strange Situation order/female stranger); and Group D (Reversed Strange Situation order/ male stranger) (Table 3.2).

Each owner was telephoned and received a fixed appointment time to prevent exposure to other participants. Approximately one month before the appointment for the Strange Situation, owners were asked to complete an on-line survey of both dog and owner characteristics (see Appendix H and Chapter 6): age, gender, neutering status, breed, origin (kennel, rescue, etc), training history, number of previous owners, amount of time with current owners, type of residence (flat, house, etc), residence location (village, town, etc), access to a garden, and the number of other dogs or pets in household. Also requested was the dog's previous experience prior to one year of age, of trauma, death or abandonment of prior owner, abuse by previous owners, kennelling for over 2 weeks and / or, serious accident or injury requiring an extended veterinary stay. Owner characteristics gathered were gender, age, marital status, children in household, whether owner was a parent (biological or adoptive), and level of education and income.

Upon arrival at the Animal Behaviour Clinic, they were greeted by the researcher and taken to the reception room. Consent forms were signed and owner procedure scripts were read, relevant for the experimental group (Appendix G). This script detailed what would occur for each of the 8 stages of the protocol and how they were expected to react. Owners were all given identical cloth scarves to wear to impregnate with owner's scent, which were to be left on the floor of the room in the 7<sup>th</sup> session (they would be reminded of this later via the walkie talkie).

### *Design*

The experiment used a between participants repeated measure design and a between groups repeated measure design.

Counterbalancing for episode order and gender of the stranger effect were introduced to determine whether secure-base effects (exploration and play) were due to the presence of an individual or habituation. Cloth scarves left on the ground prior to the last session would test exploration interest both when alone and upon reunion with

owner. As previous dog SST studies featured female strangers, we introduced a male stranger to control for gender secure-base effects and safe haven seeking.

Table 3.3

*Dog behaviour categories of Active, Passive, Safe Haven behaviours, Proximity Restoring and Distress behaviours, with individual behaviours and definitions.*

Behaviour Categories	Behaviours	Definition
Exploratory behaviour	Exploring Alone With Owner With Stranger With Owner & Stranger	Nose to the ground, walking and sniffing surfaces or air.
Play behaviours	Playing With Owner With Stranger With Owner & Stranger	Total scores for social play and independent play
Latencies	Latency to play With Owner With Stranger With Owner & Stranger Latency to explore With Owner With Stranger With Owner & Stranger Latency to play and explore	Amount of time from beginning of session to the beginning of play  Amount of time from beginning of session to the beginning of exploratory behaviours  Total for two scores
Active Behaviours Sum: active behaviours	Exploration  Independent Play Social Play Locomotion Generalised vocalisations Drinking Elimination Displacement activities	Nose to the ground, walking and sniffing surfaces or air  Play with kong on own Play with owner or stranger General movement without specific aim Total amount of vocalisations Walking to water bowl and drinking Urinating or defecating Scratching themselves, shaking, yawning
Passive Behaviours Sum: passive behaviours	At door  Orientating to door  Orientating to a person Watching a person	Standing, sitting, lying inert at the door  Standing, sitting, lying inert in a general orientation towards the door Standing, sitting, lying orienting to owner/stranger Watching stranger or owner while inert
Safe Haven behaviours	Touching a person  Attention seeking  Sitting on owner lap Following Jumping on owner or stranger	Standing, sitting, lying touching with nose, tongue or paw owner/stranger  Facing owner or stranger and whining, nudging or pawing to get attention. Jumping up and sitting on owner lap Walking alongside owner from door to chair, Jumping up on owner as they enter the room
Proximity Restoring	Vocal behaviour at door Scratching door Jumping at door	Standing or sitting while barking at door Scratching or biting at the door Jumping up on door or door handle
Distress Behaviours	Vocalisations Jumping at door Scratching at door Looking for owner  Pacing Sniffing owner chair Sniffing owner scarf	Barking, whining, whimpering Jumping up on door or door handle Scratching or biting at the door Pacing while looking out window, around the room, at door, at owner chair, or standing on sofa looking out of window Pacing with no general aim or purpose Sniffing while on floor or while on owner chair Sniffing or mouthing owner scarf

*Data analysis*

Dog behaviours were categorised as: active, passive, safe haven seeking, proximity restoring and distress behaviours (Table 3.3), with individual behaviour sub-categories. These categories were scored for each episode (owner/dog; dog alone, dog stranger and owner dog stranger).

Behaviour was videotaped with behaviour frequencies noted on an ethogram. Data were assessed for normal distribution, with six non-normal variables square root or log transformed to enable the use of parametric statistics throughout. Greeting the owner was log transformed. The following non-normal variables were square root transformed: proximity seeking alone and with the stranger; playing with owner, stranger, and owner/stranger ; exploring with stranger, owner, or both present; safe haven seeking from stranger; proximity restoring when alone and with stranger; distress when alone and with the stranger.

Table 3.4

*Exploratory analysis of variables for spread, with means, standard deviation, trimmed mean, standard error, outliers and transformed outliers.*

Variable	Mean	SD	Trimmed mean	Standard error	Outliers	Transformed outliers
Explore ODS <sup>1</sup>	4.65	3.37	4.56	.46	0	0
Explore DS <sup>2</sup>	3.77	4.22	3.47	.59	0	0
Explore DO <sup>3</sup>	3.86	3.80	3.47	.53	0	0
Safe haven DS	9.18	4.53	4.53	.63	0	0
Prox. rest. D <sup>4</sup>	6.59	4.89	6.40	.67	0	0
Prox. rest. DS	3.38	3.37	3.14	.47	0	0
Play DO	6.08	6.11	5.78	.85	0	0
Play ODS	4.71	4.80	4.47	.67	0	0
Play DS	3.05	4.93	2.56	.68	4	4
Distress D	7.92	5.15	7.76	.71	0	0
Greeting DO	1.08	.46	1.08	.59	0	0
Distress DS	5.56	4.27	5.26	.59	4	4
Active	20.99	4.89	20.99	.68	0	0
Passive	28.24	3.99	28.47	.55	1	1
Latency play/explore	30.27	3.90	30.58	.54	4	4
Secure base	35.56	2.04	35.68	.28	2	1

O=owner, D=dog, S=stranger

<sup>1</sup> ODS: Owner/dog/stranger episodes (1 only)

<sup>2</sup> DS: Dog/stranger episodes (x2)

<sup>3</sup> OD: Owner/dog episodes (x 2)

<sup>4</sup> D: Dog alone episodes (x 2)

Data were then explored for outliers. Each outlier was investigated and if determined to be unrepresentative of the data set, was transformed ( $2 \times \text{SD} \pm \text{mean}$ ) and kept in the dataset (Field, 2005). Table 3.4 is a summary of data transformations which took place on nine variables with outliers.

Following methodology employed by Topal et al. (1998), a K-means cluster analysis, which grouped dogs by similar distances from the mean scores for behaviour variables, was performed. Behaviour frequencies were subjected to repeated measure analysis of variance (ANOVA) with Bonferroni post hoc comparisons. A factor analysis of behaviour categories was performed to reduce data. Clusters were then analysed with factors in a mixed design ANOVA with Bonferroni post-hoc comparisons to determine within-cluster characteristics and changes between groups between episodes. Independent and paired sample *t*-tests investigated differences in behaviour (exploring, play, safe haven seeking, proximity restoring, passive and active behaviours) between the presence of the owner and stranger. Play and exploration were also assessed between episodes. Proximity restoring and safe haven seeking behaviours in dog-alone versus dog/stranger episodes were also assessed using paired samples *t*-tests.

Inter-observer reliability was assessed by an independent observer coding 10% of the total video sample, which were then subjected to Cohen's kappa tests,  $\kappa = .98$  revealing very high inter-observer reliability.

Data were analysed after video assessment using SPSS V.16, and plots designed using SPSS or Sigmaplot V9.

### *Ethics*

The experiment received the approval of the Ethics Committee of the University of Southampton. All participant dog owners were asked to sign a statement of consent before taking part (Appendix G) and were debriefed after the SST procedure.

## Results

### *Power analysis*

Statistical power analysis explores the relationship between sample size (*N*), significance levels ( $\alpha = 0.05$ ), the population effect (ES) and statistical power (Cohen (1991). This enables researchers to determine the sample size necessary for attain the

desired power for the hypothesised effect. Table 3.5 presents the formulae to determine power for analyses of variance, t-tests and correlations, the following formulae used in this study.

Table 3.5.

*Example of tests used in this study, with power analyses formulae, significance level ( $\alpha$ ), number of participants required (N) and effect size (ES) proposed by Cohen (1991).*

Test	$\alpha$	Formula	N required	ES
t-test: independent mean A (Ma) vs meanB.	$\alpha = 0.05$	$d = \frac{m_a - m_b}{\alpha}$	393 64 26	.20 Small .50 Medium .80 Large
ANOVA (4 groups)	$\alpha = 0.05$	$f = \frac{\sigma_m}{\sigma}$	274 45 28	.10 Small .25 Medium .40 Large
Correlation	$\alpha = 0.05$	$f^2 = \frac{R^2}{1-R^2}$	499 84 38	.02 Small .15 Medium .35 Large

From Table 3.3, a small effect would require a minimum of 274 participants whereas a large effect would require a minimum of 26 participants (Cohen, 1991). Previous research involving the Strange Situation and dogs reveals that sample sizes vary between 30-60 owner/dog dyads. Therefore, the aim of this study was to solicit enough participating dyads to attain a medium effect which was achievable given the time-frame and resources of the research ( $N = 52$ ). Individual effect sizes are also cited for each statistical test.

#### *Demographic Variables*

Almost 50% of the dogs ( $n = 23$ ) had not been taken to any formal training class, 7.7% had been to puppy classes, 19% to obedience training and 23% to both puppy and general obedience. In addition 5.8% had been to agility or fly-ball.

Owners indicated if their dogs had encountered trauma prior to 1 year of age. Responses were: being re-homed (9.6%); abuse (11.5%) or death of or abandonment by previous owners (9.6%) (as reported by rescue organisations); family children moving from home (3.8%); separation from owners due to boarding for longer than 1 week (11.5%); an accident or illness requiring a veterinary stay of more than 5 days (11.5%).



### *Normative Attachment Behaviours*

#### *Proximity Restoring and Safe Haven Behaviours*

Dogs were found to be significantly less distressed with the stranger than on their own. In paired samples *t*-tests, they displayed fewer proximity restoring behaviours (barking at the door, jumping, scratching at the door) with the stranger present ( $M = 3.38$ ,  $SD = 3.37$ ) than when alone ( $M = 6.59$ ,  $SD = 4.89$ ,  $t_{(51)} = 5.23$ ,  $p < .01$ ). The presence of the stranger ( $M = 5.43$ ,  $SD = 3.95$ ) also significantly reduced distress-related behaviours (whining, pacing, looking for owner) from the dog-alone condition ( $M = 7.92$ ,  $SD = 5.15$ ,  $t_{(48)} = 4.04$ ,  $p < .001$ ). A difference had been expected between safe haven seeking in the owner and stranger conditions, but there was no significant difference in the dogs approaching, seeking attention, jumping on, and standing/sitting touching.

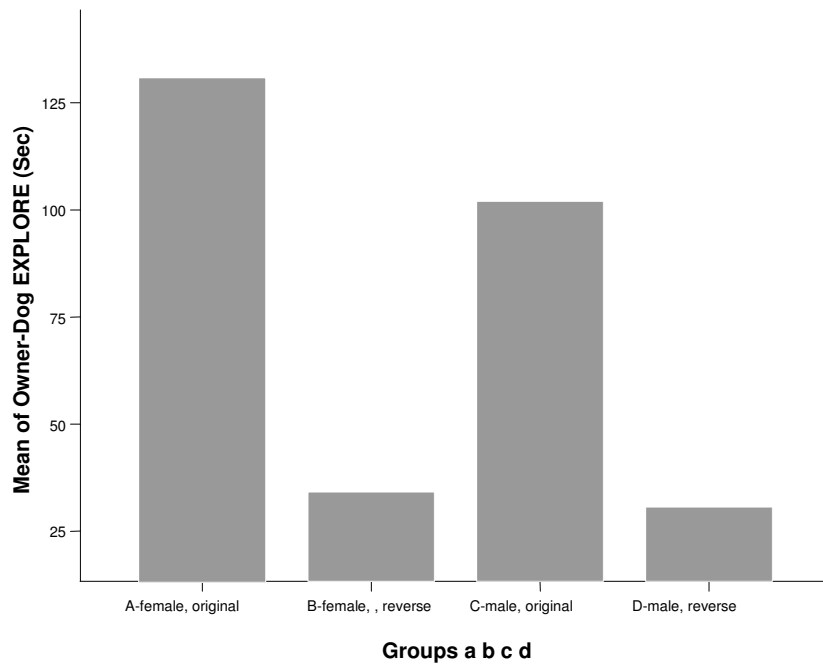
### *Secure-base effects*

#### *Play*

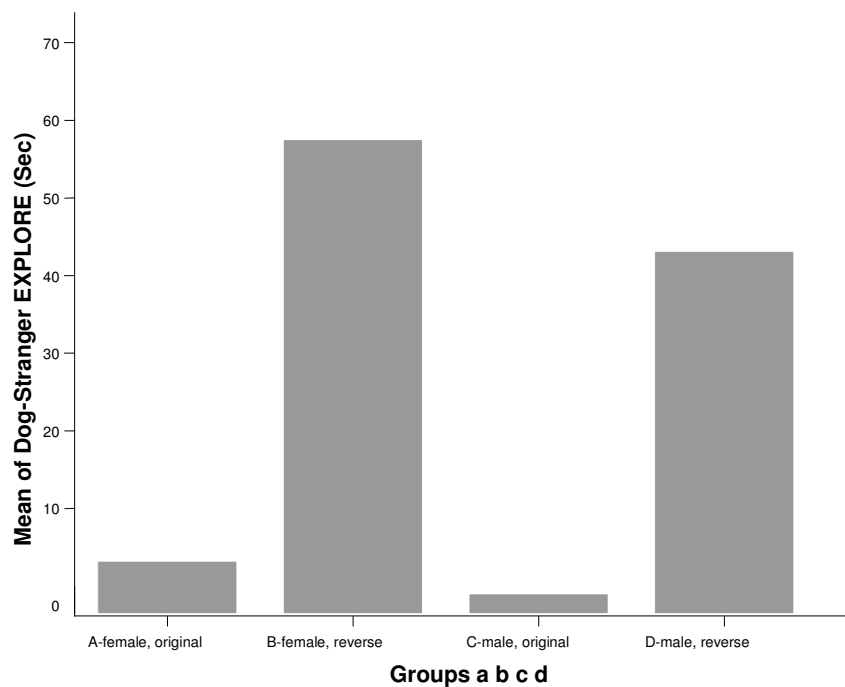
Dogs played significantly more in the presence of the owners alone ( $M = 6.08$ ,  $SD = 6.11$ ) than with the owner and stranger ( $M = 4.43$ ,  $SD = 4.65$ ,  $t_{(51)} = 1.99$ ,  $p < .05$ ), or when alone with the stranger ( $M = 2.90$ ,  $SD = 4.60$ ,  $t_{(51)} = 2.64$ ,  $p < .01$ ). This suggests that owners provided dogs with a secure base effect.

### *Exploration*

There was no significant difference in exploration levels between dog alone episodes and dog/stranger episodes. These results differ from Topal et al. (1998) and Palmer and Custance (2008), and might be explained by habituation. The first episode in order A and C, and the third episode in order B and D (first owner/dog sessions) were not included in this current analysis, whereas they had been in previous research. These episodes were excluded because of the high exploration rates in the original order A and B. Although levels of exploration were lower in the reversed order episodes B and D (Figure 3.3) they both were higher than seen in the later dog/stranger and dog/owner (reunion) episodes. A normal decline in exploration would be expected, and that was found in this study.



*Figure 3.3.* Mean rates of owner/dog exploratory behaviours in seconds by episode order and gender of stranger. In episode orders A and C, this occurred as the first episode. When orders were reversed to control for order effects (D and B), this occurred as the third episode.



*Figure 3.4.* Mean rates of stranger/dog exploratory behaviours in seconds by episode order and gender of stranger. In groups B and D this occurred as the first episode, and in groups A and C this occurred as the third episode.

Figures 3.3 and 3.4 illustrate that the mean rates of exploratory behaviours in the original ordered SST (Groups A and C) differ from the reversed order Groups B and D. In a between groups ANOVA (A, B, C, and D) with Bonferroni post-hoc comparisons, exploration mean scores between groups A and C (1<sup>st</sup> episode = dog/owner) and groups B and D (3<sup>rd</sup> episode = dog/owner), revealed significant between group effects ( $F_{(3, 48)} = 15.77, p < .01$ ), with group A (original order with female stranger) ( $M = 130.77, SD = 40.97$ ) differing significantly from group B (reversed order, female stranger) ( $M = 34.15, SD = 48.70, p < .001$ ). Similarly group C (original order, male stranger) ( $M = 102.00, SD = 51.04$ ) differed from groups B ( $p < .001$ ) and D ( $p < .001$ ). This suggests that when the dogs were alone with the owner in the original SST order, they explored significantly more than with their owner alone in the counterbalanced order. Therefore, the first episode with the owner and dog alone in the original and counterbalanced order was eliminated from the analysis, with the two dog/owner reunion episodes forming the basis of the analysis of secure base behaviours.

To test whether the counterbalanced order affected the rates of exploration in the first dog/stranger episode, a mixed design ANOVA was undertaken. However, no significant difference was found between episodes ( $F_{(3, 48)} = 2.02, p = .12, \eta^2 = .11$ ). Therefore, the counterbalanced order had no effect on the rates of exploratory behaviour in the first dog/stranger episode in groups B and D (Figure 3.3), and the 3rd episode with the dog/stranger in groups B and D (Figure 3.4). These two episodes (the first time the dog is alone with the stranger) therefore remained in the analysis.

### *Cluster Analysis*

Behaviour data was subjected to a *K*-means Cluster Analysis, which clusters cases by the aggregate distance from the mean. Four clusters were revealed (Table 3.6): Cluster 1 labelled Avoidant ( $n = 11$ ); Cluster 2 labelled Secure ( $n = 15$ ), Cluster 3 labelled Passive ( $n = 15$ ) and Cluster 4 labelled Anxious ( $n = 11$ ) (Table 3). Table 3.7 describes characteristics of each.

Table 3.6

*Results of K-means Cluster Analysis for 20 dog behaviour scores.*

Variable	Cluster 1: Avoidant <i>n</i> = 11	Cluster 2: Secure <i>n</i> = 15	Cluster 3: Passive <i>n</i> = 15	Cluster 4: Anxious <i>n</i> = 11
Secure base	36.22	34.96	35.39	35.97
Safe haven seeking	12.02	11.39	17.50	13.47
Safe haven owner	6.96	8.15	11.13	11.17
Safe haven stranger	9.18	7.44	12.70	6.78
Distress behaviours	10.25	6.81	7.27	18.19
Distress alone	8.57	5.16	5.64	14.17
Distress stranger	4.88	4.09	3.58	10.93
Proximity restoring	8.58	5.32	6.30	12.93
Proximity restoring alone	7.63	4.18	5.19	10.73
Proximity restoring stranger	2.86	2.42	2.24	6.75
Dog reactivity with stranger	4.87	3.75	3.39	10.91
Physical contact (o/d)	11.47	12.08	18.19	15.69
Physical contact (d/s)	8.01	5.85	11.24	5.83
Greeting owner	.98	1.01	1.04	1.33
Explore (d/s/o)	1.75	5.88	4.66	5.88
Explore (d/o)*	.48	4.99	3.13	6.71
Explore (d/s)	3.86	2.94	4.31	4.10
Play (d/s/o/)	9.42	4.59	3.56	.42
Play (d/o)	13.77	9.12	1.44	.59
Play (d/s)	9.15	1.12	2.41	.44
Active	26.33	19.21	16.98	23.56
Passive	23.82	30.15	30.97	26.31
Latency to play & explore	26.55	29.29	32.26	32.61
Total play behaviours	21.58	12.03	5.74	1.44
Total explore behaviours*	9.81	13.55	11.77	14.29

\*refers to reunions of dog with owner, and not the 1<sup>st</sup> owner/dog session  
d = dog, o=owner, s=stranger

Table 3.7

*Characteristics of the K-means 4 cluster groups.*

Cluster	Characteristics
1. Avoidant <i>n</i> = 11	Preference for stranger over owner with lowest level of safe haven seeking from owner and 24.2% more safe haven seeking from stranger. Lowest owner greeting and owner/dog physical contact. Quickest recovery to play and explore. High play in all episodes. Some distress (low) and proximity restoring behaviours but muted concern by owner departure.
2. Secure <i>n</i> = 15	Lowest levels of safe haven seeking and specifically with stranger, although 8% more comfort is derived from owner than stranger. Lowest distress behaviours and proximity restoring when with stranger. The stranger reduces proximity restoring (over dog alone episodes) behaviours by 42%. Moderate greeting of owner, exploration is higher with owner present. The recovery to play and explore is moderate. They show some concern when owner departs, some safe haven seeking and proximity restoring, but upon reunion, display moderate play and exploration.
3. Insecure/passive <i>n</i> = 15	Lowest levels of activity but high levels of internalised anxious behaviour. Highest levels of safe haven seeking, with a 12% preference for stranger over owner. Low distress and proximity restoring behaviours but need for physical contact from both owner and stranger is high. Greeting of the owner is of moderate to high duration with the slowest recovery to play and explore.
4. Insecure/anxious <i>n</i> = 11	Moderate/low safe haven seeking from owner. Highest levels of distress and proximity restoring behaviours by themselves and with the stranger. Moderate to low physical contact scores from owners, indicative of the high locomotory levels, which however, does not include play. Whereas Cluster 1 dogs' activity is based on play, cluster 4 dogs' activity is based on distress, proximity restoring and some exploration. Longest owner greeting and display the greatest concern by the departure of the owner.

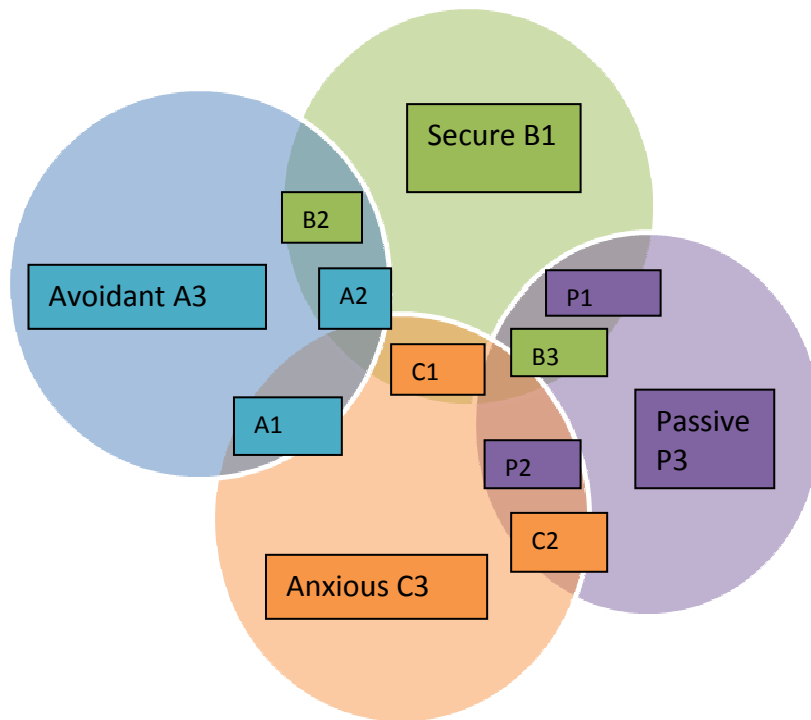
A large spread of scores in each cluster indicated potential overlaps between them, which might be more obvious if expanded into sub-classifications, as in Ainsworth et al. (1978). Table 3.8 reveals the prototype attachment style cluster when analysed with behaviour variables, and Figure 3.5 shows the overlaps schematically.

Table 3.8

*K-means cluster analysis with prototype attachment style categories (\*) and overlapping clusters with means scores for behaviour variables.*

Variable	Avoidant				Secure			Passive			Anxious	
	A1 <i>n</i> = 5	A2 <i>n</i> = 4	A3* <i>n</i> = 2	B1* <i>n</i> = 4	B2 <i>n</i> = 4	B3 <i>n</i> = 7	P1* <i>n</i> = 5	P2 <i>n</i> = 2	P3 <i>n</i> = 8	C1 <i>n</i> = 3	C2 <i>n</i> = 5	C3* <i>n</i> = 4
Secure base	36.28	35.48	37.55	32.50	35.01	36.34	35.49	34.54	35.53	37.70	35.53	35.00
Safe haven seeking	13.74	12.71	6.34	11.92	12.12	10.67	14.69	18.50	19.00	12.15	15.61	11.23
Safe haven owner	7.31	9.01	2.00	7.97	8.28	8.19	12.29	10.75	10.50	9.86	12.55	10.17
Safe haven stranger	10.95	8.62	5.89	8.78	8.78	5.90	5.16	14.52	15.70	7.06	8.00	4.49
Distress behaviours	15.52	5.14	7.30	7.29	4.79	7.70	7.86	14.11	5.20	20.25	14.30	22.63
Distress alone	12.77	3.98	7.26	4.69	3.71	6.25	5.49	13.54	3.76	16.25	12.09	15.56
Distress stranger	8.51	2.44	.71	5.31	2.78	4.15	4.91	2.78	2.94	11.76	7.20	16.31
Proximity restoring	14.00	3.72	4.74	5.31	3.36	6.44	5.39	13.64	4.27	9.31	12.11	17.94
Proximity restoring alone	12.27	3.28	4.72	3.22	2.75	5.54	4.85	13.19	3.41	8.06	10.32	14.09
Proximity restoring (s)	5.41	.85	.50	3.76	.61	2.67	3.87	2.45	1.16	4.45	5.56	11.05
Dog reactivity (S)	8.49	2.44	.71	4.91	2.18	3.98	4.91	2.78	2.59	11.93	7.08	16.27
Physical contact (o/d)	12.47	14.29	3.32	14.15	10.15	12.00	20.63	14.33	17.63	13.24	18.17	13.99
Physical contact (d/s)	9.94	6.52	6.18	7.77	5.25	5.09	6.37	13.94	13.61	6.65	6.52	3.86
Greeting owner	1.40	.82	.24	.85	.67	1.25	1.11	.95	1.02	1.43	1.17	1.50
Explore (d/s/o)	1.77	.50	4.23	4.82	8.88	4.77	4.32	5.34	4.71	7.14	6.29	3.94
Explore (d/o)*	.57	.61	.00	5.24	8.97	2.56	2.81	4.47	2.98	7.75	7.51	4.36
Explore (d/s)	.94	6.07	6.77	1.80	5.13	2.33	5.74	3.81	3.54	9.82	1.84	2.16
Play (d/s/o/)	8.28	9.38	12.37	9.88	2.82	2.58	2.58	7.05	3.31	.00	.92	.00
Play (d/o)	13.34	12.06	18.26	5.79	6.54	12.51	.00	2.50	2.07	2.16	.00	.00
Play (d/s)	3.65	13.75	13.67	4.19	.00	.00	1.78	5.77	1.97	.00	.96	.00
Active	26.21	25.05	29.22	19.28	20.17	18.62	14.96	21.95	17.00	28.91	21.06	22.39
Passive	24.13	25.09	20.50	30.01	29.68	30.49	32.25	28.05	30.89	20.93	28.86	27.45
Latency to play & explore	29.85	24.75	21.90	26.45	28.22	31.52	33.36	29.57	32.26	32.96	31.90	33.45
Total play behaviours	17.82	23.04	28.06	12.95	7.76	13.95	3.58	11.53	5.65	2.16	1.88	.00
Total explore behaviours*	9.66	9.33	11.14	13.15	18.99	10.67	10.18	13.23	12.40	17.31	15.22	9.73

\* prototype for cluster classification, D= Dog, O = Owner, S = Stranger



*Figure 3.5.* Schematic of inter-relationship between prototype clusters Secure (B1), Passive (P3), Anxious (C3) and Avoidant (A3)

Table 3.9 describes characteristics of each cluster and sub-cluster. When cross-analysed with the previous table of raw behaviour data per sub-clusters, overlaps between clusters become more apparent.

Table 3.9

*Original clusters of Secure, Avoidant, Passive and Anxious with sub categories and characteristics*

Cluster	Sub-categories	Shared Characteristics
Secure B1	Secure prototype	.
Secure B2	Secure Avoidant	Lower proximity restoring, distress behaviours, lower levels of physical contact and greeting owner
Secure B3	Secure Passive	Slow latency to play/explore, higher passivity than other Secure clusters
Avoidant A1	Avoidant Anxious	Higher levels of distress and proximity restoring behaviours and higher reactivity when with stranger
Avoidant A2	Avoidant Secure	Similar proximity restoring and distress behaviours to Secure clusters, although very low interaction with owner and greeting of owner.
Avoidant A3	Avoidant Prototype	
Passive P1	Passive/Secure	Similar exploratory levels to secure with very high safe haven and physical contact with owner..
Passive P2	Passive Anxious	Higher activity levels due to higher distress and proximity restoring behaviours
Passive P3	Passive Prototype	
Anxious C1	Anxious Secure	High distress and proximity restoring with moderate safe haven/physical contact seeking from owner.
AnxiousC2	Anxious Passive	Lower distress and proximity restoring and higher passivity than other Anxious clusters
Anxious C3	Anxious Prototype	

To test the accuracy of the cluster definitions, data was recoded based on theoretical constructs of attachment theory (Ainsworth et al. 1978; Bowlby, 1969/1982). Frequency data most representative of secure base effects in two episodes (dog/owner/stranger and dog/stranger) were recoded into nil, low, medium, and high frequency variables. Separate variables indicative of secure base effects were created: Secure Base, Insecure Base and Independent.<sup>1</sup> Table 3.10 lists the recoded variables used in determining frequencies of the new variables in the Dog/Owner/Stranger episode and Table 3.11 lists the recoded variables for the two Dog/Stranger episodes.

<sup>1</sup> Although “avoidant” more clearly defines behaviours, “independent” was used to limit confusion with Avoidant cluster dogs.

Table 3.10

*New variable categories of ODS Secure Base, ODS Insecure Base and ODS Independent created from recoded behaviour frequency scores.*

Dog/Owner/Stranger (ODS)	ODS Secure Base	ODS Insecure Base	ODS Independent
Exploration	Med	Nil	High
Following stranger	Med	Nil	High
Play with stranger	Med	Nil	High
Attention seeking owner	Low	High	Nil
Attention seeking stranger	Med	Nil	High
Independent play	High	Nil	High
Physical contact (dog/stranger)	Med	Nil	High
Latency to play	Med	High	Low
Owner contact	Low, med	Med	Nil

Table 3.10 illustrates that secure base behaviours in the owner/dog/stranger condition would consist of medium exploration and play with the stranger, combined with limited contact with the owner. Insecure dogs did not have the confidence to move away from the owner to play and explore, and are highly attention seeking. Independent dogs would display virtually no contact with the owner, but frequent play and contact with the stranger.

Table 3.11

*New variable categories of DS Secure Base, DS Insecure Base and DS Independent created from recoded behaviour frequency scores.*

Dog/Stranger	DS Secure Base	DS Insecure Base	DS Independent
Reactivity	Nil	High, med	Nil
Physical contact (dog/stranger)	Low, med	Nil	Med, high
Passive behaviours	Med, high	Low	Low
Play (independent and with stranger)	Low, med	Nil	High
Exploration	Low, med	Nil	High

Table 3.11 proposes that dog security in the dog/stranger condition would consist of no distress behaviours, some contact with the stranger as well as some play and exploration. Insecure dogs would be characterised by high reactivity and stress and no contact or play with the stranger. Independent dogs will show no reaction to the owner's departure, but high levels of interaction with the stranger.



The six recoded variables in the two conditions were compared to cluster membership in a one-way between groups analysis of variance (ANOVA) with Bonferroni post-hoc comparisons. Table 3.12 shows a significant concurrence between cluster groupings and secure base variables.

Table 3.12

*Mean scores for six secure base categories in two conditions (O/D/S and O/D) in a one-way analysis of variance with dog clusters.*

	Cluster 1* <i>n</i> = 11	Cluster 2* <i>n</i> = 15	Cluster 3* <i>n</i> = 15	Cluster 4* <i>n</i> = 11	<i>F</i> (3, 48)	<i>P</i>	Eta <sup>2</sup>
DS Insecure Base	1.82	2.27	1.73	2.91	4.82	.005	.23
DS Independent	2.55	.93	1.87	1.27	4.31	.009	.21
DOS Insecure Base	4.26	3.67	4.60	5.73	3.48	.02	.18
DS Secure Base	1.45	1.73	2.20	5.64		n/s	
DOS Secure Base	1.82	2.87	2.53	1.45		n/s	
DOS Independent	2.64	2.67	2.33	2.35		n/s	

\*Cluster 1 = Avoidant; Cluster 2 = Secure; Cluster 3 = Passive; Cluster 4 = Anxious

In a between cluster ANOVA with post hoc Bonferroni comparisons for six secure base behaviour variables (Table 3.12), “Insecure Base” behaviours differed significantly by cluster ( $F_{(3, 48)} = 4.81, p < .01$ ): in the DS (Dog/Stranger) episodes, Avoidant dogs have significantly fewer indices of insecure base behaviours ( $M = 1.82, SD = .98$ ) than the Anxious dogs ( $M = 2.91, SD = .71, p = .02$ ). Clusters differed significantly in DS Independent behaviours ( $F_{(3, 48)} = 4.31, p < .01$ ), with Secure dogs displaying significantly fewer independent behaviours in the DS condition ( $M = .93, SD = .80$ ), than Avoidant dogs ( $M = 2.55, SD = 1.57, p < .009$ ).

Secure base behaviours also differed significantly in the ODS condition ( $F_{(3, 48)} = 2.97, p < .05$ ). There were significant cluster differences between Secure ( $M = 3.67, SD = 1.76$ ) and Anxious dogs ( $M = 5.73, SD = 1.56, p = .05$ ) with Secure dogs displaying the highest levels of secure base and the lowest levels of insecure base behaviours. As shown in Table 3.11, Anxious dogs show the highest levels of insecure behaviours in both conditions, while Avoidant dogs score low on Secure base behaviours and moderate to high on Insecure base behaviours in the owner/dog/stranger condition. Passive dogs, however, score high on Secure Base behaviours in the presence of the stranger but also high on insecure base behaviours with the owner and

stranger. In other words, while the owner is present Passive dogs are highly owner attention seeking, displaying no interaction with the stranger, no play with either stranger or owner, and no exploration. When the owner departs, they are behaviourally inhibited except for stranger contact-seeking and low-level distress behaviours.

Table 3.12 shows that when the owners are present, Anxious dogs are highly owner attention seeking, display no interaction with the stranger, no play with either stranger or owner and no exploration. When the owner departs, they are highly reactive (vocalisations, scratching at the door, pacing and looking for the owner) and have no physical contact with the stranger. The stranger is not able to interrupt their distress behaviours or comfort them.

When with the owner and stranger, Avoidant dogs are characterised by the highest levels of play and exploration, reflected in the high ODS Independent score in Table 3.11, low secure base score in the ODS condition and the high independent score in the DS condition. Avoidant dogs display little reaction to the owner's departure and they display archetypal secure base behaviours with the stranger: they will approach her/him and play (Table 3.12).

Secure dogs display distress behaviours at the owner's departure, but these can be interrupted by the stranger to engage in low levels of play. They appear concerned but not preoccupied by the departure of the owner, and will on occasion seek out the stranger for comfort (Table 3.12).

To determine which behaviours were significantly related to each cluster, a between cluster ANOVA with Bonferroni post-hoc comparisons was carried out. Of the 17 variables used in the analysis, 10 revealed significant between cluster differences (Table 3.13).

Table 3.13

*ANOVA and behaviours of four cluster groups in the dog alone (d), dog/stranger (d/s), dog owner (d/o), and dog/owner/stranger (d/o/s) conditions with Bonferroni post-hoc comparisons.*

	Clusters				ANOVA		
	1* N = 11	2* N = 15	3* N = 15	4* N = 11	$F_{(3, 48)}$	$P^{**}$	Effect
Distress (d)	8.57	5.16	5.64	14.17	13.78	.000	.46
Distress (d/s)	4.88	4.09	3.58	10.30	12.81	.000	.44
Prox. Restoring (d)	7.63	4.18	5.19	10.73	5.63	.001	.26
Prox Restoring (d/s)	2.86	2.42	2.24	6.75	6.20	.003	.28
Latency Explore/Play	26.55	29.29	32.26	32.61	9.38	.000	.41
Play (d/o)	13.77	9.12	1.44	2.59	50.20	.000	.75
Play (d/o/s)	9.42	4.59	3.56	2.42	11.56	.000	.42
Play (d/s)	8.48	1.12	2.41	.44	11.83	.000	.42
Explore (o)	.48	4.99	3.12	6.71	7.84	.000	.33
Active Behaviours	26.34	19.21	16.98	23.56	19.80	.000	.55
Safe Haven (d/o)	6.96	8.15	11.13	11.17	5.84	.008	.27
Safe Haven (d/s)	9.18	7.43	12.70	6.79	6.25	.004	.28
Explore (d/o/s)	1.75	5.88	4.66	5.88	4.67	.008	.23

\* Cluster 1: Avoidant; Cluster 2: Secure; Cluster 3: Passive; Cluster 4: Anxious

\*\*Bonferroni =  $p < .004$

### *Distress Behaviours*

Table 3.13 shows that the degree of distress (pacing, whining, looking for the owner, generalised vocalisations) the dogs displayed when alone, significantly ( $F_{(3, 48)} = 13.78, p < .01$ ) differed between Anxious dogs ( $M = 14.17, SD = 2.99$ ) and all other clusters: Avoidant ( $M = 8.57, SD = 2.98, p = .009$ ); Passive ( $M = 5.64, SD = 4.24, p < .001$ ) and with Secure dogs displaying the least distress ( $M = 5.16, SD = 2.51, p < .001$ ).

Distress in the dog/stranger conditions also differed significantly  $F_{(3, 48)} = 12.81, p < .01$  between groups, with Anxious dogs ( $M = 10.30, SD = 3.74$ ) significantly differing from all other groups ( $p < .001$ ), followed by Passive ( $M = 3.58, SD = 2.70$ ), and Avoidant dogs ( $M = 4.88, SD = 4.10$ ), and Secure dogs ( $M = 4.09, SD = 2.10$ ).

Whilst Secure dogs displayed fewest distress behaviours when alone, the presence of the stranger for Passive dogs had the most significant impact of any cluster in reducing distress. When “Dog Alone” and “Dog/Stranger” episodes were compared for distress

levels in mixed design ANOVA , there was a significant reduction of distress behaviours when the stranger was present than when the dogs were alone [Wilks' Lambda = .75,  $F_{(3, 48)} = 16.28$ ,  $p < .01$ , partial  $\eta^2 = .25$ ] and a significant difference between groups ( $F_{(3, 48)} = 21.03$ ,  $p < .01$ , partial  $\eta^2 = .57$ ) with the presence of the stranger reducing distress for all clusters (Figure 3.6).

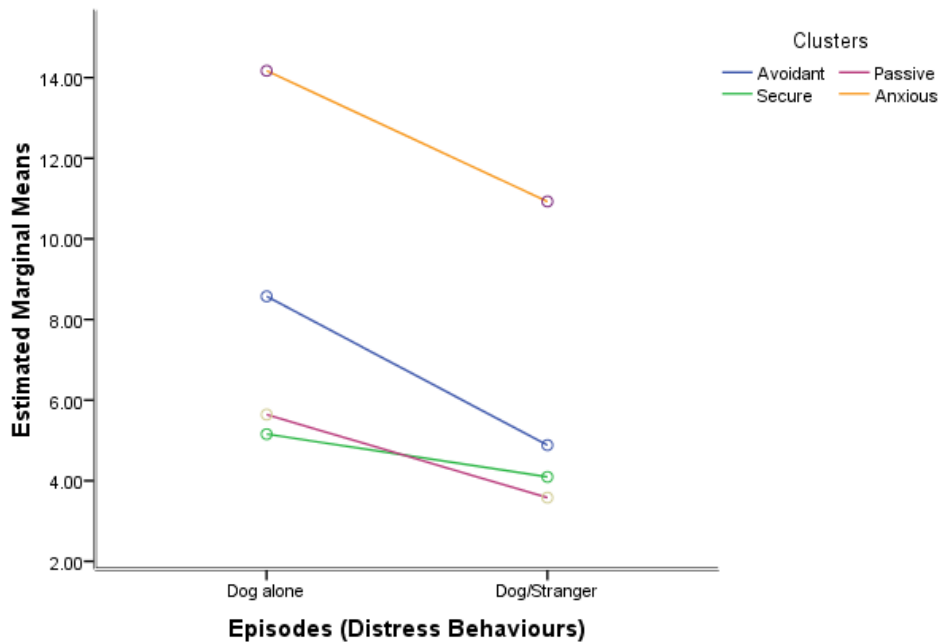
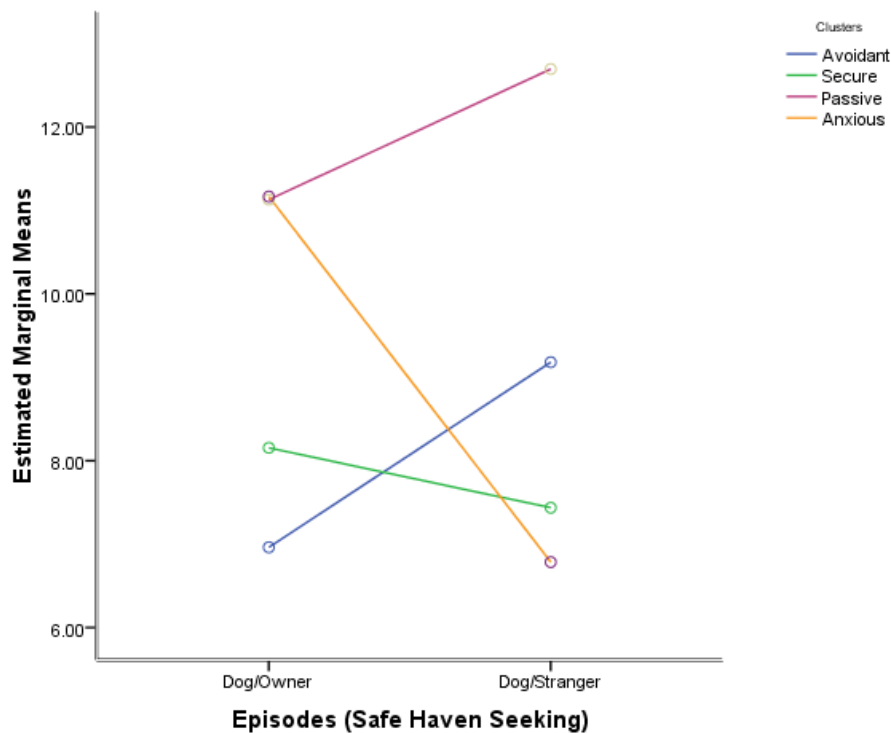


Figure 3.6. Profile plot of estimated marginal means scores for Distress Behaviours by Cluster, indicating that the presence of the stranger significantly ( $p < .001$ ) decreases distress for all clusters.

### *Safe Haven Behaviours*

In between groups AVOVA with Bonferroni post hoc comparisons (as illustrated in Table 3.13), there was a significant difference between clusters in safe haven behaviours directed towards the owner ( $F_{(3, 48)} = 5.84$ ,  $p < .01$ ) with Anxious dogs ( $M = 11.17$ ,  $SD = 2.63$ ) differing significantly from Avoidant dogs ( $M = 6.96$ ,  $SD = 4.40$ ,  $p = .02$ ) and Passive dogs ( $M = 11.13$ ,  $SD = 2.82$ ,  $p = .01$ ). Although Secure dogs ( $M = 8.15$ ,  $SD = 2.47$ ) used the owners as safe havens the least, the lowest scores were recorded by dogs in the Avoidant cluster. In a mixed design ANOVA performed on safe have behaviours, there was a significant within subjects effect between the dog/owner and the dog/stranger episodes [Wilks' Lambda = .80,  $F_{(3, 48)} = 3.90$ ,  $p < .01$ ,

partial  $\eta^2 = .20$ ]. There was also a significant difference between clusters between the two episodes ( $F_{(3, 48)} = 8.48, p < .01, \eta^2 = .37$ ) which is depicted in Figure 3.7.



*Figure 3.7.* Profile plot of estimated marginal means scores for safe haven behaviours by cluster, indicating that mean scores for both Anxious and Secure clusters decline with the presence of the stranger, and increase for Passive and Avoidant clusters.

Figure 3.7 illustrates the cluster differences for safe haven behaviours with Avoidant dogs showing a significant increase in safe haven seeking from the dog/owner to dog/stranger condition. Passive dogs have significantly higher safe haven mean scores than all other groups. They marginally seek out more attention from the stranger when the owner departs.

#### *Proximity Restoring Behaviours*

In a between groups ANOVA with post-hoc Bonferroni comparisons, there was a significant between clusters difference ( $F_{(3, 48)} = 5.63, p < .01$ ) in proximity restoring behaviour frequencies (vocalising at, jumping on door, scratching or biting door), dogs displayed when alone: Anxious dogs ( $M = 10.73, SD = 4.24$ ) displayed significantly higher levels of proximity restoring behaviours than Secure ( $M = 4.18, SD = 3.34, p = .002$ ) and Passive dogs ( $M = 5.19, SD = 4.10, p = .02$ ). Proximity restoring behaviours

displayed when the stranger was present differed significantly ( $F_{(3, 48)} = 6.20, p < .01$ ) between Anxious dogs ( $M = 6.75, SD = 4.04$ ) and all clusters: Secure ( $M = 2.42, SD = 2.08, p = .003$ ), Avoidant ( $M = 2.86, SD = 3.44, p = .02$ ) and Passive ( $M = 2.24, SD = 2.31, p = .002$ ), with Anxious dogs displaying the most and Secure dogs displaying the fewest proximity behaviours with the stranger.

When Dog/Alone and Dog/Stranger episodes were compared for proximity restoring in a mixed design ANOVA, there was a significant reduction of proximity restoring behaviours when the stranger was present from the alone condition [Wilks' Lambda = .72,  $F_{(3, 48)} = 29.58, p < .01$ , partial  $\eta^2 = .38$ ] and a significant difference between groups ( $F_{(3, 48)} = 8.37, p < .01$ , partial  $\eta^2 = .34$ ) with the presence of the stranger reducing proximity restoring behaviours for all dogs but significantly for Anxious and Secure dogs (Figure 3.8).

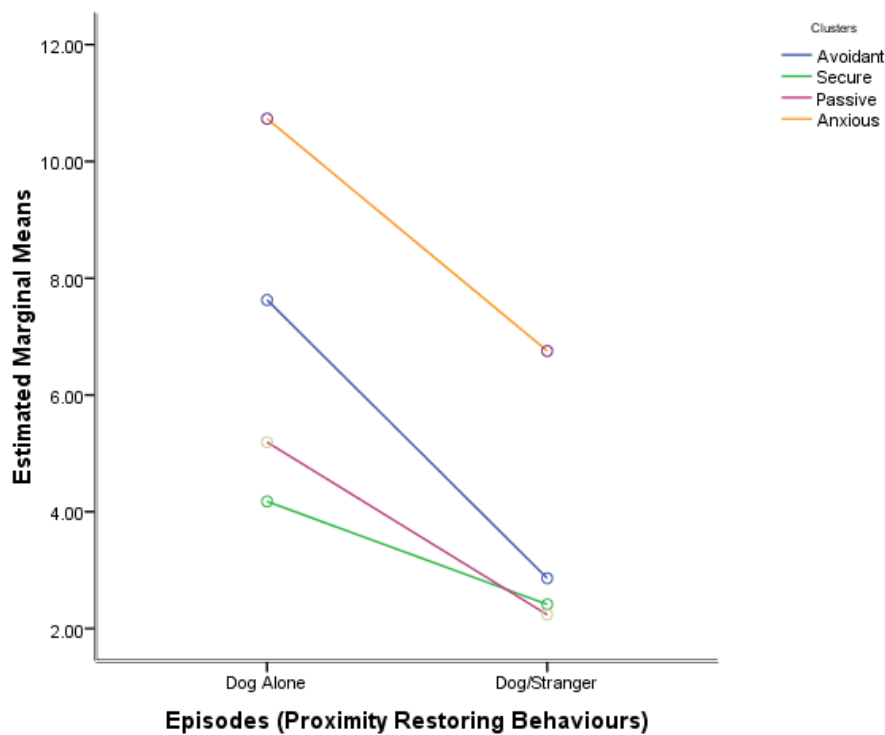


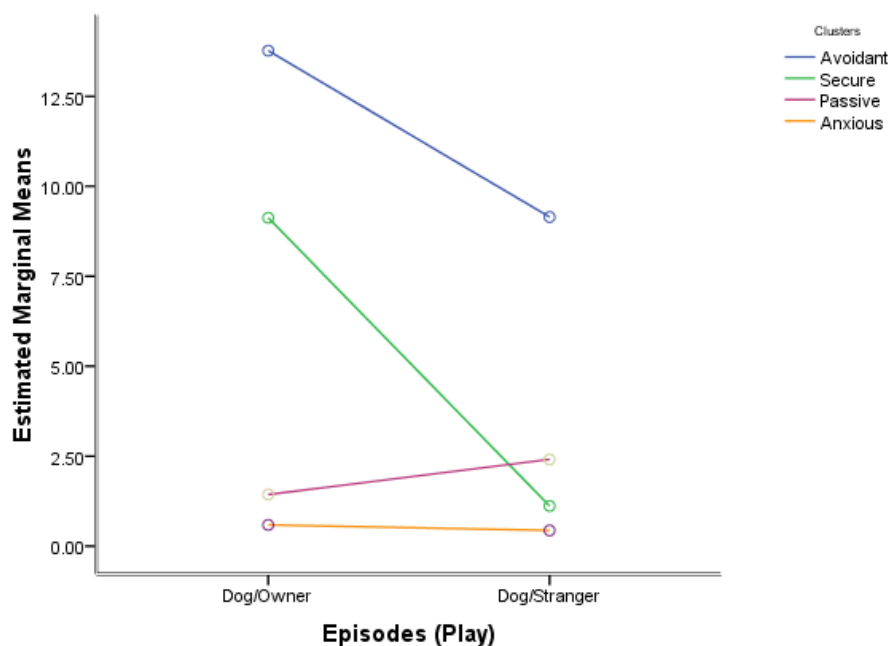
Figure 3.8. Profile plot of estimated marginal means scores for proximity restoring behaviours by cluster, indicating that the presence of the stranger significantly ( $p < .01$ ) decreases distress from the dog alone condition.

### *Play and Exploratory Behaviours*

Scores for latency to play and explore reflected the dogs' recovery from the absence of the owner to engage in behaviours indicative of homeostatis (a return to normalcy or the status quo) when the owner reappears. Higher latencies imply a slower recovery. Both Passive and Anxious dogs experienced the slowest recovery upon the owner's return, measured through the latency to begin exploring or playing. In a between groups ANOVA with Bonferroni post-hoc comparisons, this significantly differed between groups ( $F_{(3, 87)} = 9.38, p < .01$ ), with Avoidant dogs experiencing a significantly quicker latency ( $M = 26.90, SD = 3.50$ ) than Passive ( $M = 32.26, SD = 2.82, p < .001$ ) or Anxious dogs ( $M = 32.61, SD = 1.35, p < .001$ ).

Play and exploration also differed significantly between groups ( $F_{(3, 48)} = 7.84, p < .01$ ). Dogs explored in the presence of owners significantly more in the Anxious group ( $M = 6.71, SD = 2.63$ ) than Avoidant ( $M = .48, SD = 1.07, p < .001$ ) or Passive dogs ( $M = 3.12, SD = 3.83, p = .04$ ). Secure dogs' exploration scores ( $M = 4.99, SD = 3.86$ ), were similar to Anxious group scores although large variance of scores occurred in the latter. Avoidant dogs had the lowest rates of exploration in the presence of the owner but the highest levels of play ( $M = 13.77, SD = 3.11$ ). Whilst acknowledging breed preferences for exploratory or play behaviours, if exploration and play scores are amalgamated, Passive dogs, by definition were significantly less active ( $M = 16.98, SD = 3.87$ ) and Avoidant dogs significantly more active ( $M = 26.34, SD = 2.88$ ). Anxious dogs did not significantly differ from Avoidant dogs in overall activity levels ( $M = 23.56, SD = 4.49$ ), however, the broad dispersion of both exploration and play scores for Anxious dogs points to a large within-group variance.

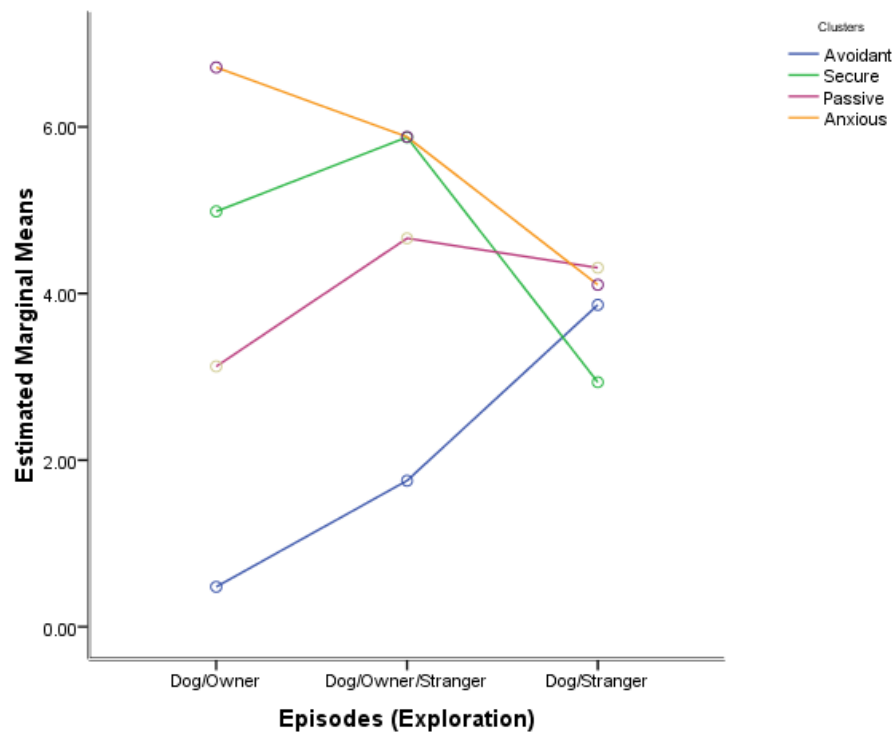
Play levels in the dog/stranger condition differed significantly ( $F_{(3, 48)} = 11.83, p < .01$ ) between groups with Avoidant dogs significantly more playful ( $M = 8.48, SD = 5.46$ ) than Anxious ( $M = .44, SD = 1.45, p < .001$ ) or Secure dogs ( $M = 1.12, SD = 3.03, p < .001$ ). When play frequencies for owner and stranger episodes were compared in a mixed design ANOVA, there was a significant difference between participant scores [Wilks' Lambda = .74,  $F_{(3, 48)} = 17.28, p < .01$ , partial  $\eta^2 = .27$ ] and a significant difference between groups ( $F_{(3, 48)} = 48.17, p < .01$ , partial  $\eta^2 = .75$ ) (Figure 3.9).



*Figure 3.9.* Profile plot of estimated marginal mean scores for play behaviours by cluster indicating that play in the owner and stranger episodes differed significantly ( $p < .01$ ), with the most significant changes seen in the Secure cluster.

When mean scores for exploration (two owner reunion episodes, one dog/owner/stranger episode and two stranger/dog episodes) were compared in a mixed design ANOVA, there was no significant difference found between episodes. However, there was a significant difference between clusters in exploration rates in the three episodes ( $F_{(3, 48)} = 3.77, p = .02, \eta^2 = .19$ ). Figure 3.10 reveals that Anxious dogs has the highest exploration rate in the presence of the owner. This decreases significantly in the stranger condition. In contrast, when the owner departs, exploration levels increase significantly for Avoidant dogs ( $p < .05$ ). The owner's presence provides a secure base effect for exploration in the dog/owner/stranger condition for Secure and Passive dogs, as exploratory behaviours increase when the stranger appears and the owner is present, but decreases when the owner departs.

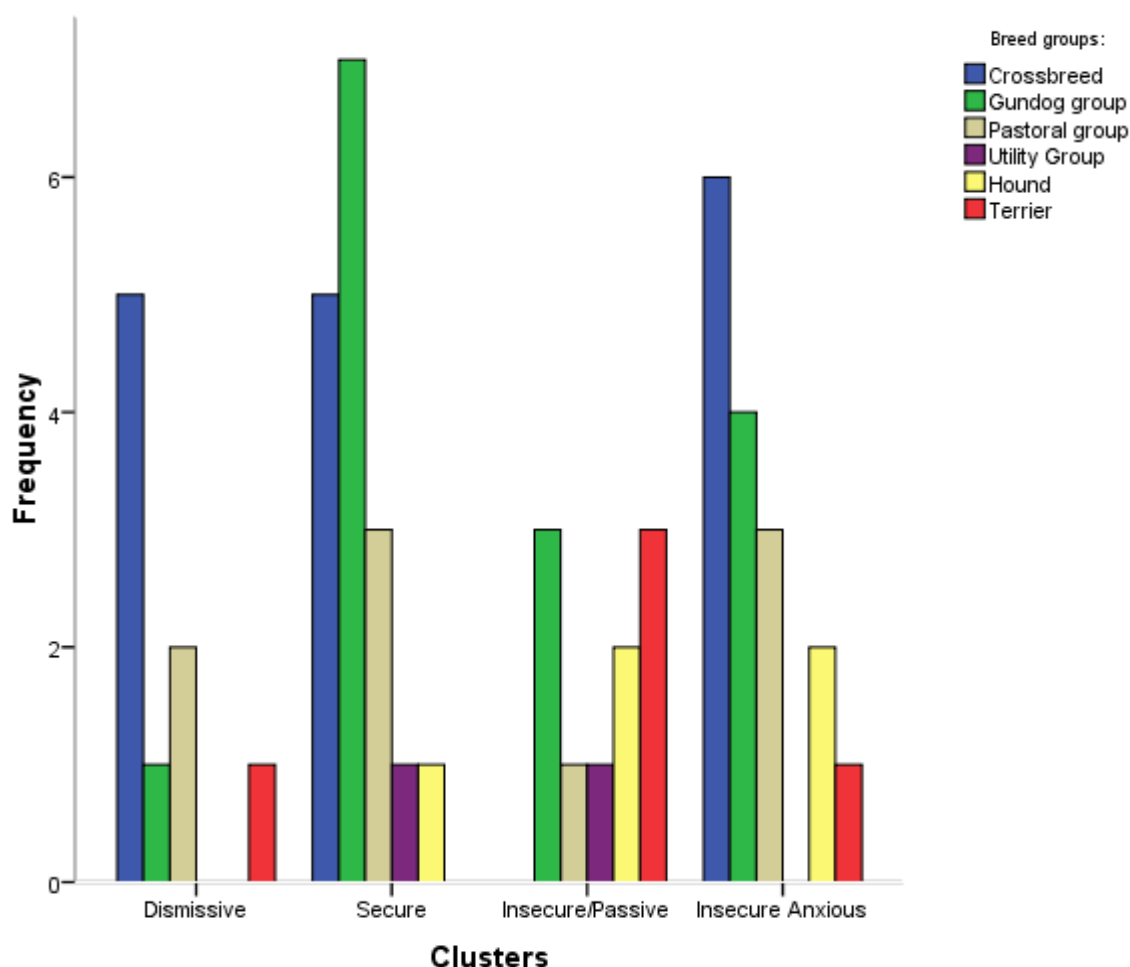




*Figure 3.10.* Profile plot of estimated marginal means scores for exploratory behaviours by cluster, indicating the significant between cluster differences in scores in D/O, D/O/S and D/S conditions.

### *Breed Differences*

Both individual dog breeds and breed groups were first converted to categorical variables. Cluster membership by individual breed was assessed using a Chi-square test for independence, which assesses the significance of association between categorical variables. However, no significant differences between individual breeds and clusters were found. In a second Chi-square test with breed groups and clusters, again no significant association between the two categories were found.



*Figure 3.11.* Frequency of UK Kennel Club dog breed groups and crossbreed dogs by cluster.

Figure 3.11 illustrates that when organised by breed group, Gundogs are most frequently found in the Secure cluster whereas Crossbreed dogs are more frequently found in the Insecure/Anxious group.

Behaviour differences between breeds were then assessed using a multivariate analysis of variance (MANOVA). Thirteen dependent variables were used: exploration (OD), exploration (DS), play (DO), play (DS), latency to play and explore (DO), safe haven seeking (DO) safe haven (DS), proximity restoring (dog alone), proximity restoring (DS), distress behaviours (dog alone), distress behaviours (DS), active behaviours, and passive behaviours. The independent variable was breed, converted to numbers for this analysis. In the first instance the data set was checked for outliers by calculating the Mahalanobis distance, which is the distance of a case from the central point of all the remaining cases (or the mean of all cases). The Mahalanobis distances

from the centroid were saved as a separate variable in the data set. In deciding whether a case is an outlier, the Mahalanbis distance is compared to the critical value obtained using a chi-square critical value table. If the Mahalanobis value exceeds the critical value, it is deemed to be an outlier (Field, 2005). In this instance, the Mahalanobis distances revealed no evidence of outliers. In addition linearity, homogeneity and mulitcollinearity were checked with no serious violations observed. However, there was no significant breed difference between any of the variables tested.

Particular attention was paid to the variables play and exploration, as they are characteristic of certain breeds. An ANOVA with breed as the independent variable and play, exploration and latency to play and explore in all episodes as the dependent variables were carried out. None of these statistical tests revealed significant between breed differences for mean play and exploration scores. When this process was then repeated using UK Kennel Club breed group categories as the dependent variable, in an ANOVA with 13 behaviour categories as independent variables, no significant between-group differences were noted for any behaviour.

#### *Effects of Age on Dog Secure Base Behaviours*

The age of the dog and play and exploration variables were explored in a Pearson correlation with Bonferroni corrections. Age in the dog/owner/stranger condition positively significantly correlated with play frequency ( $r = .64, n = 52, p < .01$ ) and latency to play/explore ( $r = .55, n = 52, p < .01$ ) (Table 3.14). In addition, older dogs were weakly correlated with higher levels of safe-haven seeking ( $r = .37, n = 52, p < .01$ ) suggesting the the older the dog the higher the level of safe-haven seeking.

Table 3.14

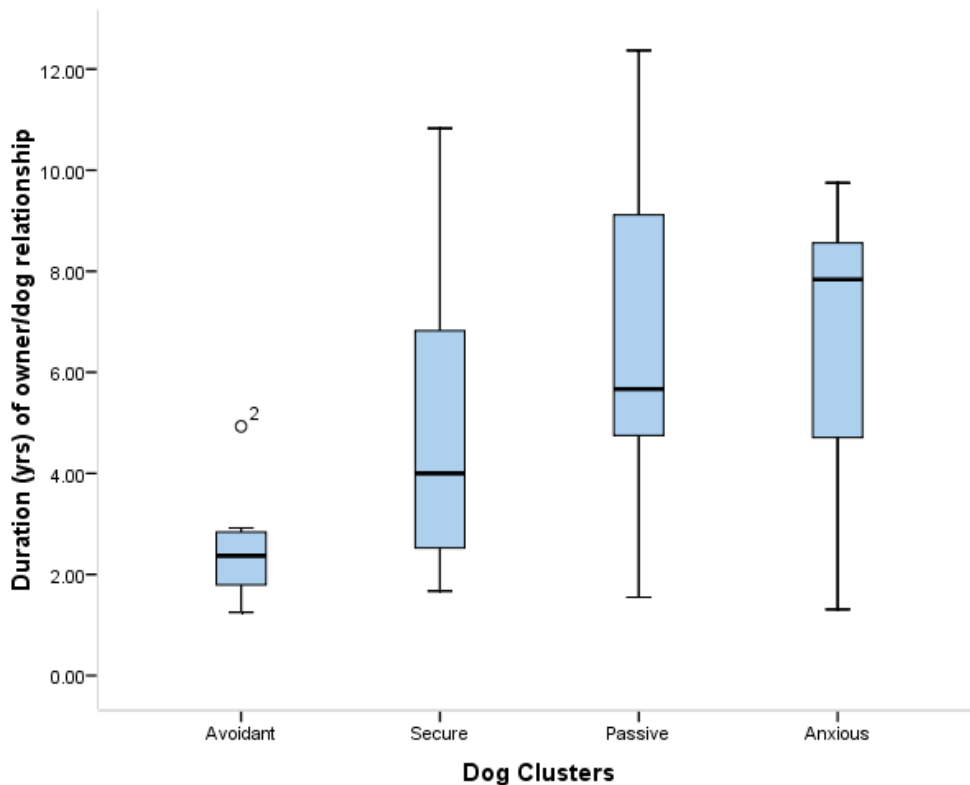
*Pearson correlation coefficient depicting relationship between age and play/explore variables, including means and standard deviations.*

	1	2	3	4	5	6	7	8	M	SD
Dog/owner dyads, $n = 52$										
1. Age	-	<b>.43**</b>	<b>.35*</b>	<b>-.41*</b>	<b>-.59**</b>	-.30	<b>.37*</b>	-.28	5.82	3.28
2. Latency Play/Exp.		-	.10	<b>-.54**</b>	<b>-.71**</b>	<b>-.69**</b>	<b>.43**</b>	<b>-.43**</b>	30.43	3.38
3. Explore D/O/S			-	-.23	-.33	-.32	-.04	-.06	4.65	3.38
4. Play D/O				-	.41	<b>.37*</b>	<b>-.58**</b>	<b>.39*</b>	6.08	6.11
5. Play ODS					-	<b>.59**</b>	<b>-.37*</b>	.31	4.43	4.65
6. Play D/S						-	-.11	.34	2.90	4.61
7. Safe Haven Owner							-	<b>-.37*</b>	9.40	3.51
8. Active beh.								-	21.00	3.51

*Bold indicates significant at: \* $p < .01$ , \*\* $p < .001$  (Bonferroni corrections)*

Dog characteristic variables, such as single or multi-dog households, where obtained, age obtained and exposure to trauma before 1 year (early separation, abandonment, accident requiring a long veterinary stay, abuse or neglect) were then compared to dog clusters.

In a between groups ANOVA with Bonferroni post hoc comparisons, the duration of the dog/owner relationship differed significantly by cluster ( $F_{(3, 48)} = 6.29$ ,  $p < .01$ ). Avoidant dogs had the shortest relationships with their current owners ( $M = 2.50$ ,  $SD = 1.00$ ) when compared with Passive dogs ( $M = 6.71$ ,  $SD = 3.45$ ,  $p = .002$ ) and Anxious dogs ( $M = 6.62$ ,  $SD = 2.75$ ,  $p = .005$ ). Although Secure dogs ( $M = 5.20$ ,  $SD = 3.17$ ) were owned for a shorter period than both Anxious and Passive dogs, this was not found to differ significantly (Figure 3.12). Figure 3.12 also shows that one case (2) dog in the Avoidant cluster was an outlier as it was owned for 5 years.



*Figure 3.12.* Box plot with means, upper and lower quartiles and standard deviation of duration of owner/dog relationship in years by dog cluster.

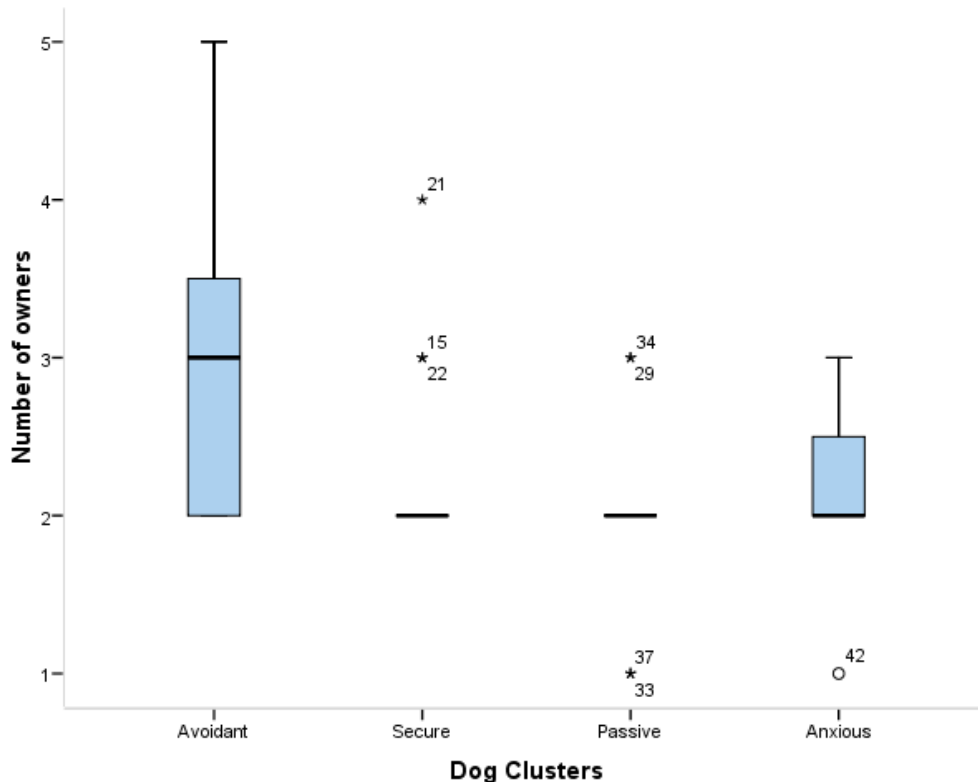


Figure 3.13. Boxplot indicating the mean, upper and lower quartiles and standard deviation for the number of previous owners by dog cluster

Figure 3.13 illustrates that Avoidant dogs ( $M = 2.91$ ,  $SD = 1.00$ ) had significantly more owners than Passive dogs ( $M = 2.00$ ,  $SD = .54$ ,  $p = .01$ ). In a between groups ANOVA with post hoc Bonferroni post hoc comparisons, this difference was significant ( $F_{(3, 48)} = 3.82$ ,  $p < .02$ ) despite the presence of outliers. No other significant between cluster differences were found. Secure, Passive and Anxious dog clusters all contained cases that were outliers, with 2 Secure and Anxious dogs having 3 owners, 2 Passive dogs with one owner only, and 1 Anxious dog with one owner only.

Therefore, both the amount of time owned and a history of 2 or more owners were reflected in the Avoidant cluster. This suggests that they had the least time to establish an attachment relationship with the current owners.

To determine what percentage of the variance in secure base, safe haven, proximity restoring and distress behaviours could be explained by age, previous ownership and length of ownership, a multiple regression analysis was performed as illustrated in Table 3.15. In a separate analysis for secure base behaviours, safe haven, proximity restoring and distress behaviours as dependent variables and age of the dog, the number of previous owners and length of ownership entered as independent

variables, no variables made a statistically significant contribution in explaining the variance in the dependent variable scores. However, when investigating play and exploratory behaviours separately, there was a significant impact of age on play behaviour. In a multiple regression analysis with total play behaviours as the dependent variable, and the number of previous owners and amount of time owned by current owners, age was found to contribute a significant 30.6% of the variance in play behaviours (Table 3.15). All predictors combined contributed 37.9% of the variance in play behaviours.

Table 3.15

*Multiple regression analysis with play behaviours as the dependent variable and age, number of previous owners and time owned as predictor variables.*

Variable	Multiple R	R <sup>2</sup>	Adj. R <sup>2</sup>	B	Standard error B	Beta	t	Sign. of t
Block 1:	.55	.31	.29	17.76	1.91		9.32	.000
Age of dog				-1.33	3.64	-.55	-4.70	.000
Block 2:	.62	.38	.34	13.05	3.64		3.59	.001
Age of dog				.28	1.22	.12	.23	N/S
Previous owners				-1.75	1.33	-.67	-1.31	N/S
Timed owned				1.94	1.29	.18	1.50	N/S

Dependent variable: Play behaviours

A non-significant result however was found when performing a multiple regression analysis with exploratory behaviours as the dependent variable and age, number of previous owners and time owned by current owners as independent variables. As shown in Table 3.16 age explained a non-significant 5.7% of the variance in exploratory behaviours with all predictors explaining a non-significant 12% of the model.

Table 3.16

*Multiple regression analysis with exploratory behaviours as the dependent variable and age, number of previous owners and time owned as predictor variables.*

Variable	Multiple R	R <sup>2</sup>	Adj. R <sup>2</sup>	B	Standard error B	Beta	t	Sign. of t
Block 1:	.24	.06	.04	10.61	1.19		8.88	.000
Age of dog				.31	.18	.24	1.93	.09
Block 2:	.34	.12	.06	13.01	2.33		5.58	.00
Age of dog				1.52	.78	1.17	1.94	.06
Previous owners				-1.37	.86	-.98	-1.16	N/S
Timed owned				-.99	.83	-.17	-1.20	N/S

Dependent variable: Exploratory behaviours

To determine whether owner gender predicted dog cluster membership, both were entered into a one sample chi-square test. There was no significant association between owner gender and dog attachment security. Similarly, there was no significant association between dog gender and cluster membership.

In summarising the effect of dog demographic factors on attachment security, age is a significant predictor of one component of secure base behaviour: play. No other dog characteristic was found to statistically contribute a significant portion of the variance in variables measuring dog attachment security/insecurity.

## Discussion

The aim of this study was to categorise individual differences in dog attachment security in the Strange Situation Test (Ainsworth et al. 1978). Using recoded and transformed variables based on attachment theoretical constructs of secure base, safe haven, proximity restoring and separation-related distress behaviours, this study found that dogs were clustered into groups which revealed one secure and three insecure attachment categories: *insecure-anxious*; *insecure-avoidant* and *insecure-passive*. Secure, Anxious and Avoidant categories are roughly equivalent to Ainsworth et al. (1978) infant classifications of secure, avoidant and ambivalent/resistant. However, in this study a new category characterised by passivity, or lack of behavioural expression was noted. There was no significant evidence of a *disorganised* behaviour pattern (Main & Hesse, 1990) in this experiment, although two dogs displayed intermittent disorganised behaviours (described later).

Secure base behaviours in this study referred to both independent, social owner/stranger play and exploration (sniffing the room) when the owner was present. When the owner was absent, it was expected that proximity restoring behaviours (barking, pawing at the door), would be evident with a decline in play and exploration. This occurred in the Secure, Anxious and Passive dog clusters, but not the Avoidant cluster.

### *Avoidant Dog Cluster*

Avoidant dogs were characterised by a lack of owner focus: low duration greeting, attention seeking and comfort seeking. They exhibited the highest play and exploration levels and high stranger versus low owner interaction. There is little

evidence of attachment system activation in Avoidant dogs, suggesting the absence of a dog/owner attachment relationship. This supports the findings of SST infant studies. Those with avoidant attachments were more likely to ignore the parent upon reunion, did not seek them out for comfort, but would interact with the stranger (Ainsworth et al. 1978). Interestingly, Avoidant dogs displayed moderate levels of distress behaviours when alone. In Ainsworth et al. (1978) Avoidant infants also displayed distress and anxiety when their mothers departed, but only in the home environment. This, it was suggested, was symptomatic of frustration and appears as anger directed at the mother at home, but is not expressed during the SST results found in laboratory studies (Grossman et al. 1999; Sroufe & Waters, 1977). Therefore, there is evidence that Avoidant infants are undergoing distress at the psychological level (Grossman et al. 1999), whereas dogs may be expressing frustration in the protocol, but only when alone.

#### *Secure Dog Cluster*

Secure dogs exhibited a slight preference for the owner over the stranger and did not display high levels of safe haven behaviours with either owner or stranger. They differ from Avoidant dogs in more distress being shown when owners depart, and in the longer greeting duration. Secure dogs' owners provide them with a secure base which deactivated the attachment system, thereby enabling play and exploration, as found in primate studies. For example Secure Rhesus monkeys would freely explore and play returning intermittently to the mother (Suomie, 1997), which was the pattern found with Secure dogs.

#### *Anxious Dog Cluster*

Anxious dogs were characterised by high levels of distress behaviours when alone, and high levels of proximity restoring behaviours when alone and with the stranger. In this case insecurity was externalised and emanated from the unpredictability and lack of control of the environment (Lindsay, 2000). There is evidence of attachment system activation by the long greeting duration and inability of the owner to pacify them, as well as the slowest latency to homeostatis. These findings support SST studies in which infants were characterised as Ambivalent/resistant if they were highly distressed, threw tantrums, and would not be easily comforted by the parent (Ainsworth et al. 1978). Although Anxious dogs' distress was reduced by the presence



of the stranger, s/he could not interrupt their proximity restoring behaviours (barking, scratching and jumping at door) nor provide comfort.

#### *Passive Dog Cluster*

A new finding in this study was the classification of dogs as Insecure/Passive. These dogs exhibited the lowest levels of play and exploration with the most owner greeting and safe haven seeking. They were in high physical contact with both owner and stranger, and had the slowest return to homeostatis when the owner reappeared. This behaviour shares some characteristics with *learnt helplessness* in which an individual, confronted with uncontrollable negative stimuli, does not externalise their behavioural responses to the stimuli (Seligman & Maier, 1967). Lack of control results in fear and anxiety and this is manifested in a lack of behaviour. There is evidence that Passive dogs' attachment system was activated in their high need for comfort seeking, but it appears as though they could not obtain the required comfort from owners to deactivate the attachment system to enable play and exploration. It is interesting to note that the stranger provided higher levels of comfort than the owner. Passive dogs therefore display evidence of the "fright" but not the "flight." This passive or learnt helplessness category shares characteristics with the Ambivalent/Resistant (Ainsworth et al. 1978) in which the infant will freeze, and not effectively gain comfort from the parent. However, it is different in apparent high internalisation of anxiety. Therefore, the new category of Passive could be defined as a lack of behaviour or a learnt helplessness response to the uncontrollable environment which results in fear, requiring physical comforting from any individual.

It was expected that age might be associated with Passive dogs. Play was the only variable to differ significantly by age, and may be responsible for some overlap between Secure and Passive clusters. As 29% of the 52 participants in this study showed evidence of attachment system activation accompanied by behavioural inhibition, it suggests that high internalisation of behaviours due to anxiety is perhaps a more common behavioural response to stress than previously thought.

Only two dogs showed evidence of the Disorganised/Disorientated behaviours (Main & Solomon, 1990). In one case this consisted of stereotypic pacing which could be intermittently interrupted by the owner, but the owner could not comfort this dog. The behaviour was present before the current owner obtained the dog from a rescue shelter, and unfortunately, its prior history was unknown. The other disorganised dog would move to approach the owner and then run to the opposite end of the room, a type

of flight without solution (Hesse & Main, 1999) which could be in response to the owner's use of threatening behaviours (see Chapter 4). Main and Solomon (1990) suggest that disorganised behaviours result from the unpredictability of the attachment figure's behaviours which generate fear and the appearance of confusion. It is more likely that fearful dogs would show no interest in approaching the owner, which was seen in Avoidant dogs in task solving (Chapter 5). However this was not associated with behavioural disorganisation.

In Ainsworth et al.'s (1978) original study, 52% of infants were Secure, 26% Avoidant and 17% Resistant/ambivalent. In this study, 29% of dogs were Secure, 29% Passive, 21% Avoidant and 21% Anxious. This study used a *k*-means cluster analysis based on raw behaviour frequencies obtained through observation, unlike the SST which uses qualitative observations to create behaviour categories and sub categories, and requires attendance at a training institute to master the scoring technique. The current method was used for scientific robustness and to facilitate replication. For this reason, *k*-means was used to define both prototype and sub-clusters.

#### *Nature versus Nurture*

An interesting result was the lack of correlation between dog breed characteristics and Strange Situation behaviour. It had been expected that the more reactive breeds, such as Dachshunds and King Charles Spaniels would show higher levels of reactivity from the owner's departure (Bradshaw et al. 1996) and that Collies, GSD, Retrievers and Rottweilers would show the lowest reactivity and highest acceptance of the stranger (Svartberg, 1996). Although Gundog Group dogs (Retrievers in particular) were found in the Secure cluster, this does suggest a lower level of behavioural reactivity, as found in other studies (Bradshaw et al. 1996). However, as statistical tests failed to find significant breed or breed group differences, attachment security could be related more to environmental than to genetic effects. This supports previous research on the genetic predisposition of behaviour. Bakermans-Kranenburg and van IJzendoorn (2007) suggest that genetic expression may be responsible for 50% of the intergenerational transmission of attachment profiles, with the remainder an integration of environmental conditions, including caregiver representation models (Madigan et al. 2006).

Anxious dogs did not conform to a specific breed and the number of prior owners was not found to be a significant determinate of Anxious cluster membership.

In human (Barry et al. 2008) and primate (Suomi, 1997) studies there is a genetic predisposition towards the development of insecure attachments when maternal responsiveness is low. Anxious dogs therefore may have a genetic predisposition to heightened sensitivity to context by virtue of a short allele of the 5-HTTLPR serotonin transporter gene. Whilst owner behaviour may be equivalent to normal nurturing, this might not be adequate for dogs with the short allele. In light of a lack early environmental trauma, if this hypothesis is correct, sensitive dogs would require caregiving that is highly nurturing. Thus, lower levels of owner interaction could increase their high levels of insecurity and anxiety (discussed in Chapter 4). Further studies exploring owner nurturing and neurotransmitter associations might provide evidence of a link between genetic sensitivity to context and attachment security in dogs.

#### *Dog Demographic Variables and Attachment Style*

Avoidant dogs had been owned for a significantly shorter time and had more owners, which suggests that the dog/owner bond had not had time to develop into an attachment relationship. Hazen and Zeifman (1999) suggest that in human adult relationships attachment bonds are formed after approximately two years. However, in adult romantic relationships, Fraley and Shaver (1997) found that even when the length of the relationship was controlled, Avoidant individuals failed to form attachment relationships. Fraley and Shaver (1998) suggest that it could be a defensive strategy. It is unknown whether the dogs appear Avoidant as a defensive strategy built up because of significantly more broken owner/dog relationships, or due to the owners' behaviour. For example, owners could be avoidant of close attachment relationships and have a distancing strategy in all relationships, human and non-human.

No dog characteristics other than age and play were related to dog behaviours in the SST. This supports the findings of Topal et al (1998) who also found no association between dog age, gender, breed or origin on SST style. However, Topal et al. (1998) found no age association with play. This could have been due in part to breed differences of dogs between the two studies. The largest breed group in Topal et al. were Belgian Shepherds ( $n = 17$ ), with 27 or roughly half the sample belonging to the Working dog group. In contrast, in this study, cross breed dogs made up the largest group ( $n = 13$ ) followed by Border collies ( $n = 9$ ) and Springer spaniels ( $n = 8$ ), breeds associated with high activity levels (Hart & Hart, 1988). Interestingly, the mean age of

the dogs and owners in Topal et al. were younger than those in this current study and therefore it could be hypothesised that play levels would be higher in Topal et al., but this was not the case. The different composition of breed groups, while not individually significant in contributing to behaviour, could have contributed to differences in play levels between this study and Topal and colleagues.

#### *Preference for owner over stranger*

Secure dogs showed preference for the owner over the stranger, as proximity restoring behaviours were reduced when the stranger was present. The stranger was able to interrupt and encouraged them to interact, albeit for a shorter duration of time. Anxious dogs also showed a preference for the owner over the stranger, with almost no interaction with the stranger. In contrast, Avoidant dogs, showed a significantly higher preference for the stranger over the owner, as well as high levels of interaction with the stranger.

Interestingly, Passive dogs scored higher on safe haven behaviours with the stranger than with the owner, although of all four clusters, they exhibited the highest demand for physical comfort in any condition. While the owner was present, Passive dogs were highly attention seeking, displayed no exploration or interaction with the stranger. When the owner departed, they were generally inactive but sought out contact with the stranger at a higher level than with their owner. However, it is erroneous to suggest that they display a preference for the stranger over the owner (Topal et al. 1998) and that they are not “attached” to owners (Scott & Elliot, 1961). Dogs who are well socialised to humans would be expected to seek out human comfort when stressed. It is an evolutionary strategy, especially in times of stress to remain in close proximity to the pack. One can argue therefore that Passive dogs in this study were conditioned to a high level of interaction and close proximity to a supportive figure better able to cope with the environment which it has associated with a human being. Dogs that had received comforting from several humans, such as dog sitters, other friends or family may have an increased expectation that that they would be comforted from strangers in the owner’s absence. It is logical to expect that these highly human-socialised dogs would seek out the comfort of the stranger when the owner departed. For that reason, preference for one individual over another cannot be viewed in isolation as an indicator of an attachment relationship.

### *Limitations of Study*

While the experimental environment was controlled, there was no similar control of the participants' early social and physical environments. Although early trauma was not a significant predictor of cluster membership, if dogs were obtained from rescue shelters, early environmental information may not have been available. These between-participant differences may explain a significant variance in dog behaviour. A sample with complete early history profiles may produce different results. In addition, due to the low number of male dog owners (17%), replication of this study with more male owners may provide different dog cluster membership results.

This study also found inherent order effects. In the counterbalanced order, there was a significant difference between levels of exploration. For that reason, the first session with the dog and owner alone was eliminated from the analysis and exploration levels between owner/dog were based on reunion episodes only. Counterbalancing did not occur in the only other study to measure individual differences (Topal et al. 1998) but is important in ensuring accuracy in measuring secure base behaviours and should be adopted in future studies. Counterbalancing for gender of the stranger however, was not found to significantly impact the results.

Finally, this study did not measure sympathetic arousal as evidence of attachment system activation. The use of cortisol collection should also be considered, although gathering of stress hormone samples could confound the results (e.g. increasing the stress response through sample gathering).

### **Conclusion**

This study found evidence of individual differences in dog attachment security in the SST with 29% Secure, 29% Passive, 19% Anxious and 19% Avoidant. This was not found to be due to breed, age or gender. Avoidant dogs were however found to have the most number of previous owners as well as the shortest duration relationship with their current owners. A new category of Passive insecurity was found, which differs from infant SST studies, and is characterised by high physical contact with any human, accompanied by behavioural inhibition. Future research should investigate the genetic link between sensitivity to context and attachment security, as well as dog avoidance and length of ownership.

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## The Relationship of Owner Behaviour to Dog Attachment Style in the Strange Situation Test

### Introduction

Previous studies have not assessed owner behaviour in the Strange Situation Test (SST) in relation to dog attachment style. While Chapter 3 highlighted individual differences in dog attachment style, this chapter will investigate the relationship between dog attachment security/insecurity and owner behaviour in the SST. This may provide insight into the quality of owner nurturing.

Quality of nurturing in infant studies relates to sensitivity, responsiveness and consistency of the caregiver, especially in response to attachment system activation when the infant is frightened or distressed. The calming presence of the attachment figure provides a safe haven in secure attachment relationships. A parent that is sensitive to an infant's signals of fear or distress is more likely to respond in a timely and consistent fashion, with calming signals to alleviate distress (Bowlby, 1969/1982).

There is evidence that dog owners alleviate distress in dogs through gentle petting. It has been found to lower blood cortisol (Coppola et al. 2006), heart rate (Hennessy et al. 1998) and blood pressure (Odendall & Meintjes, 2003). Hennessy et al. (1998) found that female owners' use of soft voices and gentle petting resulted in lower sympathetic nervous system activation (increase in heart rate and cortisol levels) when dogs were faced with venipuncture. In contrast, harsh handling has been found to increase anxiety in dogs (Horvath et al. 2008).

If a parent acts inconsistently in response to the activation of the infant's attachment system or the parent becomes a source of fear instead of a safe haven, the infant risks developing disorganised behaviour responses. As measured in SST studies, the infant is motivated to approach the parent, but stops, freezes, or performs repetitive behaviours, a *flight without resolution* behavioural response. In infant studies, Hesse

and Main (1999) have measured six types of parental frightening behaviour (FR) which are associated with infant disorganised behaviours: threatening (looming over child, applying positive punishment); frightened (parent seems frightened); dissociative (not consciously aware of surroundings, as in deep thought), sexual (excessive cuddling or kissing), deferential (parent is submissive to child) and disorganised (parent's behaviour loses coherency). Whilst behavioural disorganisation was only found in two dogs in Chapter 3, evidence of dog avoidance of owners was prevalent in 21% of the sample and could be related to the use of owner FR behaviour, or, alternatively, attachment security could be associated with the lack of owner FR behaviour.

Nurturing quality can moderate the effects of genetic influences on behaviour, such that despite a genetic predisposition to high reactivity, those raised in an optimum environment are able to flourish. Suominen (1997) took female Rhesus monkey infants from their natural mothers shortly after birth and cross-fostered them with either normal (the control) or high-nurturing caregivers (the experimental group). The infants raised in a highly nurturing environment were found to explore more and displayed higher levels of curiosity and fewer behavioural disturbances than those in the control group. When these monkeys became mothers themselves they adopted the maternal behaviour of their foster mother. Therefore the environmental benefits of extreme nurturing can be culturally transmitted to the next generation.

The aim of this study is to determine if owner behaviour is related to dog attachment style in the SST. Owner behaviours measured will be: talk and touch duration; the number of instances in which they respond to dog attention seeking; the number of instances in which they attempt to verbally or physically control the dog's behaviour; and, the number of instances in which they use frightening (FR) behaviours. It is hypothesised that owners who use FR behaviours would be high on both verbal and physical control and will have dogs characterised as Insecure; owners scoring low on FR behaviours and high on touch will be more likely have dogs rated as secure. Therefore, it is hypothesised that there will be a relationship between owner interaction and dog attachment security/insecurity.

## Method

### *Participants*

The participants were those from Chapter 3. In this study, of the 52 owners, 82.7% were female ( $n = 43$ ) and 17.3% male, ranging in age from 25 to 72 years, ( $M = 47$ ,  $SD = 11.51$ ).

Table 4.1

*Six parental and dog owner frightening (FR) parental behaviour categories used in coding and definitions (Abrams, Rifkin & Hesse, 2006, p. 350; Hesse & Main, 2006 p. 320)*

Parental FR Behaviours	Definition	Parent Behaviour	Possible Owner Behaviour
Dissociative	Parent enters into an altered state of consciousness, or appears removed from an actively conscious state.	Parent suddenly freeze, despite nearby movement Parent addresses infant in an altered tone (simultaneously vocalising while inhaling breath) Parent uses odd noises or speech patterns.	Owner remains frozen (unmoving eyes or body), despite dog attention-seeking, as though the owner was in a trace. Owner does not acknowledge dog's presence.
Threatening	Direct threatening or frightening behaviour in view of infant, though not necessarily directed at infant.	Aggressive stances, such as stiff-legged "stalking" or infant Crawling towards infant (in a non-play context, exposure of canine teeth, growling at infant. Looming or sudden movements in the vicinity of the infant's face.	Owner makes themselves appear large and looming: arms raised, stiff legged, owner "growling". Attempts to play in a non-play context
Frightened	Parent exhibits sudden frightened look, inexplicable in origin.	Parent backs away or retreats suddenly from infant. Whites of eyes are exposed and fearful facial expressions	Owner suddenly appears frightened. Accompanied by a sudden and sharp inhale of breath, or an uncharacteristic vocalisation (cry, scream).
Timid or deferential	The parent appears submissive to infant	Parent is submissive to infant aggression, such as hitting or hair pulling (hands folded, head bowed) Parent turns to infant as haven of safety	Owner assumes submissive role: allowing dog to climb on them, biting, nipping or excessive licking.
Sexualised behaviours	Inappropriate romantic behaviours	Excessive caressing, deep kissing	Excessive touching of dog including genitalia, and excessive kissing.
Disorganised	Parental behaviours compatible with infant D categories from Main and Soloman (1990)	Parent displays contradictory behaviour patterns Mistimed movements, rocking and lack of an observable coherent caregiving strategy such as non-response to a crying infant	Owner appears at one moment deferential and then suddenly dissociative or threatening.



### *Procedure*

Owner behaviour was assessed for frightening behaviour (FR) and owner talk, touch, and response. Owner FR was based on a similar methodology to Hesse and Main (1996) which assessed six categories (Table 4.1): *threatening, frightened* owner behaviours, *dissociative, deferential, disorganised* and *sexualised or romantic* (see Chapter 1). Owner FR behaviour was scored on the number of instances it was observed, and was then compared to clusters using a chi-square analysis.

### *Data Analysis*

Owner talk was based on the duration (the total seconds talking per owner/dog episode). Touch was scored from the total seconds of owner-initiated petting, and response was scored from the total number of instances in which the owner responded verbally or with petting to the dog's attention seeking requests. Therefore, touch, responding and control totals were scored independently from talk duration. The type of owner talk (giving orders, praise, reassuring, general talk, nonsense talk, using the dog's name) was assessed by the number of utterances.

Dog clusters were then analysed using between groups ANOVA with Bonferroni post hoc comparisons with owner behaviours. To control for demographic effects such as the dog's age, correlations were first performed with both dog behaviour variables and owner variables, and then subjected to a multivariate analysis of variance (MANOVA) to assess gender (owner and dog) and breed.

Data first explored for dispersion with square root transformations on skewed variables to allow the use of parametric statistics throughout. Outliers were also investigated. Table 4.2 is a summary of data transformations which took place on nine variables found to contain outliers. Each outlier was investigated and if determined to be unrepresentative of the data set, was transformed ( $2 \times \text{SD} \pm \text{mean}$ ) and kept in the dataset (Field, 2005).

Table 4.2

*Exploratory analysis of variables for spread, with means, standard deviation, trimmed mean, standard error, outliers and transformed outliers.*

Variable	Mean	SD	Trimmed mean	Standard error	Outliers	Transformed outliers
O talk (sec)	14.15	4.12	14.09	.57	5	2
O touch (sec)	13.58	4.38	13.68	.61	1	1
O Respond (no.)	2.87	2.13	2.74	.29	1	1
O Orders (no.)	5.37	3.86	5.09	.53	2	2

O=owner

### *Ethics*

The experiment received the approval of the Ethics Committee of the University of Southampton. All participant dog owners were asked to sign a statement of consent before taking part (Appendix G) and were debriefed after the SST procedure.

## Results

### *Owner Talk and Touch*

As depicted in Figure 4.1, owners with Avoidant dogs talked more to them than dogs in any other group, with owners of Passive dogs talking to them the least.

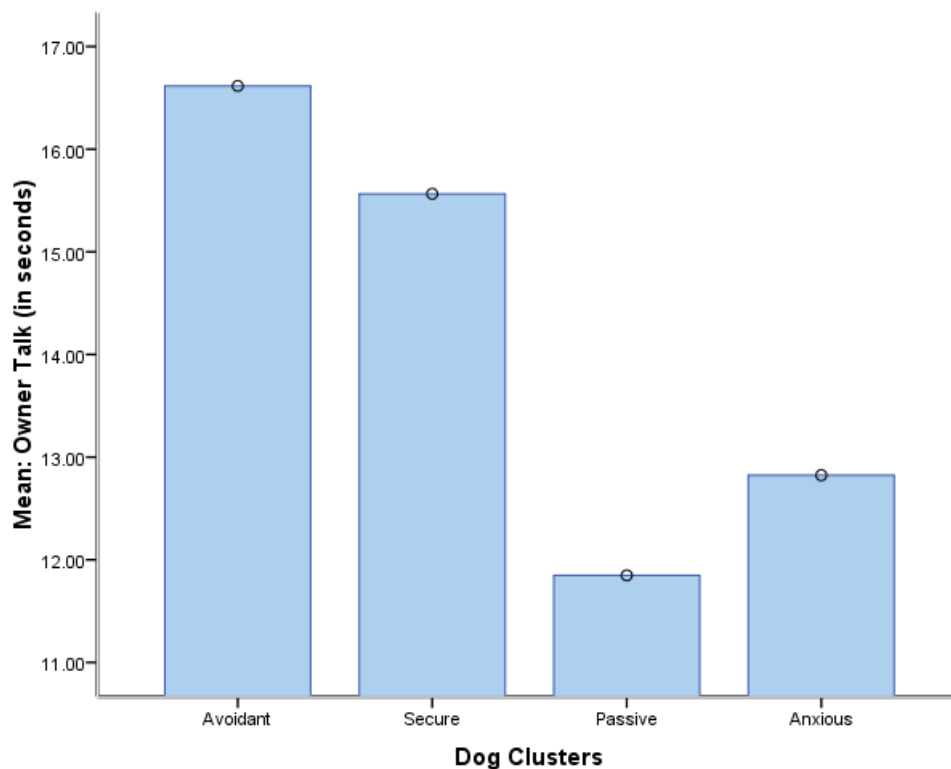


Figure 4.1. Mean distribution by cluster of owner talk levels in seconds.

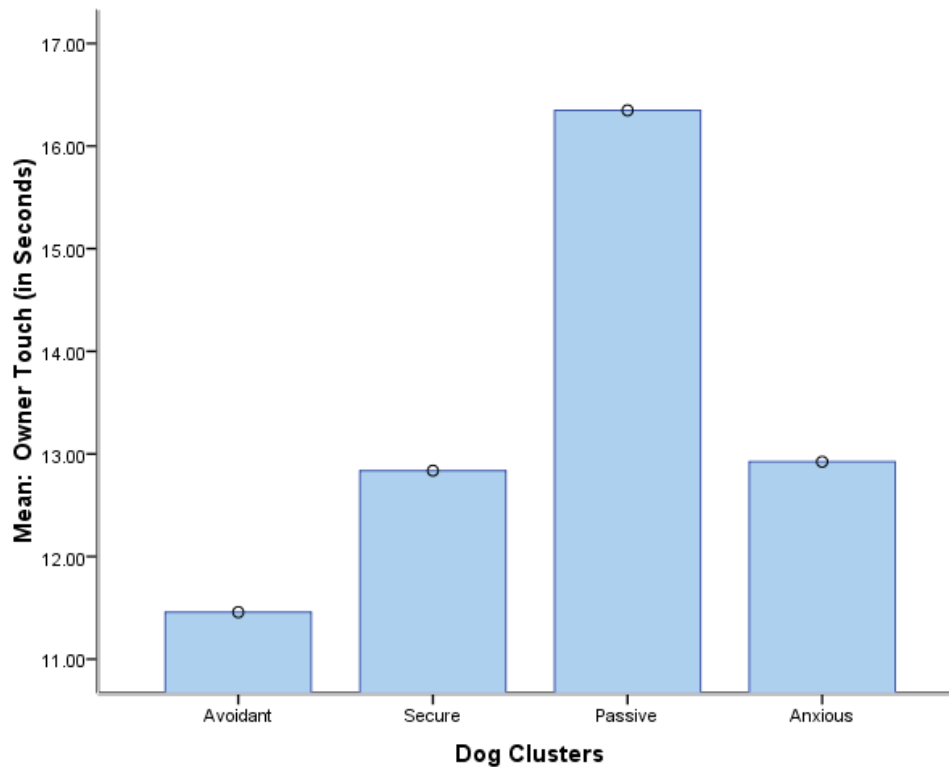


Figure 4.2. Means of owner touch (petting the dog) by cluster in seconds.

Figure 4.2 shows the high frequency of owner touch for Passive dogs compared with Avoidant dogs, with similar scores for both Secure and Anxious dog clusters.

Owner behaviour was then compared across dog clusters in a between group ANOVA with Bonferroni post-hoc tests. The means of four owner variables were found to significantly differ between clusters (Table 4.3 and 4.4)

Table 4.3

*A one way between cluster analysis of variance for owner variables talk and touch, with means, and effect size.*

	Clusters				Anova		
	1* N = 11	2* N = 15	3* N = 15	4* N = 11	F (3, 48)	P	Effect
Owner Talk (secs)	16.62	15.56	11.85	12.82	4.66	.006	.23
Owner Touch (secs)	11.45	12.84	16.35	12.92	3.56	.02	.18
Owner giving orders (no.)	5.19	4.01	2.29	3.11	4.87	.005	.23
Owner asking questions (no.)	4.52	4.33	2.81	3.02	5.04	.004	.24

\* 1: Avoidant; 2: Secure; 3: Passive; 4: Anxious

In a between group ANOVA with Bonferroni post-hoc comparisons (Table 4.3) significant between group differences for owner talk ( $F_{(3, 48)} = 4.66, p < .01$ ) and owner touch ( $F_{(3, 48)} = 3.56, p = .02$ ) were found. Owners of Avoidant dogs ( $M = 16.62, SD = 4.85$ ) talked to them significantly more than Passive dogs ( $M = 11.85, SD = 2.35, p < .01$ ), but they were petted significantly less ( $M = 11.46, SD = 5.48, p < .01$ ) than all other clusters. Passive dogs were petted significantly more ( $M = 16.35, SD = 4.13, p < .01$ ) than all other groups. The results suggest that attachment insecurity in Passive dogs is associated with low levels of owner talk and high levels of touch, and an Avoidant owner/dog bond by high levels of owner talk and low owner touch. Attachment security is characterised by moderate owner talk and low touch.

Table 4.4

*A one way between cluster ANOVA for owner variables “giving orders” and “asking questions” with means and effect size.*

	Clusters				Anova		
	1* N = 11	2* N = 15	3* N = 15	4* N = 11	$F(3, 48)$	$P$	Effect
Owner giving orders	5.19	4.01	2.29	3.11	4.87	.005	.23
Owner asking questions	4.52	4.33	2.81	3.02	5.04	.004	.24

Owner talk (Table 4.4) was broken down by talk type, such as owner saying it's name, giving orders (“fetch”, “sit”, “leave”, etc.), asking it questions (“where's the toy?”) praising, general talk and reassurance. In a between groups ANOVA with Bonferroni post-hoc comparisons, giving the dog orders ( $F_{(3, 48)} = 4.87, p < .01$ ) and asking it questions ( $F_{(3, 48)} = 5.04, p < .01$ ) differed significantly by cluster. Avoidant dog owners ( $M = 5.19, SD = 2.70$ ) gave their dogs orders significantly more orders than Passive dog owners ( $M = 2.29, SD = 1.66, p < .01$ ). Similarly, Avoidant dog owners ( $M = 4.82, SD = 1.06$ ) asked their dogs questions significantly more than Passive dog owners ( $M = 2.82, SD = 1.44, p < .01$ ). Owner reassurance, praising or saying its name were not associated with cluster membership.

Owner behaviour variables and prototype dog attachment clusters were then analysed in a between group ANOVA with Bonferroni post hoc comparisons. One significant relationship was found between the prototype Avoidant cluster (A3) (Figure 4.3) and all other clusters in respect of owner touch levels ( $F_{(7, 44)} = 3.28, p < .01, \eta^2 =$

.34), with again the most significant differences found between the Avoidant prototype cluster A3 ( $M = 5.01$ ,  $SD = .01$ ) and the Passive cluster ( $M = 16.76$ ,  $SD = 5.58$ ,  $p < .05$ ) and Passive prototype ( $M = 15.99$ ,  $SD = 2.67$ ,  $p < .01$ ). Figure 4.3 depicts the significant difference between groups.

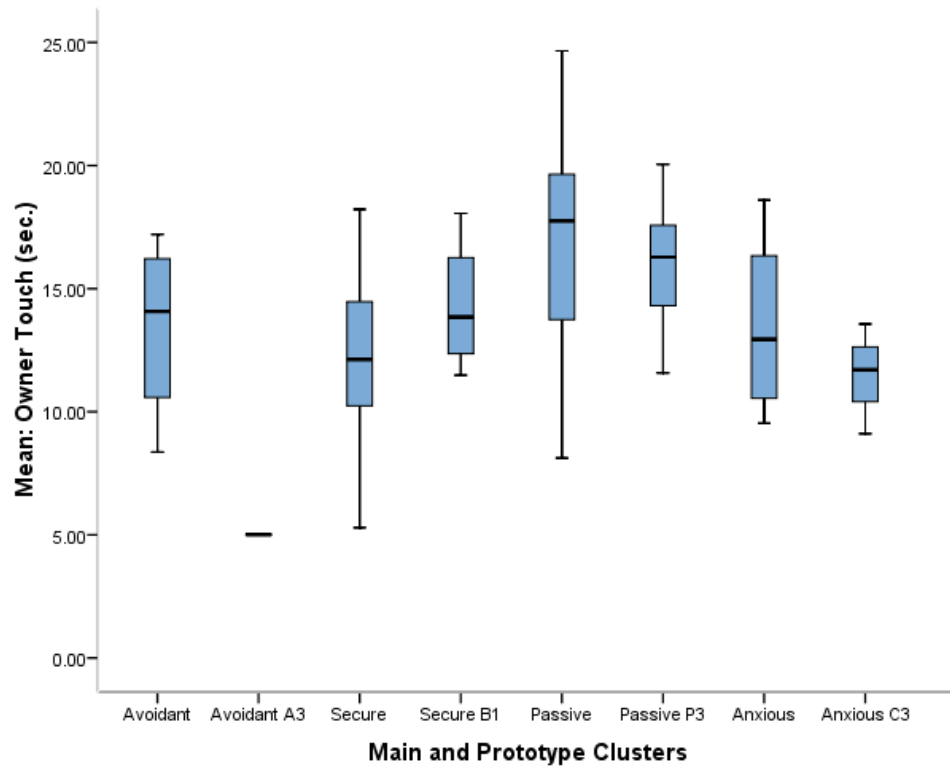


Figure 4.3. Mean of owner touch in seconds by main clusters and prototype clusters.

Although significant differences in owner talk between prototype clusters was not found, Figure 4.4 nonetheless illustrates differences between the Avoidant A3 cluster and the other clusters, with opposite results for owner talk (high) and owner touch (low).

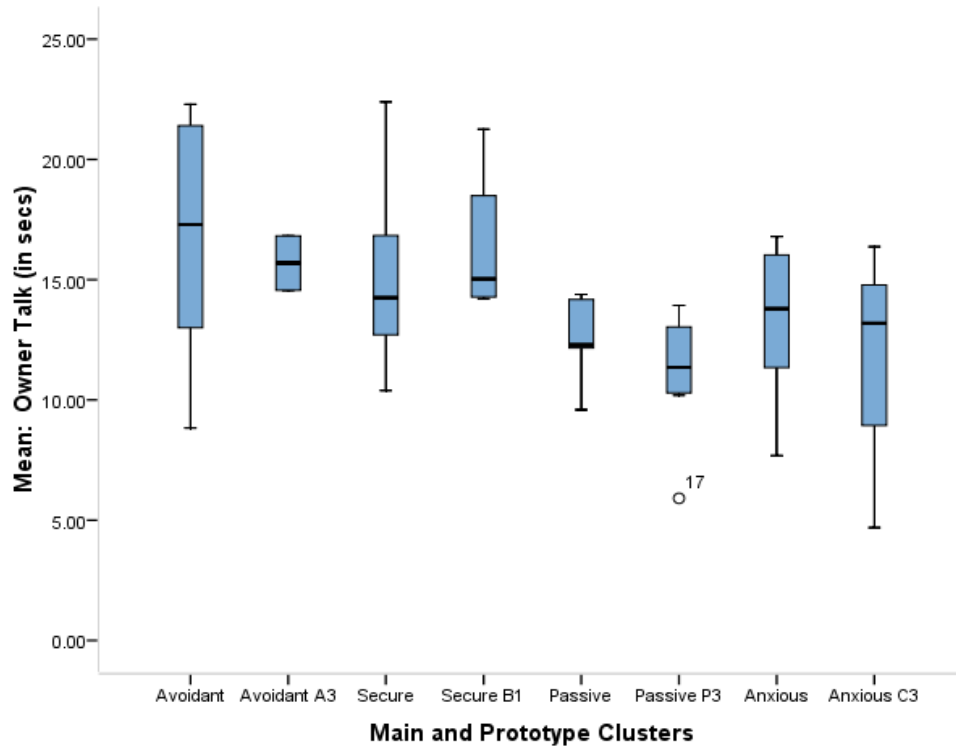


Figure 4.4. Mean of owner talk totals by main and prototype clusters

Dog behaviours variables were then compared with owner behaviour scores in a Pearson correlation (Table 4.5). Significant associations were found specifically in safe haven, play and latency to play and explore behaviours.

Table 4.5 shows that dogs whose owners exhibited higher levels of touch were found to be related to higher levels of dog safe-haven behaviours ( $r = .44, n = 52, p < .002$ ), which includes attention seeking, passive behaviours (sitting, standing, lying) or physically touching the owner. The owners responded to the dogs' request for attention by touching them. In contrast, owner talking levels had the opposite effect on safe haven behaviours: higher levels of owner talk were correlated with significantly lower levels of safe haven behaviours ( $r = -.39, n = 52, p < .01$ ). As would be expected from the nature of play, owner touch was negatively correlated with play levels ( $r = -.36, n = 52, p < .01$ ) whereas owner talk was significantly positively correlated with higher levels of play ( $r = .48, n = 52, p < .01$ ).

Latency to play or explore (the amount of time dogs' took to recover from the SST to begin play or explore) was also significantly related to owner talk and touch. Longer recovery times upon owner reunion, that is longer latency to play or explore,

were significantly associated with high levels of owner touch ( $r = .44, n = 52, p < .01$ ) and low levels of owner talk ( $r = -.34, n = 52, p < .01$ ).

The dog's age was also investigated in a Pearson correlation with significant dog and owner behaviour variables. Similarly to latency to play/explore, Table 4.5 also reveals a significant, though weak, positive association between age and owner touch ( $r = .25, n = 52, p < .05$ ) and a significant negative association with talk ( $r = -.32, n = 52, p < .05$ ) although the significance of these results is lost when subjected to Bonferroni corrections.

Table 4.5

*Pearson correlation coefficient depicting relationship between owner touch, talk, respond and control with safe haven behaviours, play and latency to play and explore, with means and standard deviations.*

	1	2	3	4	5	6	7	8	M	SD
Dog/owner dyads: $n = 52$										
1. Dog's age	-	<b>-.32*</b>	.25	-.13	-.18	.20	<b>-.55**</b>	<b>.43**</b>	5.82	3.38
2. Owner talk		-	<b>-.32*</b>	<b>.36*</b>	<b>.32*</b>	<b>-.39*</b>	<b>.48**</b>	<b>-.34*</b>	13.58	4.38
3. Owner touch			-	.06	.12	<b>.44**</b>	<b>-.36*</b>	<b>.44**</b>	14.14	4.12
4. Owner respond				-	<b>.49**</b>	-.14	.24	-.19	2.87	2.13
5. Owner control					-	-.16	.19	.06	5.72	4.20
6. Safe haven beh.						-	<b>-.35*</b>	<b>-.34*</b>	18.58	5.91
7. Play behaviours							-	<b>-.74**</b>	13.56	12.52
8. Latency play/exp.								-	30.27	3.90

Bold typeface indicates significance: \*  $p < .05$ , \*\*  $p < .002$  (Bonferroni)

#### *Owner Frightening Behaviours (FR)*

Of the 52 sample, 25% or 13 owners displayed FR behaviours at some point during the SST. Of these, 4 exhibited threatening behaviours (Table 4.6). This consisted of looming threateningly over the dog while playing in a non-play rigid stance. Two of the recipient dogs were Avoidant, one Secure and one Passive. *One* dog owner exhibited frightened behaviour (sharp inhale of breath) when the dog urinated on the carpet. The dog backed into the wall appearing fearful of the owner but remained inert. This dog was rated as Passive. *Two* owners exhibited deferential behaviour,

allowing their dogs (one Avoidant and one Passive) to climb on and claw them, without actively intervening. *Four* owners were found to exhibit dissociative behaviour. When their dogs' attachment system was activated and they approached and whined at the owner for attention, the owners remained inert as though in a trance, despite their dogs' attention seeking. Two of these dogs were rated as Avoidant and two, Anxious. Finally, *two* owners operated what is best described as disorganised strategies, at times supportive and sensitive, and at others threatening. Both these dogs were rated as Avoidant. Two dogs displayed disorganised behaviours in the SST. One exhibited approach then flight behaviours. Its owner used FR (threatening) behaviours. Although this dog is Secure, it's sub-classification was Avoidant. The owner of the dog exhibiting repetitive behaviours did not use FR behaviours.

Table 4.6

*Summary table of the use of owner FR behaviours by dog cluster*

Owner FR behaviour	Number of owners displaying	Avoidant cluster dogs	Anxious cluster dogs	Passive cluster dogs	Secure cluster dogs
Threatening	4	2		1	1
Frightened	1			1	
Deferential	2	1		1	
Dissociative	4	2	2		
Disorganised	2	2			

In a chi square analysis, there was a significant association between dog attachment security and owner FR behaviour,  $\chi^2_{(1)} = 3.78, p < .05$ . Dogs were 6.75 times more likely to be scored as Insecure (Avoidant, Passive or Anxious) in the Strange Situation if their owners exhibited FR behaviours than Secure.

Although individual dog clusters were not found to be significantly associated with FR behaviours, this could be because of the small number of cases in each group. The trend however suggests that owners of Avoidant dogs are five times, owners of Passive dogs 4 times and owners of Anxious dogs 3 times more likely to use frightening behaviours than owners of Secure dogs. However, there was no significant difference found between the dog behaviour variables: proximity seeking, distress, proximity restoring or safe haven seeking behaviours and owner FR behaviours.



### *Owner behaviours and dog and owner characteristics*

Owner behaviour was analysed using a multivariate analysis of variance (MANOVA) to determine a relationship to breed. With dog breed as the independent variable and owner behaviours of talk, touch, control, respond and owner FR behaviours as the dependent variables, a significant effect was found for one breed: the Estrella Mountain Dog [Wilks' Lambda = .14,  $F_{(4, 60)} = 1.43$ ,  $p = .05$ , partial  $\eta^2 = .39$ ]. This dog's owner's behaviour varied significantly ( $F_{(15, 36)} = 3.23$ ,  $p < .01$ ) from all other owners, specifically in relation to high owner talk levels. This participant represented one of two multivariate outliers in the data set. As the Mahalanobis distance (the distance of this one outlier from the central value in the data set) did not vary substantially from the critical value, this score was left in the data set. Therefore a conclusion cannot be made that the breed of the dog was significantly related to owner behaviour based on one case.

A MANOVA analysis of owner gender with behaviour variables showed that owner gender did not explain a significant variance in owner behaviour variables. Likewise, using dog gender as the independent variable and owner behaviours of talk, touch, respond, control, threatening, frightened, dissociative, disorganised owner behaviour as the dependent variables, there was no significant effect of dog gender on any behaviour.

## Discussion

The hypothesis of this study was that owner behaviour would significantly relate to SST dog attachment style. This was supported with owner talk and touch significantly relating to dog cluster membership and owner FR behaviour significantly relating to security/insecurity status.

### *Owner talk and touch*

Frequencies of both owner talk and touch were associated with individual dog clusters. Avoidant dogs had owners who talked to them significantly more than dogs in the other three groups but petted them significantly less. In a reverse to this, Passive dogs experienced the lowest levels of owner talk and the highest levels of owner touch. Owners of Secure dogs touched and petted them at a moderate level in response to

attention seeking, thereby providing a haven of safety. Owners of Anxious dogs were more likely to use high levels of talk and low levels of touch.

Avoidant dogs were touched the least of any cluster, but talked to the most. This supports the findings of parent/infant studies in which the parents of infants rated as Avoidant in the Strange Situation exhibited the fewest tactile behaviours (Ainsworth et al. 1978). Talk in this experiment correlated with fewer distress behaviours, lower play latencies (quicker recovery) and fewer attachment-to-owner behaviours (such as safe haven seeking from the owner). However, the relationship may not be linear. Dogs could be avoidant due to a history of owner FR behaviours or because owners talked to them at excessive levels and touched them less. Owners may talk to these dogs more and touch them less because they displayed low attachment behaviours which failed to elicit the type of caregiving that results in a close physical rapport. Alternatively, they talked to them more because the dogs exhibited poor behavioural response. It could be that the experimental protocol if undertaken in a home environment would have yielded different results. Furthermore, as Avoidant dogs were found to have shorter duration relationships with current owners, the bond that enables comfort seeking behaviours may not have developed. Hazen and Ziefman (1999) and Weiss (1988) suggest that it takes two years in adult relationships for an attachment bond to form. Therefore, these dogs may not have had time to form an attachment to the owner. What is evident, for Avoidant dogs owners did not appear to provide a haven of safety.

Passive dogs were touched the most and talked to the least. The owner's interaction with them either reinforced or reduced their fear. Further studies using blood cortisol analysis could have clarified whether Passive dog's stress increased or decreased through owner petting, although Odendall and Meintjes (2003) found evidence of reduced stress in dogs that are stroked and talked to gently, without cortisol analysis. Future studies should include physiological measures of the stress response, or a reversal in owner behaviour. For example, would a reduction in touch and an increase in owner talk result in more secure base behaviours? Are these dogs Passive as a result of high levels of owner physical contact or are the owners engaging in high levels of petting because the dogs are showing signs of passive insecurity? In dog/owner episodes Passive dogs display 40% fewer play and 71% fewer exploratory behaviours than Secure dogs in the SST. This suggests that internalising stress is a normal behavioural response and not due to the presence of the owner. As this could be a generalised behavioural response, Passive dogs' attention seeking could have induced

the petting response from the owner and not the other way around. It appears as though owners were responding to the dogs' requests for nurturing, which activated their caregiving system.

Owners of Anxious dogs displayed similar levels of talk and touch as Avoidant dog owners, although not as extreme. They displayed high levels of talk and low levels of touch, even though their dogs were highly attention seeking and safe haven seeking. However, Anxious dogs did not seek comfort from the stranger which could indicate that they do not associate human petting per se with a safe haven. Anxiety in dogs arises when they predict that an uncontrollable or aversive situation is about to occur and cannot find an adequate coping response (fight or flight) in order to return to a parasympathetic state (Lindsay, 2000). In these cases, the dogs may have adapted, or learned coping behaviours in the absence of a coping strategy which has unconsciously been reinforced by the owners. The coping behaviour may be closeness to owner as a safe haven, but the owner's talk/ touch when the dog is anxious, could be interpreted by the dog as "owner reassurance" or a validation of their anxiety once the sympathetic nervous system is activated. In this case, mild anxiety is often heightened and prolonged through the owner's unconscious positive reinforcement (petting) of the negative behaviour (anxiety). If this is a normal response for owners, dogs may learn to associate owner touch with anxiety, and sympathetic arousal may occur as a classically learned response even when touch is at low levels, which seems to be confirmed in this study.

As Secure dogs had owners who exhibited moderate levels of both talk and touch, it appears as though owners responded in a controlled and moderated fashion to the dogs' requests for attention. Once attention was received, in other words, secure base effects were achieved through this controlled interaction, they exhibited confidence to play and explore, which is similar to Secure parent/child (Ainsworth et al. 1978) and primate studies (Suomi, 1997). Differences from the Anxious dogs may be related to a higher underlying general anxious state in and/or different styles of owner/dog interaction, with the owners of Secure dogs relating to them in a more predictable manner. For example, having clear communication signals of when interactions with owner are available produce predictability and reduces anxiety (McBride, 1995).

### *Owner Frightening Behaviour (FR)*

Although only 25% of owners were found to exhibit frightening (FR) behaviours, these were significantly found to be related to dog insecurity. In human studies, FR parental behaviours are distinctive. They appear out of context: distinctly non-play-like during play, or play-like during non-play sessions. The 4 owners with threatening FR behaviours and the 2 owners with disorganised behaviours employed non-play-like gestures during play. The dogs responded by retreating from the owners. The results of this study do not support the findings of Abrams et al. (2006) and Hesse & Main (2006) in which infant disorganisation in the Strange Situation is also associated with FR maternal behaviours. Instead, in this study the behaviours most associated with owner frightening behaviour were related to attachment insecurity, namely avoidance or stilling (characteristics of the Avoidant and Passive clusters). Only 2 dogs showed evidence of disorganised behaviour. One of these dog's owners had used threatening FR behaviours in the Strange Situation Test. However, in 12 of the 13 dogs whose owners had used FR behaviours, there was little evidence of dog behavioural disorganisation.

Four of the owners used dissociative FR behaviours, in which they appeared trance-like and did not respond to the dog's attention seeking during attachment system activation. Hesse and Main (2006) found that parents in a dissociative state did not notice distress in infants and were not therefore sensitive to their needs. The caregiving system does not activate in response to the child's attachment needs and therefore is a significant predictor of infant disorganisation (Abrams et al. 2006). The 4 cases of owner dissociative behaviours were associated with Passive and Avoidant dog clusters. It could be that some of the passivity in Passive dogs is due to dissociation from stressful events. Of the 15 Passive dogs in this study, 5 had owners showing some degree of FR behaviours. It could be hypothesised that whereas the stressful protocol induced the dissociative passivity in 10 dogs, the dissociative behaviour of the *owners* is associated with dissociative passivity in 5 Passive dogs.

Seven out of 11 dog owners of Avoidance dogs (or 63%) displayed FR behaviour in the SST. The extent to which owner FR behaviours contributed to dog avoidance cannot be ascertained accurately in a laboratory procedure. Other factors such as the dog's previous history and training techniques could be causal factors. Harsh training techniques, such as the use of shock collars have been found to produce both short and long-terms behaviour effects in which the dogs learn to associate the presence

of the owner with distress (see Schilder & van der Borg, 2004). To test these hypotheses, an analysis of both owner and dog behaviour in a task-solving or game playing protocol, or a behaviour analysis in the home environment rather than a laboratory, might provide greater insight into the effects of owner behaviour, particularly owner FR behaviour on dog attachment style.

The results from this experiment could be generalised to situations involving minor stressors, such as visits to the veterinarian, where high levels of owner touch is more likely to increase rather than decrease dog anxiety. In these cases, owner talk alone may be more calming. Experiments involving the moderation of owner behaviour in stress-inducing situations may provide insights into the effects of reduced levels of touch on sympathetic nervous system activation in dogs exhibiting high levels of anxiety. Studies looking at the incidence of anxiety/fear based separation-related behaviour problems in dogs with high-petting versus low-petting owners in moderately stressful situations may provide insights into the effects of differing levels of owner touch on sympathetic activation. In addition, although none of the owners' behaviours showed evidence of abusive or harsh handling, the fact that owners of insecure dogs were significantly more likely to use moderately frightening behaviours is an interesting finding that warrants further investigation.

### Conclusion

The hypothesis of this study, that owner behaviour would be associated with dog attachment style in the SST was supported. Owner behaviour was found to relate both to dog clusters and dog behaviours. Owner FR behaviour was significantly related to dog attachment style, particularly in relation to the Avoidant and Passive dog clusters. Avoidant dogs, who had the shortest duration relationship with the current owners, had owners who used more FR behaviours than other clusters, talked to them significantly more than owners of dogs in the other three groups but petted them significantly less. Anxious dog owners used low touch and high talk. Passive dogs had owners who also used FR behaviours, the lowest levels of owner talk and the highest levels of owner touch. This experiment suggests that while the dog/owner bond may strengthen over time, owners who have adopted a style of interacting characterised by an absence of even moderate FR behaviours accompanied by moderation in talk and touch, both in terms of responding to the dogs' requests for attention and the owner initiating the

behaviours themselves, were more likely to own dogs rated as Secure in this experiment.

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## The Relationship between Owner Behaviour and Dog Attachment Style in a Task Solving Experiment

The Strange Situation Test (SST; Ainsworth et al. 1978) revealed individual differences in dog attachment style with classifications of Secure, Avoidant, Anxious and Passive. Dogs in each cluster differed in the use of owner as a secure base to play and explore, distress behaviours (emotional response to separation), proximity restoring behaviours (need to re-establish contact) and safe haven behaviours (need to be near or in physical contact). Chapter 4 found significant differences in owner SST behaviour by cluster: owners of Insecure dogs used significantly higher levels of FR behaviours and were found to exhibit high talk/low touch with Avoidant dogs and low talk/high touch with Passive dogs. The aim of this chapter is to explore the link between dog attachment security, owner behaviour and exploratory behaviour in task solving (TS).

### Introduction

In developmental research a link has been found between infant attachment security, parental sensitivity and infant confidence in exploration through task solving. Exploration consists of a balance between approach/withdrawal behaviours. Attachment theory proposes that attachment security is derived through the availability, consistency and sensitivity of the attachment figure derived through positive interactions (Bowlby, 1969). This consistency provides infants with confidence to explore and become skilful in managing their environment (Grossman et al. 1999; Main, 1983; Sroufe, 1979). In contrast, infant insecurity has been linked to insensitive caregiver behaviours in task solving: interruption of play, inconsistent responses and insensitivity to the infant's emotional state (Grossman et al. 1999). Grossman et al. found that caregivers of Avoidant toddlers were less sensitive in noticing distress and often interrupted or took over play, increasing the child's distress. Caregivers of Ambivalent/resistant toddlers also interrupted play in response to their own anxiety.

Matas et al. (1978) investigated the association between attachment styles and confidence in problem solving by first using the SST to categorise toddlers at 18 months, then assessing play and exploratory behaviours with their mothers at 24 months. Interactions were simultaneously recorded and instances in which the mother attempted to control the child were counted. They found that Secure toddlers exhibited higher levels of persistence, focus, competence and success in problem solving tasks. Their caregivers were more supportive and focussed on their child's activities than caregivers of insecure children<sup>1</sup> (Matas et al. 1978). Thus, caregivers of Secure toddlers provided non-invasive support to encourage, rather than discourage exploration, findings similar to Sroufe (1979) and Schieche and Spangler (2005).

The current study set out to apply the methodology from Matas et al. (1978) to investigate the attachment-exploration balance in dogs by measuring dog and owner behaviour in task solving (TS). It was predicted that the exploratory system in Secure dogs would activate when presented with a task. They may use the owner as a secure base, or seek proximity, but it was not expected that these would inhibit exploration frequencies. In contrast, insecure dogs (in particular Passive and Anxious) may approach the task with fear, resulting in lower levels or non-existent exploratory system activation. In these cases it is predicted, as in Matas et al. (1978) that the attachment system will become activated resulting in higher levels of proximity seeking (in Anxious dogs) or withdrawal (in Avoidant dogs) with reduced TS levels.

Secondly, this chapter investigates the link between owner behaviour in TS and dog attachment style. It is hypothesised that owners of Secure dogs will provide positive indices of support. They would not interfere with play and would provide encouragement. In contrast, owners of insecure dogs (Avoidant, Passive and Anxious) would interfere with play, and be less sensitive to the dogs' emotional states. It was expected that the quality of owner support would be related to longer TS duration. For example, a high quality of owner support which involves low levels of invasive behaviours (such as physical restraint of the dog) would be related to higher TS behaviour duration. Therefore, a relationship between dog attachment style and owner behaviour in TS was predicted in this study.

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<sup>1</sup> Individual "insecure" categories (e.g. avoidant, ambivalent/resistant) were not analysed separately in that study.



## Method

### *Participants*

There were 52 participating dogs ( $F = 24$ ,  $M = 28$ ) and owner dyads with an age range of 18 months to 14 years ( $M = 5.68$ ,  $SD = 3.40$ ). Amongst the owners, 9 (17.3%) were male and 43 (82.7%) were female, with an age range from 25 to 72 years ( $M = 46.5$ ,  $SD = 11.59$ ). This sample consisted of the same participants tested in the SST, Chapter 3. Dog owners stayed with their dogs throughout this experiment.

### *Materials*

The experimental room and equipment used were identical to that used in the SST. The task involved the use of a dog toy, Dog Turbo designed by Nina Ottosson Zoo Active Products. The objective of the game is for dogs to move blocks through passages where treats are located. They learn that by moving the blocks in the right direction, treats are released through holes in the sides of the toy (Figure 5.1).



*Figure 5.1.* The “Dog Turbo” by Nino Ottosson. The dog moves blocks with their paws to release treats by side holes.

### *Procedure*

The task solving game occurred directly after the Strange Situation Test in chapter 3. Owners were briefed on the game’s operation and were told that they were to

encourage dogs to use paws rather than tongues to move the blocks to release treats. Owners were given a tin of treats to use as required. The game was placed on the floor, and video cameras recorded dog and owner behaviour for three minutes. The 3-minute timeframe was chosen to ensure that dogs would remain focussed on the game before habituation occurred.

### *Data Assessment*

Continuous time sampling was used. Tapes were viewed and both dog and owner behaviours noted on an ethogram.

### *Assessment of Owner Behaviour*

Replicating the same methodology as Matas et al. (1978), the sensitivity, supporting presence and overall quality of caregiver support was measured in two separate Likert scales (Tables 5.1). In Table 5.1, owner sensitivity ranged from 1 (largely insensitive) to 7 (highly sensitive). Owner quality of assistance was measured from 1 (low quality characterised by high play interruption and invasive behaviours) to 7 (high quality with low play interruption, low physical restraining of dog).

Table 5.1

*Owner behaviour in the task-solving test, based on two scales: Owners' Supportive Presence and Quality of Assistance provided (adapted from Matas et al. 1978).*

<b>Scale rating</b>	<b>Owner sensitive/supporting presence</b>	<b>Quality of assistance</b>
1	Owner appears insensitive to dog discomfort and its signals. Owner is inattentive and physically removed from task (e.g. owner is not sitting with dog, but on chair or sofa, standing or sitting away from task). Owner is forceful in ordering dog verbally.	Owner highly invasive: Owner provides negative assistance and is highly involved in restraining dog by physically moving dogs' legs/paws on 5 or more occasions. Owner solves task for dog more than 75% of the time.
3	Owner somewhat insensitive to dog discomfort and signals. May initially seem supportive but then moves to sofa or chair, providing no encouragement.	Owner somewhat invasive. Owner involved in physically restraining and touching/moving dog's legs on up to 4 occasions.
5	Owner somewhat sensitive to dog's signals. Owner supportive but primarily passive throughout task solving, providing limited encouragement.	Owner rarely invasive. Owner provides positive assistance to help dog solve task but may grab paw or interfere in task on up to two occasions.
7	Owner highly sensitive to dog's signals. Owner supportive in dog's efforts: permits physical closeness while avoiding invasiveness (restraining dog, grabbing paws). Owner encourages and praises dog.	Owner never invasive. Owner provides highly positive assistance: helps dog see relationship between required actions and task solving, giving just enough assistance to keep dog working at task. Owner may touch paw, never grabs and does not interfere with task-solving.

Other owner behaviours assessed were the duration of total owner control of the dog (in seconds over the 3-minute task) plus frequencies of individual control behaviours: grabbing paw, touching paw, attempting to grab paw, and picking up or physically restraining the dog. The number of instances in which the owner praised the dog (“good dog”), gave the dog orders (“use your paw”) and reassured the dog (“its alright”) were counted.

#### *Assessment of Dog Behaviour*

Five separate 5-point rating scales were used to assess dog behaviour: their orientation towards the task; intensity of focus on the task; help-seeking from owner; proximity seeking towards owner; acceptance of owner restraint and avoidance of owner (Table 5.2). Other dog behaviours assessed were the duration of play (in seconds) and the number of play bouts as per Matas et al. (1978).

Table 5.2

*Dog behaviour scales in task-solving test, scored on 5-point scales for orientation towards the task, intensity of focus, help-seeking and proximity seeking (adapted from Schieche & Spangler, 2005), and dog acceptance of paw touching.*

Scale rating	Physical Orientation towards task	Intensity of focus	Proximity seeking (3 separate scores for each minute of the 3 minute task and one score for Total Proximity seeking)	Dog acceptance of owner restraining behaviours (picking up dog, grabbing paw)	Dog Avoidance of Owner (physical moving away from owner, observing owner from a distance)
1	Dog is not in physical vicinity of task, ignores task, does not approach, does not try to solve.	No exploration	No attention to owner, dog does not seem to perceive owner.	Not accepting, active attempts to avoid by moving/jumping backwards	No avoidant behaviours.
2	Dog is within the vicinity of the task, has 2 intense looks of 3 secs, but does not try to solve task.	Looking at task but does not manipulate	Dog seeks proximity less than 50% of the time.	Somewhat accepting, but posture is indicative of escape	Dog shows evidence of avoidance on one occasion.
3	Dog is in the vicinity of the task and repeatedly moves between task and owner	Dog hesitantly may smell or lick but is not actively involved in task solving	Dog seeks proximity more than 50% of time and often moves between owner and task.	Neutral posture	Neutral
4	Dog is in direct physical contact with task with episodes of interruption	Dog is actively occupied with task with episodes of interruption	Dog remains within close reach or physical contact with owner while participating in task.	Moderate acceptance, posture somewhat forward	Dog often (more than 2 occasions) avoids contact with owner and is vigilant in watching owner
5	Dog is in direct physical contact with task for the duration.	Dog manipulates and is successful at task with no interruptions	Dog has constant physical contact (on owner lap, or directly behind owner) and does not participate in task.	Full acceptance, posture forward	Dog avoids all contact with owner and is highly vigilant in observing owner from a distance.

## Data Analysis

The sessions were videotaped using a quad-screen format. Behaviour of the dogs and owners were subjected to independent analyses. Data were assessed for normal distribution, with non-normal variables square root or log transformed to enable the use of parametric statistics throughout. Data were then explored for outliers. Table 5.3 is a summary of data transformations which took place on the six variables found to contain outliers. Each outlier was investigated and transformed ( $2 \times \text{SD} \pm \text{mean}$ ). If, after investigation, the score was determined to be unrepresentative of the data set and could otherwise bias the statistical model (Field, 2005), it was transformed but kept in the data set. One variable, *owner reassuring dog* was found to contain 9 outliers but upon investigation of the data, these cases comprised all scores  $> 0$  using reassurance as 43 cases scored 0. This variable was therefore converted to a categorical 2 level variable (owner reassurance: yes/no).

Table 5.3

*Exploratory analysis of variables for spread, with means, standard deviation, trimmed mean, standard error, outliers and transformed outliers.*

Variable	Mean	SD	Trimmed mean	Standard error	Outliers	Transformed outliers
Play duration	10.21	2.93	10.50	.41	4	4
O support	5.51	1.78	5.67	.25	2	2
O quality	4.61	1.90	4.68	.26	0	0
O grab paw	1.73	1.47	1.66	.21	0	0
O touch paw	.45	.77	.36	.11	1	1
O pick up dog	.43	.75	.34	.11	1	1
O Total control	2.07	1.61	2.02	.23	0	0
Giving orders	4.16	1.85	4.21	.26	0	0
Praising dog	1.29	1.31	1.22	.18	0	0
Reassuring	.38	.79	.28	.11	9	0
Play bouts	2.42	.76	2.46	.11	1	1
Dog avoidance of owner	2.73	1.54	2.69	.21	0	0
Total proximity seeking	2.90	.58	2.90	.08	0	0
Proximity 1st minute	1.40	.42	1.48	.06	0	0
Proximity 2nd minute	1.50	.50	1.49	.07	0	0
Proximity 3rd minute	1.45	.50	1.44	.07	0	0
Total intensity of focus on task	2.90	.58	2.90	.08	0	0
Total orient to task	2.90	.63	2.90	.08	0	0

O=owner

Dog clusters from the SST (Chapter 3) were used in either independent sample *t*-test or one way analysis of variance (ANOVA) with Bonferroni post hoc comparisons to determine differences in both owner behaviour and dog behaviours between clusters.

Dog characteristics were assessed in a questionnaire described in detail in Chapter 6 (Appendix H): age, gender, neutering status, breed, origin (kennel, rescue, etc), training history, number of previous owners, amount of time with current owners, type of residence (flat, house, etc), location of residence (village, town, etc), access to a garden, and the number of other dogs or other pets in household. Also requested was the dog's previous experience of trauma. Owner demographic variables assessed were gender, age, marital status, children in the household, whether the owner was a parent, level of education and income.

To control for demographic effects such as the dog's age, correlations were first performed with both dog behaviour variables and owner variables, and then subjected to a linear regression analysis to control for age effects. Breed differences were assessed using a multivariate ANOVA.

Data were analysed after video assessment using SPSS V.16, and plots designed on Sigmaplot V9. Inter-observer reliability was assessed by 3 independent observers coding 10% of the total video sample, which were then be subjected to Cohen's kappa tests,  $\kappa = 0.98$  revealing very high inter-observer reliability.

### *Ethics*

The experiment received the approval of the Ethics Committee of the University of Southampton. All participant dog owners were asked to sign a statement of consent before taking part (Appendix G) and were debriefed after task.

### *Results*

Descriptive analyses of the exploration-attachment balance revealed that 90% of dogs' exploratory systems were activated, with 5 dogs (9.6%) experiencing no TS by remaining virtually passive. In the first minute 53.9% of dogs were actively engaged in TS. However, this falls to 38.5% by the third minute. Evidence of attachment system activation was found in 9 dogs (16.5%). These dogs remained in close physical contact with the owner while engaged in TS in the first minute. This rises to 16 dogs (30.8%) in the second and third minute of exploration. Sixteen dogs (30.7%) displayed active avoidance of the owner, in an attempt to escape owner control (grabbing paws). Of the

owners, 6 owners (11.5%) displayed the lowest levels of supporting presence whereas 34 (65.4%) were highly sensitive/supportive. Most owners did exert some physical control (76.9%) by grabbing or attempting to grab paws or physically restraining dogs.

In independent sample *t*-tests, no dog gender differences were found in any variable. In a Pearson Correlation, the dogs' ages were not found to have a significant relationship with any owner or dog behaviour variable. However, owner gender differed significantly in the duration of proximity seeking. Dogs with female owners ( $M = 2.58$ ,  $SD = 1.61$ ) had significantly higher levels of proximity seeking in the last minute (indicating prolonged proximity seeking) than dogs with male owners ( $M = 1.56$ ,  $SD = .88$ ;  $t_{(21)} = 2.68$ ,  $p < .01$ )

In a Pearson correlation with Bonferroni corrections, the impact of owner behaviour on the dogs' task-solving duration, orientation towards the task and intensity of task manipulation were analysed. Table 5.4 correlates owner control variables (grabbing paws, picking up the dog, attempting to grab paws and overall physical control of the dog) with TS duration. A significant negative relationship was found between task solving duration and overall physical control of the dog, ( $r = -.40$ ,  $n = 52$ ,  $p < .01$ ), owners grabbing paws ( $r = -.35$ ,  $n = 52$ ,  $p < .01$ ) and physically restraining dogs (picking them up) ( $r = -.42$ ,  $n = 52$ ,  $p < .01$ ).

Table 5.4

*Pearson correlation coefficient, means and standard deviations of dog task solving frequency and owner behaviour.*

	1	2	3	4	5	6	M	SD
Dog/owner dyads, $n = 52$								
1. TS duration	-	<b>-.40*</b>	<b>-.35*</b>	.13	-.14	<b>-.42**</b>	112.69	48.13
2.. Total Owner control		-	<b>.96**</b>	-.18	<b>.50**</b>	<b>.66**</b>	6.81	7.46
3. Grab leg/paw			-	-.18	.30	<b>.50**</b>	5.10	5.88
4. Touch paw				-	-.05	-.14	.87	1.75
5. Attempt to grab leg					-	.26	.98	1.53
6. Picking up dog						-	.73	1.60

Bold typeface indicates significance: \*\* $p < 0.002$  (Bonferroni), \*  $p < 0.01$

In a Pearson correlation (Table 5.5), TS duration, orientation and intensity were analysed with owner variables not related to physical control, such as the quality of

assistance, giving praises to the dog, giving the dog commands and reassuring the dog. Table 5.5 indicates that TS duration is positively significantly associated with the quality of owner assistance ( $r = .38, n = 52, p < 0.01$ ), for example, using positive reinforcement such as praise ( $r = .34, n = 52, p < 0.01$ ). The use of praise is significantly positively associated with the dogs' orientation towards the task ( $r = .61, n = 52, p < .01$ ) and with a highly intense focus on task solving ( $r = .65, n = 52, p < .01$ ). This therefore suggests that owner praise was perceived as reinforcing, which translated into longer duration of TS, longer orientation towards the task and a continued intensity of focus on solving the task.

Table 5.5

*Pearson correlation coefficient, with means and standard deviations of task solving duration, and quality of owner assistance including praise.*

	1	2	3	4	5	6	7	M	SD
Dog/owner dyads, n = 52									
1. TS duration	-	<b>.77**</b>	<b>.71**</b>	.10	<b>.38*</b>	.02	<b>.34*</b>	10.34	2.55
2. Orient. to task		-	<b>.92*</b>	.24	<b>.32*</b>	.15	<b>.61**</b>	2.90	.63
3. Intensity of focus.			-	.29	.29	.12	<b>.65**</b>	2.91	.58
4. Owner supportive presence				-	<b>.47**</b>	.07	<b>.42**</b>	5.56	1.75
5. Quality of owner support.					-	-.12	.20	4.56	1.91
6. Giving dog orders.						-	.25	4.19	1.84
7. Owner Praising dog							-	1.32	1.31

Bold typeface indicates significance: \*\* $p < .002$  (Bonferroni) \*  $p < .01$

### *Dog Breeds*

In a multivariate analysis of variance (MANOVA) the relationship of dog breed on TS performance and owner behaviour was assessed based on six variables: TS duration, intensity of focus, task orientation, owner support, owner quality of assistance and owner control. In the first instance data were checked for normality, linearity outliers, homogeneity and multicollinearity with no outliers or other violations observed. There were no significant differences between dog breed groups on any the dependent variables.



### *Dog and owner characteristics*

Dog and owner ages, genders, the origin of the dog, training history and experience of trauma were also assessed to determine associations with behaviours using a MANOVA. There was no significant relationship between dog or owner characteristics and TS behaviours in this experiment.

### *Task Solving and Dog Attachment Style*

Table 5.6 provides a summary of the means and standard deviations by dog SST clusters for both owner and dog TS behaviours. The mean for total TS in Secure dogs ( $M = 132.82$ ) is higher than the combined mean for all clusters. Passive dogs displayed the lowest mean ( $M = 91.40$ ) followed by Avoidant dogs ( $M = 100.56$ ). Secure dogs also seek proximity with the owner at a higher level than all other dogs, which is indicative of the owner providing a secure base and supporting presence.

Table 5.6

*Dog behaviour variables and owner behaviour variables means and standard deviations by dog cluster*

	Totals		Avoidant		Secure		Passive		Anxious	
	M	SD	M	SD	M	SD	M	SD	M	SD
Dog Behaviours										
Total TS (secs)	112.69	48.13	100.56	40.08	132.82	38.02	91.40	59.48	111.44	49.99
Help Seeking	2.13	1.36	1.89	1.54	2.59	1.33	2.10	1.45	1.81	1.22
Proximity Seeking	8.79	3.36	8.78	2.68	10.47	3.15	7.10	3.25	8.06	3.45
Owner Behaviours										
Owner support	5.54	1.78	5.89	1.62	6.00	1.87	5.20	1.75	5.06	1.77
Owner quality	4.56	1.91	3.33	1.93	5.47	1.81	4.40	1.96	4.38	1.67
Controlling	6.81	7.46	10.33	7.75	5.00	5.70	4.70	5.83	8.06	9.28
Ordering	20.83	14.62	23.00	10.04	26.41	15.34	11.00	10.53	19.81	14.62
Praising	3.42	4.71	5.00	4.40	5.71	6.35	1.70	2.63	1.19	1.83

The relationship between dog attachment style, owner behaviour and dog TS behaviours were then analysed in a between groups one way ANOVA with Bonferroni post hoc comparisons (Table 5.7).

Table 5.7

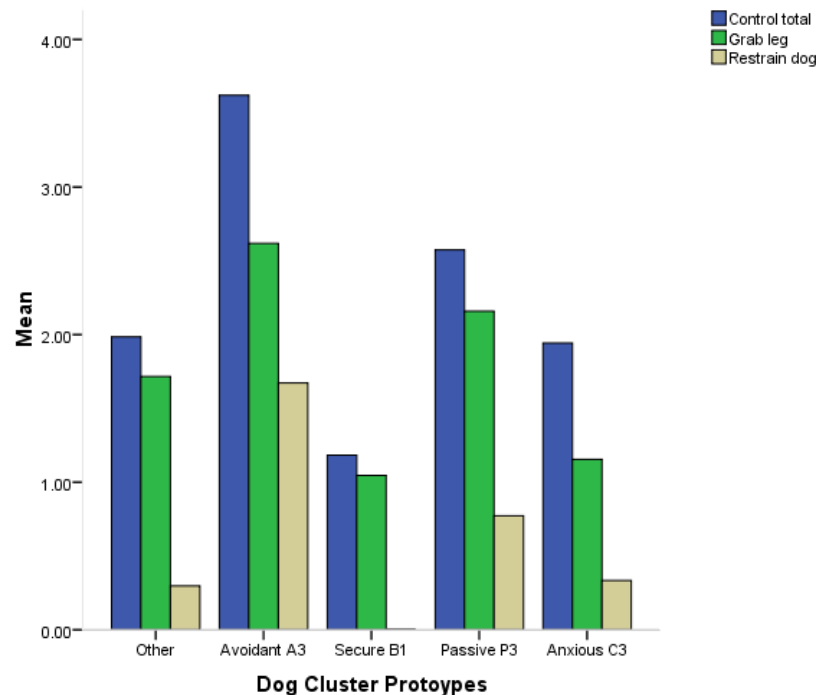
*One way ANOVA for TS variables relating to dog and owner behaviour with means and standard deviations.*

Variables	Avoidant (n = 11)		Secure ( n = 15)		Passive (n = 15)		Anxious n = 11)		$F_{(3, 48)}$	$p$	$\eta^2$
	M	SD	M	SD	M	SD	M	SD			
Dog Orientation to task	2.94	.63	3.28	.53	2.65	.64	2.70	.59	3.29	.03	.17
Quality of owner assistance	3.18	1.89	5.33	1.88	4.33	2.02	5.18	.98	3.67	.02	.19
Giving dog orders	4.97	1.31	4.98	1.90	3.24	1.81	3.59	1.58	3.87	.02	.19
Owner praising dog	1.80	1.28	1.88	1.47	1.00	1.19	.51	.72	3.57	.02	.22
Proximity seeking (1 <sup>st</sup> min)	1.18	.26	1.49	.45	1.57	.41	1.28	.43	2.47	.07	.13
TS duration	9.91	2.31	11.33	1.82	9.21	3.04	10.98	2.52	2.21	N/S	
Total owner control	2.94	1.33	1.72	1.55	2.21	1.84	1.49	1.31	1.95	N/S	

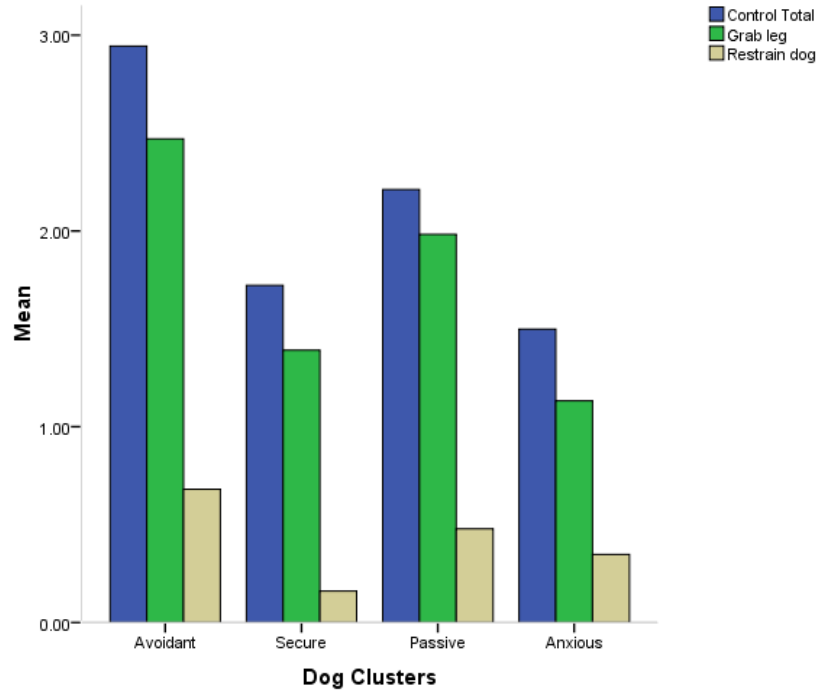
In a one way ANOVA with Bonferroni post hoc comparisons (Table 5.8) four variables were found to have significant between group differences. The quality of assistance provided by owners during the task differed significantly between groups ( $F_{(3, 48)} = 3.67, p = .02, \eta^2 = .19$ ) with owners of Secure dogs ( $M = 5.33, SD = 1.88$ ) providing a higher quality of assistance than owners of Avoidant dogs ( $M = 3.18, SD = 1.89, p = .02$ ). The frequency of owner order giving during the task also differed significantly between groups ( $F_{(3, 48)} = 3.87, p = .02, \eta^2 = .19$ ) with owners of Secure dogs ( $M = 4.98, SD = 1.90$ ) and Avoidant dogs ( $M = 4.97, SD = 1.31$ ) differing significantly from Passive dogs ( $M = 3.24, SD = 1.81, p = .04$ ). A large effect was found for owner praising the dogs, with differences ( $F_{(3, 48)} = 3.57, p = .02, \eta^2 = .22$ ) between owners of Secure dogs ( $M = 1.88, SD = 1.47$ ) and Anxious dog owners ( $M = .51, SD = .72, p = .04$ ). Passive dogs were found to be significantly less orientated towards the task ( $M = 2.65, SD = .64$ ) when compared with Secure dogs ( $M = 3.28, SD = .53, p = .04$ ;  $F_{(3, 48)} = 3.29, p < .03, \eta^2 = .17$ ). Although not significant, there was a trend between groups for proximity seeking in the first minute of the task ( $F_{(3, 48)} = 2.47, p = .07$ ) which, with a larger sample may reveal significance. Passive dog ( $M = 1.57, SD = .41$ ) sought proximity at higher levels than all other clusters, whereas Avoidant dogs sought proximity at the lowest levels ( $M = 1.18, SD = .26$ ). Proximity seeking is indicative of an activation of the attachment system, which was not conducive to TS. While the attachment system was activated in Passive dogs the exploratory system was

not, whereas proximity for Secure dogs was indicative of secure base behaviours which then enabled exploration.

Owner behaviours which involved physical control of the dog, such as grabbing paws, picking up the dog or touching paws were not found to significantly relate to the main clusters. However, when prototype cluster subgroups were analysed in a one way between groups ANOVA with Bonferroni post hoc comparisons, the Avoidant prototype group ( $n = 2$ ) was found to significantly differ from all other clusters on the number of times the dog was physically restrained by the owner during the task ( $F_{(11, 40)} = 2.37, p < .01, \eta^2 = .39$ ). Although this cluster contains only 2 participants it nonetheless suggests a relationship between higher levels of owner control and dog avoidance; a potentially interesting trend for further research (Figure 5.2). No Secure prototype dog owners ( $n = 4$ ) restrained their dogs during this experiment.



*Figure 5.2.* Bar chart indicating mean scores by prototype clusters Avoidant, Secure and Anxious, plus the total of non-prototype clusters (Other) for three owner behaviour variables revealing a significant between group difference for A3 (Avoidant Prototype) dogs and owner control ( $p < .01$ ).



*Figure 5.3.* Bar chart indicating mean scores by cluster for three owner behaviour variables: total owner control of dog scores, grabbing paw/legs and restraining/holding the dog.

Although non-significant, as depicted in Figure 5.3, owner control means (sum of owner grabbing dog's paw/legs and holding/restraining the dog) were higher for Avoidant dogs ( $M = 2.94$ ,  $SD = 1.33$ ), than all others clusters, suggesting that owners were more inclined to use physical restraint, whereas Secure ( $M = 1.72$ ,  $SD = 1.55$ ) and Anxious dog cluster owners ( $M = 1.49$ ,  $SD = 1.31$ ) used the lowest levels of physical restraint.

#### *Task-solving in Securely and Insecurely Attached Dogs*

To investigate further TS functions and owner behaviour between attachment groups, (as per Grossman et al. 1999; Matas et al. 1978) attachment groups were reduced to Secure ( $n=15$ ) and Insecure ( $n=37$ ) cases. Mean scores for exploratory and owner behaviours were compared in independent sample *t*-tests (Table 5.8).

Table 5.8

*Independent samples t-test of significant dog behaviour and owner behaviour scores by Secure dog cluster and Insecure dog clusters (Avoidant, Anxious and Passive), with means, standard deviations, and effect sizes.*

	Secure, <i>n</i> = 15		Insecure, <i>n</i> = 37		<i>t</i>	df	<i>p</i> =	Eta <sup>2</sup>
	M	SD	M	SD				
Puzzle orient. Factor	13.17	2.03	11.67	2.53	1.99	50	.05	.05
Orientation to task	3.28	.53	2.78	.61	2.91	50	.005	.10
Intensity of focus	3.18	.51	2.80	.58	2.19	50	.03	.06
Proximity Seeking	3.18	.51	2.80	.58	2.19	50	.03	.06
Restraining dog	.16	.50	.50	.77	-2.06	44	.05	.03
Giving orders	4.98	2.90	3.86	1.73	2.05	50	.05	.06
Praising dog	1.88	1.47	1.09	1.19	2.02	50	.05	.05
Duration of play	11.32	1.82	9.94	2.72	1.81	50	.07	.04

Table 5.8 shows that there were significant between group differences in task orientation between Secure ( $M = 3.28$ ,  $SD = .53$ ) and Insecure dogs ( $M = 2.78$ ,  $SD = .61$ ;  $t_{(50)} = 2.91$ ,  $p < .01$ ) with a large effect ( $\eta^2 = .10$ ), indicating that Secure dogs spent more time task solving. Secure dogs ( $M = 13.17$ ,  $SD = 2.03$ ) scored significantly higher for being “puzzle orientated” than Insecure dogs ( $M = 11.67$ ,  $SD = 2.53$ ;  $t_{(50)} = 1.99$ ,  $p < .05$ ,  $\eta^2 = .05$ ). Secure dogs ( $M = 3.18$ ,  $SD = .51$ ) were significantly more intensely focussed on the task than Insecure dogs ( $M = 2.80$ ,  $SD = .58$ ;  $t_{(50)} = 2.19$ ,  $p < .05$ ,  $\eta^2 = .06$ ). Secure dogs ( $M = 3.18$ ,  $SD = .51$ ) also sought proximity with owners at a significantly higher rate than Insecure dogs ( $M = 2.80$ ,  $SD = .58$ ) indicating activation of the attachment system but it does not inhibit exploration.

The quality of owner assistance was reflected in differences between scores for giving orders and praising the dogs. Owners of Secure dogs gave orders at significantly higher rates ( $M = 4.98$ ,  $SD = 2.90$ ) and praised them at higher rates ( $M = 1.88$ ,  $SD = 1.47$ ) than owners of Insecure dogs ( $M = 3.86$ ,  $SD = 1.73$ ;  $t_{(50)} = 2.05$ ,  $p < .05$ ,  $\eta^2 = .06$ ), ( $M = 1.09$ ,  $SD = 2.02$ ;  $t_{(50)} = 2.02$ ,  $p < .05$ ,  $\eta^2 = .05$ ). Conversely, owners of Secure dogs restrained them significantly less ( $M = .16$ ,  $SD = .50$ ) than owners of Insecure dogs ( $M = .50$ ,  $SD = .77$ ; ( $t_{(44)} = -2.06$ ,  $p < .05$ ,  $\eta^2 = .03$ ). High restraining behaviours by owners of Insecure dogs may explain their dog’s lower proximity seeking scores. They were less inclined to approach the owners of their own accord as a secure base.

These results indicate that owners of Secure dogs provided significantly less interference, encouraging them to continue at the task, through both order giving and praise, without forcing them through control or restraint. As a result, Secure dogs spent more time focussed on TS, using the owners as a secure base. In contrast, Insecure dogs' owners restrained them more and talked to them less. Insecure dogs' orientation towards the task was shorter and less successful.

To investigate the relationship between owner and dog behaviour variables by Secure and Insecure groups, a between groups Pearson correlation was performed on five measures of dog behaviour (task-solving duration, orientation towards task, intensity of focus on task, proximity seeking and avoidance of owner) and seven measures of owner behaviour (owner support, owner quality of assistance, owner control, grabbing paws, touching paws, restraining and ordering dog). A Pearson correlation coefficient was run separately for both data sets (Insecure and Secure). Coefficients were then converted to standardised scores and calculated using  $Z_{obs}$ :

$$Z_{obs} = \frac{Z_1 - Z_2}{\sqrt{\frac{1}{N_1 - 3} + \frac{1}{N_2 - 3}}}$$

This formula determines a statistically significant between group difference for correlation scores. A score of  $-1.96 < Z_{obs} < 1.96$  indicates that scores are not statistically different, whereas if  $Z_{obs} < -1.96$  or  $Z_{obs} > 1.96$ , the difference between scores are statistically significant ( $p < 0.05$ ) (Field, 2005). Table 5.10 highlights significant between group differences in bold. Although Secure dogs' behaviour during the task and owner support is significantly positively correlated in terms of task duration ( $r = .61, n = 15, p < .01$ ), orientation to the task ( $r = .59, n = 15, p < .01$ ), and the intensity of task solving ( $r = .51, n = 16, p = .04$ ), only dog behaviour directed at the owners differs significantly between clusters.

Table 5.9 shows that Secure dogs are significantly more likely to seek out owner proximity if the quality of the owner support is high. This is not the case with Insecure dogs, as level of owner support is not related to proximity seeking. Positive support equates with proximity seeking in Secure dogs, but not in Insecure dogs who do not seek owner contact. Owner control is negatively correlated with an owner supporting presence in Secure dogs, while proximity seeking is positively correlated. Therefore,

Secure dogs seek out owner proximity because owners do not use control in their interactions. This differs significantly from the Insecure dog group, whose proximity seeking is not based on owner interaction variables.

Table 5.9

*Correlation between dog and owner behaviour in Secure and Insecure dog clusters*

	Secure Dog cluster, <i>n</i> = 15							Insecure Dog Clusters, <i>n</i> = 37						
	Owner Support	Owner Quality	Owner Control	Grab leg	Touch leg	Restrain Dog	Order Dog	Owner Support	Owner Quality	Owner Control	Grab leg	Touch leg	Restrain dog	Order Dog
Task duration	.61	.40	-.15	-.18	-.22	-.36	-.33	-.10	.35	-.43	-.37	.20	-.41	-.01
Orient to task	.60	.42	-.16	-.16	.15	-.22	-.12	-.10	.12	-.18	-.10	.45	-.27	.21
Intensity of focus	<b>.68</b>	.49	-.30	-.30	.21	-.32	-.15	<b>.12</b>	.14	-.12	-.07	.42	-.20	.18
Prox seeking	<b>.68</b>	.49	-.30	-.30	-.21	-.32	-.15	<b>.12</b>	.14	-.12	-.07	.42	-.20	<b>.18</b>
Avoiding Owner	<b>-.86</b>	<b>-.80</b>	.50	.41	.02	.34	.48	<b>-.28</b>	<b>-.38</b>	.43	.33	-.12	.44	.19

Items in bold flag significant ( $p < .01$ ) between cluster differences.

As shown in Table 5.9, although both Secure and Insecure dogs' scores for owner avoidance are negatively correlated with owner support and quality of assistance, there is also a significant between group difference. For Secure dogs, there are strong negative correlations suggesting that positive owner guidance and support is negatively related to avoidance. However for Insecure dogs, these two factors are only weakly correlated with avoidance. This suggests that Secure dogs are more sensitive to the quality of owner support and this is reflected in their secure base and task solving behaviours. Secure dogs' relationships with owners are based on positive interactions which promote secure base behaviours (longer and more intense exploration combined with proximity seeking). This is significantly different in the Insecure group in which owner support is not associated with persistence at task solving, but is correlated with task rejection when owner control becomes invasive, reflected in lower exploratory scores and fewer secure base (proximity seeking) behaviours. Cause and effect is not obvious from a correlation design, nonetheless, these results suggest that the type of control owners exhibit has a direct impact on the duration and involvement of the dogs in TS. Whereas touching the leg encourages task involvement, grabbing and restraining

the dog does not. Therefore, a difference in owner sensitivity of touch and owner invasiveness appears to be associated with dog attachment style, which furthermore results in significant differences in dog task-solving behaviour.

## Discussion

The results support the hypothesis that individual differences in dog attachment style are reflected in the performance of exploratory behaviours and in interactions with owners during task solving. Securely attached dogs were significantly more task orientated than all other clusters. Owner behaviour was also related to dog cluster. The quality of owner assistance provided to Secure cluster dogs was characterised by low levels of physical interference and positive assistance by providing enough guidance to keep the dog focussed on the task. Although Secure cluster dog owners gave them significantly more orders than other clusters (“use your paw”, “find it”), they also delivered significantly more positive reinforcement through praise (“good boy/girl”) than owners of Passive or Anxious dogs. Secure dogs used their owners as a secure base, as proximity seeking behaviours gave them the confidence to TS. Rather than being invasive or interfering, they enabled proximity to occur.

Passive dogs who exhibited high levels of proximity seeking in the first minute of the task, remained behaviourally inhibited throughout the experiment. Their owners gave them few orders or praise. They did not enable nor prevent exploration. Behavioural passivity (both dog and owner) was characteristic of Passive dog/owner dyad.

The results support Matas et al. (1978) who found that the quality of maternal support was related to levels of exploration in toddlers. However, the current study differs to child studies in caregiver-directed secure base behaviours. Kagan (1997) found that children with behavioural inhibition were more likely to seek proximity with the caregiver. However, this experiment found highest levels of proximity seeking among Secure dogs, but only in the first minute of the experiment. Secure dogs sought out their owners for comfort when faced with a novel stimuli (the task). There is evidence that these owners successfully provided secure base effects, which deactivated the attachment system, enabling Secure dogs to focus on task solving.

Several toddler studies found that Ambivalent/Resistant subjects exhibited high rates of exploration, but only when in close physical contact with the caregiver (Cassidy



& Berlin, 1994, Schieche & Spangler, 1993). In this experiment, Anxious dogs were associated with low to moderate levels of exploration and low levels of physical contact with owners. In this case, the owners' physical proximity did not provide a secure base which deactivated the attachment system enabling exploration. This appears to be opposite to child studies, in which physical proximity is believed to lower sympathetic nervous system arousal (Shieche & Spangler, 2005). Although not statistically significant, owner behaviour towards Anxious dogs involved high levels of control (grabbing legs or restraining the dog), which was surpassed only by the Avoidant cluster. Owners of Anxious dogs may have inadvertently increased their arousal through the application of invasive behaviours.

Avoidant dog owners had the highest mean for controlling behaviours, combined with the lowest quality of assistance. Grossman et al. (1999), Main (1983) and Matas et al. (1978), found that caregivers of insecure children interfered rather than assisted in the process of play and exploration. High owner interference negatively impacted task duration, particularly for Avoidant dogs. There is evidence that the dogs would have continued TS had owners not physically restrained them because they would in many cases begin to TS again, once free. Avoidant dogs also did not seek proximity with the owners. In Grossman et al. (1999) and Sroufe (1979) avoidant toddlers did not seek proximity with the caregiver and explored less, which was indicative of caregiver interference and the dysfunction of the attachment/ exploratory balance (Sroufe, 1979).

Both Passive and Avoidant dogs share some traits with Disorganised toddlers. Passive dogs displayed strong behavioural inhibition (lowest TS duration) combined with the lowest levels of proximity seeking, except in the first minute, which was significantly higher compared with all other clusters. Owners of Passive dogs do not appear to provide a secure base when the dogs' attachment system is activated in the first minute of the task, do not reduce the stress and thus do not promote exploratory behaviour. Passive dogs share some characteristics with Disorganised children (Schieche & Spangler, 2005; Spangler, Freemer-Brombik & Grossman, 1996) such as evidence of attachment system activation without proximity seeking behaviours. Owner behaviour may provide an explanation for Passive dogs' behavioural inhibition. As these owners had the lowest levels of owner control and the lowest levels of giving orders, they perhaps failed to motivate their dogs. Order giving levels were significantly higher in Secure dogs, suggesting that the passivity of owners mirrored the behavioural

inhibition of their dogs. Replicating with scripts encouraging Passive owners to use higher levels of non-invasive owner interaction, such as order giving, could result in higher levels of exploration for Passive dogs.

Avoidant dogs also displayed some behaviour disorganisation as a result of owner behaviour. When the child's attachment system is activated, the normal behaviour would be to approach the caregiver, but in Disorganised children fear of the attachment figure results in freezing, or the performance of repetitive behaviours such as rocking (Main & Hesse, 1990). Although motivated to TS initially Avoidant dogs' TS ceased when owner behaviour became invasive. The fear and unpredictability of the owner deactivated the exploratory system in Avoidant dogs. However, instead of freezing or performing repetitive behaviours, Avoidant dogs more vigilantly observed their owners to pre-empt owner control. There was no evidence in this study that dogs dissociated from their conscious state in the same way found in Disorganised children. Rather, they became highly alert in readiness to flee the owners' invasive control.

### Conclusion

This study found a significant relationship between owner and dog behaviour, and dog attachment style in task-solving. Positive owner/dog interactions based on sensitive owner support and non-invasive assistance was related to activation of the exploratory system. This type of owner profile was significantly related to the Secure dog cluster. In contrast, interactions based on low levels of support, highly controlling and invasive owner behaviour were related to lower levels of exploration. Significantly, this was related to insecure dog clusters, but more particularly to the Avoidant and Passive dog clusters. The results point to the importance of owner sensitivity in owner/dog interactions in deactivating the attachment system enabling exploratory (task-solving) behaviours.

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## Analysis of the Association between Owner Self Reports of Attachment and Caregiving, and Dog Attachment Style

### Introduction

Previous chapters have found that owner behaviour in the Strange Situation Test and Task Solving relates to individual differences in dog attachment style. In particular, high control, invasive and moderately frightening owner behaviours were related to dog avoidance. Owner behaviour may be indicative of a caregiving style which may or may not be related to their beliefs about their caregiving style. Self-report studies could therefore highlight the discrepancy or agreement between owner beliefs and behaviours as dog caregivers.

#### *Infant Attachment and Adult Caregiving*

Individual differences in caregiving styles result from several factors, including an individual's working models of attachment (Bowlby, 1998). Working models also inform patterns in adult romantic relationship quality as well as a style of relating in romantic relationships (Hazen & Shaver, 1987). There is evidence of links between attachment styles in romantic relationships, caregiving to children and child attachment security (George & Solomon, 1996). Dickstein et al. (2009) assessed mothers' representational models of attachment using the Adult Attachment Interview (AAI), and the Marital Attachment Interview (Dickstein, Seifer, St. Andre & Schiller, 2001) to measure romantic attachment, and the SST to measure infant attachment. They did *not* find a significant relationship between adult and marital attachment representations and SST infant security at 1 year. However, in a home video assessment of family functioning with the child at 14 months, significant associations between measures were found, suggesting that the family functioning system using video analysis was a better predictor of infant attachment security than the SST. Nonetheless, there is evidence that the parents' marriage relationship contributes to child attachment security.

To assess attachment style in romantic relationships, Brennan et al. (1998) organised 320 items from 60 self-report measures into a 36-item scale, the Experience in Close Relationships Scale (ECR; Brennan et al. 1998). It uses constructs from attachment theory to group individuals into styles of relating based on two dimensions of *anxiety* and *avoidance*, in which anxiety is characterised by preoccupation concerning rejection, and avoidance by discomfort from closeness. From these dimensions, they defined romantic attachment styles as: *secure* (low anxiety and avoidance); *fearful* (high anxiety/high avoidance); *preoccupied* (low avoidance/high anxiety) and *dismissing* (high avoidance/low on anxiety). The resulting self-report measure has been used subsequently by many researchers as predicative of romantic attachment style.

Kunce and Shaver's (1994) Caregiving in Adult (romantic) Relationships (CAR) scale found strong inter-correlations with ECR attachment categories. Adults Secure in adult attachments were more responsive and empathetic to partners and low on impulsivity or compulsive caregiving. Preoccupied individuals were low on sensitivity and cooperation, and high on providing physical proximity. Those with an ambivalent or dismissive attachment style were low on sensitivity, preferred distance to proximity and were more compulsive. Those fearful in adult relationships, exhibited low proximity, low sensitivity while reporting high compulsivity in caregiving (Kunce & Shaver, 1994). The study of caregiving style in romantic relationships is important because careseekers whose caregivers provide a secure base and a safe haven are better able to cope in stressful situations (Feeney & Collins, 2004; Simpson et al., 1992) which may impact their relationships with others in their households, such as their children and dogs.

#### *Relationship between Adult Caregiving and Dog Attachment*

It is hypothesised that the dog's attachment system activates the owner's caregiving system in the same way an infant activates a parent's caregiver system. Beck and Madresh (2008) looked at the transmission of attachment working models in the owner/pet relationship by adapting scales from romantic attachment theory (Brennan et al 1998; Bartholomew & Horowitz, 1991). They first measured the owner's sense of attachment derived from pet ownership (an adapted ECR), and then correlated romantic attachment ECR styles with attachment-to-pet styles. There was a weak but significant correlation between preoccupied and avoidant scores on the ECR, and on the revised pet

attachment scale indicating a tenuous link. They suggest that while relationship styles with pets could be indicative of an overall style of relating in adult relationships, they are also most likely predicted by the individual personality of the dog. While it may have been more informative to use the ECR and a dog behaviour measure, this nonetheless was the first study to look at the transmission of working models to the owner/dog relationship.

Self-reports of companion animal caregiving have been the subject of many studies (Bennett & Rohlf, 2007; O'Farrell, 1995; Shore, Douglas & Riley, 2005) although primarily in relation to dog behaviour. For example, Jagoe and Serpell (1996) found a relationship between some owner behaviours (allowing the dog to sleep on the bed, feeding the dog before the owners) and behaviour problems, although dogs with behaviour problems may preclude owner interactions. The studies cited here were questionnaire-based.

The aim of this chapter was to determine firstly, if self-reports of owner caregiving are related to dog attachment style, and secondly, whether attachment styles in close adult relationships informs owner-to-dog caregiving, as found in parent/child studies. Thirdly, self-reports of dog caregiving style will be assessed in conjunction with behavioural data from owner behaviour in the SST (Chapter 4) and task solving (Chapter 5). It is hypothesised that a relationship will be found between dog security/insecurity and owner self reports. It is also hypothesised that self-reports would mirror behavioural data of owner behaviour in the SST and task solving.

## Method

### *Participants*

The participants were the 52 owners in the SST (Chapter 3) and the task solving experiment (Chapter 5). There were 24 female and 28 male dogs with an age range of 18 months to 14 years ( $M = 5.68$ ,  $SD = 3.40$ ). Of the owners, 9 were male (17.3%), 43 (82.7%) were female, with an age range from 25 to 72 years ( $M = 46.5$ ,  $SD = 11.59$ ).

### *Procedure*

Owners completed a questionnaire on-line through the University of Southampton's on-line survey portal ([www.psychology.soton.ac.uk/psychosurvey](http://www.psychology.soton.ac.uk/psychosurvey)). They were required to complete the survey *before* participating in the SST, dog task and

Pet Owner Interview at the University of Southampton animal behaviour clinic. Only these participants had access to the online questionnaire, via an access code. The first page of the survey contained a statement of introduction and consent (Appendix G) and concluded with a debriefing statement. The completed questionnaires were not viewed by the researcher until all experiments were completed.

### *Materials*

The questionnaire consisted of 4 sections.

The first section gathered demographic information on the owner and the second section on the dog, such as dog and owner ages, genders, dog neutering status, owner household income, owner education, children in household (see Appendix H for the full questionnaire). These characteristics were used in the analysis of all the chapters of this thesis, whereas sections 2, 3, 4 pertained to this current study.

Sections two and three comprised the Experience in Close Relationships (ECR) 36-item scale (Brennan et al. 1998) and Kuncze and Shaver's (1994) 32-item Caregiving in Adult Relationships scale (CAR) respectively. Section four comprised a 69-item customised set of questions to elucidate the owner's Dog Caregiving Style (DCS).

The ECR, CAR and DCS are all assessed through Likert scales: the ECR is a 7 point scale from 1 (not at all like me) to 7 (exactly like me); the CAR is a 6 point Scale from 1 (not at all like me) to 6 (exactly like me); and, the DCS is a 5 point Scale from 1 (not at all like me) to 5 (exactly like me).

The ECR contains items both positively and negatively worded that are subsequently clustered into two dimensions of *anxiety* and *avoidance*, and four attachment-style categories of *secure*, *fearful*, *preoccupied* and *dismissing*. Statements representative of *secure* focus on the provision of a secure base within the relationship ("I feel comfortable sharing my private thoughts and feelings with my partner"), whereas *fearful* individuals are high on anxiety and avoidance ("I want to get close to my partner, but I keep pulling back"), *dismissive* individuals are high on avoidance and low on anxiety ("I try to avoid getting too close to my partner") and *preoccupied* are high on anxiety and low on avoidance ("I worry a lot about my relationship").

The CAR (Kuncze & Shaver, 1991) contains items which assess degrees of *proximity* versus *distance*, reflecting an individual's ability to provide physical and emotional comfort to a distressed partner ("When my partner needs a hug, I am glad to provide it"); *sensitivity* versus *insensitivity* reflected in the ability to notice and interpret

a partner's emotional needs ("I can always tell when my partner needs comforting..."); *cooperation* versus *control*, reflected in support of the partner's attempts to solve problems rather than taking over ("I always respect my partner's ability to...solve his/her own problems") and *compulsive* caregiving, in which individuals tend to get over-involved in their partner's problems ("I create problems by taking on my partners troubles as if they were my own").

The DCS comprises 69 items devised by the researcher (Table 6.1). Previous parental/child research informed the themes listed in Table 6.1 Twenty-one items were adapted from Arnold, O'Leary, Wolff and Archer, (1993), who measured parenting style as *lax* (failing to respond to child negative behaviour), *over-reactive* (emotionally charged reactions to negative behaviour) or *verbosity* (use of verbal reprimanding, nagging and lecturing). Two were adapted for this study: *lax* dog care ("if my dog does something I don't like, I often just let it go") and *over-reactive* ("I get so frustrated and angry at my dog's behaviour"). In addition, 8 items were adapted from Baumrind's (1971) Parental Authority Scale. Baumrind's study defined parental authority as *permissive* (making few demands on children and are non-controlling, rarely using punishment), *authoritarian* (requiring obedience and tending to use physical punishment) and *authoritative* (providing clear but firm direction in an overall atmosphere of affection) (Baumrind, 1971). Authoritative items were used in the *firm but fair* style ("I set limits on what my dog can do and where it can go within the home"). Items in the *affectionate* ("I enjoy a cuddle with my dog") and *derogative* ("when my dog is bad, I sometimes want to give it away") dog care styles and others specifically related to dog care (i.e. *lax*: "*I allow my dog to sleep on the bed with me*") were devised by the researcher, based on personal communication with trainers and behaviourists regarding owner behaviours, and through the researcher's clinical behaviour experience.

Table 6.1

*Dog Care scale items characterised by 5 themes: Lax, Over-Reactive, Firm but Fair, Affectionate and Derogative.*

Lax Dog Care	Over-reactive (aggression and fear – related)	Firm but fair	Affectionate	Derogative
When I tell my dog not to do something, and he/she does it anyway  I don't stop him/her.	I get so frustrated and angry at my dog's behaviour.	When my dog misbehaves, I firmly tell it to stop.	I know my dog looks to me for guidance	I don't buy special toys for my dog
If my dog misbehaves and then "looks guilty", I generally ignore the behaviour.	I raise my voice and yell at my dog when he/she's been bad.	I set limits on what my dog can do and where it can go within the home.	I understand my dog.	Sometimes I abdicate responsibility for my dog to someone else.
When we're not at home, I let my dog get away with a lot more.	When I'm stressed or upset, I know I am quick to shout at my dog.	I am firm with my dog by not giving in to him/her when he/she begs for attention.	I know my dog comes to me for reassurance when frightened or hurt	I am annoyed at my dog's barking
If my dog whines for my attention, I will usually give in.	I overreact to my dog's behaviour and punish it more than I mean to.	I would never hit or slap my dog.	I know my dog will cry out for me if it can't find me.	My dog is a disappointment to me
When my dog does something I don't like, I often just let it go.	I lose my temper when my dog doesn't do something I ask it to do.	I try to stay calm when my dog misbehaves.	My dog always knows where I am when he/she is out exploring	I don't always know where my dog is.
If saying "no" doesn't work, I offer my dog something nice so he/she will stop acting up.	I grab or handle my dog roughly.	I use a threatening voice when my dog has been behaving badly.	I greet this dog as soon as I come home.	I think owning a dog is too much work
My dog's priorities often come before others in the household, including myself.		I know my dog knows its place in the pecking order at home	I have taken this dog to other classes (agility)	I am afraid of my dog.
I don't think my dog would benefit from training classes	I will take my dog to the vet even if I think the injury is minor.	I have confidence in my dog's quick response to my commands	I have taken this dog to training classes	I wish I didn't have the dog.
I think of my dog as "top dog" in the home	I am anxious when walking my dog.	I make sure my dog sleeps in its own bed.	I spend time training this dog.	If my dog has rolled in something, I will lock it away until I can bathe it.
I let me dog sit on the sofa with me	Sometimes think I worry too much about my dog.	If my dog does something I don't like, I retrain it to a more acceptable behaviour	I spend my leisure time with me dog	I slap or use physical punishment when my dog misbehaves.
I have let my dog make the home his/her's	I worry about this dog when I am not with him/her.	Sometimes I need to restrict my dog's access to places in the home.	I exercise with my dog	I make sure my dog knows that its done the wrong thing.
I think my dog has a mind of its own	I know I will be a wreck when my dog dies		I take the dog to visit family/friends	When my dog is bad, I sometimes want to give it away.
I can't stop my dog from doing something I don't like.	When my dog disappears on walks I panic		I enjoy a cuddle with my dog	I push my dog away when it comes to me for attention
I let my dog sleep on my bed.			My dog and I have a strong bond.	If my dog soils in the house, I often point it out so he/she learns it is wrong
My dog has the free run of the house/follows me around the house			I organise someone to walk the dog or let it out if I am unavailable	
I let my dog steal food from my plate/fork.				
I know my dog often freely wanders the neighbourhood				



“Over-reactive” dog care variables were further divided into “aggression” or “fear-related” (Table 6.2).

Table 6.2

*Over-reactive aggression and fear-related items on the Dog Caregiving Scale*

Over Reactive (O/R) Aggression (AG)or Fear (F)	Scale Item
O/R-Ag	I get so frustrated and angry at my dog's behavior
O/R-Ag	I raise my voice and yell at my dog when s/he's been bad.
O/R-Ag	When I'm stressed or upset, I know I am quick to shout at my dog.
O/R-Ag	I over-react to my dog's behaviour and punish it more than I mean to.
O/R-Ag	I lose my temper when my dog doesn't do something I ask it to do.
O/R-Ag	I grab or handle my dog roughly.
O/R-F	I will take my dog to the vet even if I think the injury is minor.
O/R-F	I am anxious when walking my dog.
O/R-F	Sometimes I think I worry too much about my dog.
O/R-F	I worry about this dog when I am not with him/her.
O/R-F	I know I will be a wreck when my dog dies.
O/R-F	When my dog disappears on walks, I panic.

Table 6.3 is a summary table of scales used in this chapter and resultant categories.

Table 6.3

*Summary of resultant categories from the ECR, CAR and DCS scales*

Scale	Measure	Dimension	Dimension	Subscales (Styles)				
ECR (Experience in Close Relationships)	Adult romantic attachment style	Anxiety	Avoidance	Secure	Fearful	Dismissive	Preoccupied	
CAR (Care-giving in Adult Relationships)	Care-giving to adult humans			Proximity vs Distance	Sensitive vs. Insensitive	Cooperation vs. Control	Compulsive	
DCS (Dog Care-giving Style)	Care-giving to own dog			Lax	Firm but Fair	Over-reactive Aggression or Fear Related	Affectionate	Derog

*Design*

In this within-participants study, the variables were: owner demographics, dog demographics, adult attachment style (ECR), adult caregiving style (CAR), dog caregiving

style (DCS), dog attachment style (SST, Chapter 3), owner behaviour (Chapter 4 and Chapter 5), and dog behaviour in task solving (Chapter 5).

### *Data analysis*

Demographic data and dog behaviour variables were compared using independent sample *t*-tests for 2 category variables (e.g. gender) or one way analysis of variance (ANOVA) with Bonferroni post hoc comparisons for multi-category variables (e.g. employment type). Similar tests were undertaken to analyse dog demographics. The DCS scale was correlated with the ECR and the CAR scales. The latter two scales were then ranked using Pearson's *r* correlation coefficients which tested the statistical relationship between DCS and these measures (Howitt & Cramer, 2005). Bivariate correlation coefficients significant (2-tailed) alpha levels were set at  $p < 0.05$  with Bonferroni corrections used for each individual test to protect against Type 1 errors. Significant variables were then tested using a between groups ANOVA with Bonferroni post hoc comparisons with dog clusters from the SST. Owner behaviour scores from Chapter 4 and both dog and owner variables from Chapter 5 (task solving) were also correlated with the DCS scores to determine significant associations.

### *Ethical Approval*

This experiment received the prior approval of the ethics committee of the University of Southampton. All respondents were asked to read a statement of consent on the first page of the on-line questionnaire and check a box indicating that they wished to proceed.

## Results

### *Data Preparation*

Scores for the ECR were calculated according to Brennan et al. (1998), with negative items reversed scored, first computed into two dimensions of *anxiety* and *avoidance*. They were then computed into the four attachment style categories of *secure*, *dismissive*, *fearful* and *preoccupied*. Scores in the CAR (Kunce & Shaver 1994) were computed into the four styles of *proximity versus distance*, *sensitivity versus insensitivity*, *cooperative versus controlling*, and *compulsive caregiving*.

Data were reviewed for spread, missing data, multicollinearity and outliers. As the data were normally distributed, no transformations were required. Eight variables were

found to contain outliers (five dog care categories of lax, over-reactive, firm but fair, affectionate and derogative, and adult caregiving categories of proximity vs. distance, sensitivity vs. insensitivity and cooperative vs. controlling). Each case was investigated and where appropriate outliers were transformed ( $M \pm SD \times 2$ ).

### *Scales*

All scales were tested for normal distribution using one-sample Kolmogorov-Smirnov tests. The three scales (Table 6.4) were explored individually and were found to be normally distributed enabling the use of parametric statistics.

Table 6.4

*Kolmogorov-Smirnov test assessing normality of distribution of scores on three scales.*

Scale	<i>D</i>	Df	Significance level	Distribution
Caregiving in Adult Relationships (CAR)	.05	46	.20	Normal
Dog Caregiving Style (DCS)	.08	42	.20	Normal
Experience in Close Relationships (ECR)	.09	52	.20	Normal

### *Reliability*

Respondents' scores for each scale were added to give a total score after negative scores were reversed. These were used to test the reliability of the questionnaire scales using Cronbach's alpha ( $\alpha$ ) coefficient tests (Table 6.5). All three scales had acceptable levels of internal consistency with Cronbach's  $\alpha$  coefficients of over the recommended value of 0.7 (Nunally, 1978).

Table 6.5

*Reliability statistics of the CAR, ECR and DCS scales.*

Scale	Cronbach's $\alpha$	No. of items
Caregiving in Adult Relationships (CAR)	.87	32
Dog Caregiving Style (DCS)	.81	69
Experience in Close Relationships (ECR)	.91	36

### *Owner and Dog Demographic Characteristics*

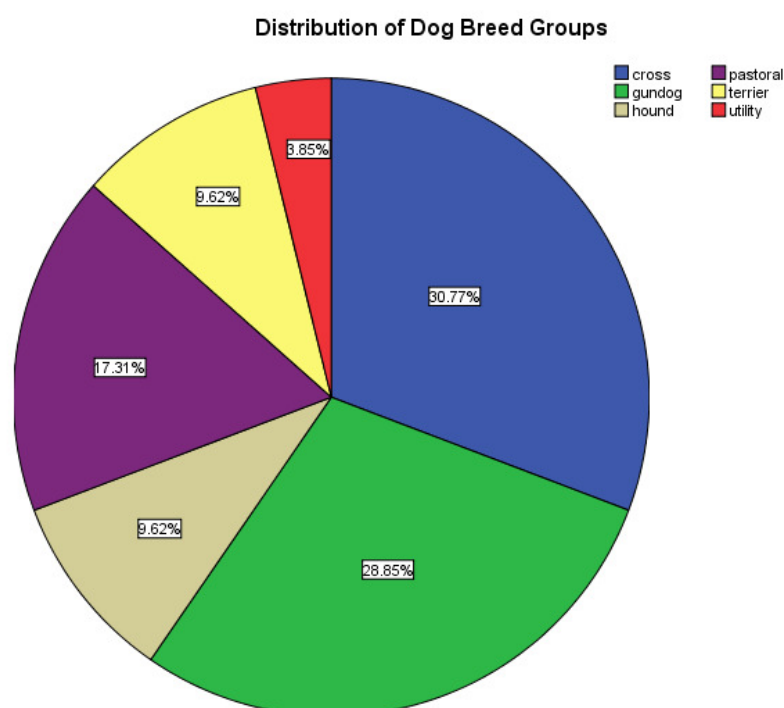
Of the 52 dog owners, (Male = 9, Female = 43), 65.39% were cohabiting or married, while 34.61% were not living with a romantic partner (5.76% lived with another

person and 28.85% lived alone). The highest proportion of participants lived in towns and cities (30.76% each), followed by villages (26.92%) and rural locations (11.53%). Thirty of the participants were parents (57.77%) and all were their biological offspring. There were no adoptive or step-parents in this study. We also asked if they had experienced trauma under the age of 18 years and 26.92% indicated that they had: 7.69% experienced the death of a parent or sibling, 5.76% experienced parental divorce, 5.76% had been hospitalised, 3.84% placed in foster care and 3.84% had been carers for ill parents.

The sample consisted of 26.92% with university degrees (17.30% with post graduate degrees) and 21.15% had some “A” levels. The average income for each participant (not per household) was approx £20,000, with 28.84% earning under £10,000, 30.76% earning between £20,000-£30,000 and 26.92% earning over £30,000 per annum.

Only 4 participants had never owned dogs before their current dog. The majority were experienced dog owners with 90.38% owning at least 2 dogs prior to the current dog. Most participating dogs were the only dogs in their household (76.90%), although 21.15% of dogs shared their homes with one other dog, and 1.92% with 3 or more dogs.

The 28 male and 24 female dogs were aged from 18 months to 12.5 years ( $M = 5.82$ ,  $SD = 3.38$ ). Forty-two (80.76%) were spayed or castrated. Figure 6.1 shows the breakdown of dogs by breed groups.



*Figure 6.1.* Distribution of dogs by breed group.

### *Owner Dog Caregiving Style (DCS) Scale*

Prior to factor analyses, the 69 DCS statements were subjected to a principal components analysis. However, suitability for factor analysis through a correlation matrix revealed weak correlations below .3. Furthermore, initial solution tests revealed 21 components with eigenvalues over 1 explaining 87.31% of the variance. A parallel analysis was undertaken to determine criterion values (Table 6.10). Table 6.6 reveals that 9 components' eigenvalues exceeded the criterion values from parallel analyses.

Table 6.6

*Output from parallel analysis comparing actual eigenvalues with criterion values.*

Component no.	Actual eigenvalue	Criterion value from parallel analysis	decision
1	7.34	3.02	accept
2	6.83	2.85	accept
3	6.17	2.68	accept
4	4.10	2.55	accept
5	3.38	2.43	accept
6	2.91	2.32	accept
7	2.75	2.22	accept
8	2.49	2.14	accept
9	2.27	2.05	accept
10	1.96	1.97	reject

However, upon review of each component all had variables with several cross-loadings. For that reason, the DCS items were manually reduced to six themes: Over-reactive-fearful, Over-Reactive aggressive, Lax, Firm but Fair, Affectionate dog care and Derogatory dog care (see "Methods").

Dog caregiving scale categories were inter-correlated in a Pearson correlation (Table 6.7).

Table 6.7

*Pearson correlation coefficient of interrelationship between dog caregiving styles, with means and standard deviations.*

	1	2	3	4	5	6	M	SD
Dog/owner dyads $n = 52$								
1. Lax	-	-.15	.16	.03	<b>.39*</b>	-.12	2.12	.59
2. Firm/fair		-	<b>.34*</b>	-.05	-.12	.06	3.59	.64
3. Affection.			-	-.20	.05	-.18	4.06	.70
4. Derogatory				-	.16	<b>.48**</b>	1.63	.35
5. O/R Fear					-	.09	2.31	.82
6. O/R Aggre.						-	1.44	.68

Bold typeface indicates significance: \*  $p < .05$ , \*\*  $p < .003$  (Bonferroni)

Table 6.7 reveals two significant relationships: owners who scored high for a derogatory dog care style, were positively significantly associated with an over-reactive (aggressive) dog care style ( $r = .48, n = 52, p < .01$ ). For example, those who were derogatory were associated with self-report of the use of physical punishment. A second positive but weak correlation was found between affectionate and firm-but fair dog care ( $r = .34, n = 52, p < .05$ ).

#### *Owner Experience in Close Relationships and Dog attachment style*

In the ECR (Brennan et al. 1998) two subscale dimensions were first computed: Anxiety ( $\alpha = .92$ ) and Avoidance ( $\alpha = .92$ ). The Anxiety subscale measured an individual's fear of rejection or abandonment while the Avoidant measured discomfort with close relationships and independence versus intimacy. Scores in the ECR scale were then computed into romantic attachment styles: *Secure* ( $n = 18$ ), *Dismissive* ( $n = 13$ ), *Preoccupied* ( $n = 10$ ) and *Fearful* ( $n = 11$ ).

The dimensions of Anxiety and Avoidance were not found to relate to dog attachment style in a one way ANOVA using dog clusters as the independent variable, or in *t*-tests using dog security/insecurity as the dependent variable.

Owner romantic attachment style was then tested for association with dog attachment style in a Pearson's chi-square. Although the results did not differ significantly ( $\chi^2_{(9)} = 5.03, p > .01$ ) there were interesting trends. Table 6.8 reveals that Avoidant and Anxious dogs were 3.84 more likely to have owners in the Dismissive ECR attachment category than Secure dogs. Passive dogs were 6.36 times more likely to have ECR Secure owners, and 3.55 times more likely to have owners with a Dismissive ECR style. Secure dogs were 2.53 times more likely to be owned by Secure ECR owners than dogs in the Avoidant or Anxious dog clusters, and 1.66 times more likely than the Passive cluster.

Table 6.8

*Pearson Chi-square frequencies of owner scores in the Experience in Close Relationships Scale (Brennan, et al. 1998 ) with dog attachment style clusters percentage frequencies in the Strange Situation Test.*

	Owner Secure $n = 18$	Owner Fearful $n = 11$	Owner Preoccupied $n = 10$	Owner Dismissing $n = 13$
Dog Secure Cluster( $n = 15$ )	11.53%(6)	9.61%(5)	3.84%(2)	3.84%(2)
Dog Avoidant Cluster ( $n = 11$ )	3.84% (2)	3.84%(2)	5.76%(3)	7.69%(4)
Dog Passive Cluster ( $n = 15$ )	13.46%(7)	5.76%(3)	3.84%(2)	5.76%(3)
Dog Anxious Cluster ( $n = 11$ )	5.76%(3)	1.92%(1)	5.76%(3)	7.69%(4)

Further trends were revealed when combined dog clusters of attachment security and insecurity (Passive, Anxious and Avoidant) were analysed in a Pearson chi-square with combined owner ECR categories reflecting attachment security or insecurity (Fearful, Preoccupied, Dismissing) (Table 6.9). Owner clusters grouped as Dismissive or “Other” Insecure or Secure dog attachment is shown in Table 6.10.

Table 6.9

*Results of Pearson Chi-square analysis with Owner security and insecurity in romantic relationship categories and dog secure and insecurity clusters from the Strange Situation.*

	Owner Secure	Owner Insecure	Total dog <i>n</i>
Dog secure attachment	11.53% (6)	17.30% (9)	15
Dog insecure attachment	23.07% (12)	48.07% (25)	37
Total owner <i>n</i>	18	34	52

Table 6.10

*Results of Pearson Chi-square analysis with Owner Dismissive and combined other romantic relationship categories and dog secure and insecurity clusters from the Strange Situation.*

	Owner Dismissive	Owner Other (secure, fearful, preoccupied)	Total dog <i>n</i>
Dog secure attachment	3.84% (2)	25.00% (13)	15
Dog insecure attachment	21.15% (11)	50.00% (26)	37
Total owner <i>n</i>	13	39	52

Although not statistically significant ( $\chi^2_{(1)} = .27, p = .10$ ), Table 6.9 points to an interesting trend in that almost 50% of Insecure dogs had owners with Insecure ECR attachment styles. The lack of significance may reflect the small sample and larger participant samples in each category may produce significant associations.

There was however a significant association between owners operating a Dismissive romantic attachment style and dog Insecurity ( $\chi^2_{(1)} = 5.62, p < .05$ ) (Table 6.10). Owners operating a dismissing or distancing strategy were 5.5 times more likely to have dogs rated as Insecure (Avoidant, Passive or Anxious). Caution must be exercised in

interpreting these results as this additional test runs a risk of creating Type II errors, where significance is found where none exists.

#### *Owner Characteristics and ECR Scores*

Four ECR attachment styles were then analysed for relationships with owner and dog characteristics, such as marital status, age, gender, education, parenthood, dog age, gender and breed. No owner or dog characteristics were found to relate to owner ECR attachment style. For example, ECR Dismissive owners were not more likely to be single or childless. One variable, owner income, was marginally related to ECR dismissive owners. In an independent samples *t*-test, dismissive owners had marginally lower incomes than other owners ( $t_{(48)} = 1.93, p = 0.06$ ). No other trends were noted.

#### *Caregiving in Adult Relationships (CAR)*

When romantic attachment styles (ECR) were compared with adult caregiving styles (CAR) in a Pearson correlation with Bonferroni corrections, one significant association was found. A Preoccupied ECR attachment style positively yet weakly correlated with a Compulsive CAR style ( $r = .28, n = 52, p < .05$ ).

CAR styles were also compared with dog clusters in a one way ANOVA with no significant relationships found. In examining the means of each cluster (Table 6.11) it can be seen that, in comparison with other clusters, owners of Avoidant dogs had slightly higher scores for proximity, and lower scores for cooperation and compulsivity.

Table 6.11

*Comparison of means and standard deviations of dogs clusters from the SST with Caregiving in Adult Relationship (CAR) scores.*

Dog Attachment cluster CAR Style	Avoidant		Secure		Passive		Anxious	
	M	SD	M	SD	M	SD	M	SD
Prox/distance	30.18	1.72	29.25	1.83	29.78	2.01	30.01	2.11
Sensitive/insensitive	27.64	2.94	28.02	2.62	27.69	2.66	28.69	2.75
Cooperation vs. Control	29.36	2.37	31.14	2.85	30.80	3.32	31.32	2.67
Compulsive	23.91	4.57	24.07	4.12	24.13	6.01	24.53	4.70



*Owner Dog Caregiving Style (DCS), Owner Romantic Attachment (ECR) and Caregiving (CAR)*

Six dog caregiving styles were then subjected to a one-way between groups ANOVA which revealed no significant relationships, nor trends, between DCS and ECR attachment categories. Table 6.12 shows each ECR category mean by DCS category for comparison.

Table 6.12

*Means and standard deviations for ECR scores when compared to Dog Caregiving style scores*

ECR Style	Dog Caregiving Style											
	Affectionate		Lax		Over-reactive Fear		Over-reactive Aggressive		Firm but Fair		Derogatory	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Secure	3.97	.70	2.08	.51	2.49	1.03	1.52	.78	3.56	.66	1.66	.35
Fearful	4.02	.86	2.41	.51	3.30	.80	1.51	.86	3.55	.50	1.59	.38
Preoccupied	4.04	.82	1.93	.78	3.00	1.03	1.43	.61	3.61	.82	1.62	.37
Dismissing	4.21	.51	2.10	.56	2.67	.77	1.28	.43	3.66	.65	1.63	.33

However, a Pearson Correlation showed one weak correlation (Table 6.13). Those operating a CAR style of proximity and an affectionate dog care style ( $r = .29, n = 52, p < .05$ ) were weakly but positively correlated. When Bonferroni corrections were applied, the significance of this association was lost, which suggests a weak relationship only.

Table 6.13

*Pearson correlation with Bonferroni corrections for Caregiving in Adult Relationship (CAR) scale associations with Dog Caregiving Styles (DCS), with means and standard deviations.*

	1	2	3	4	5	6	7	8	9	10	M	SD
Dog/owner dyads ( <i>n</i> = 52)												
1. Prox. vs distance	-	-.08	.22	-.04	-.15	-.23	.10	<b>.29*</b>	.15	-.10	29.74	2.21
2. Sensitive vs. insensitive		-	-.03	.27	.09	-.02	.03	.20	-.17	-.10	28.00	2.68
3. Cooperative vs. controlling			-	<b>.32*</b>	.06	-.08	.08	.09	-.19	-.25	30.70	2.88
4. Compulsive				-	.02	-.12	.02	-.10	.02	-.17	24.53	4.70
5. Lax dog care					-	<b>.39**</b>	-.18	.15	.16	.03	13.83	4.93
6. O/R-fearful						-	.09	.05	.05	.16	4.04	.72
7. O/R Aggress.							-	-.18	.06	<b>.48**</b>	2.88	.60
8. Affectionate dog care								-	<b>.34*</b>	-.20	3.69	.64
9. Firm/Fair									-	.05	4.06	.70
10. Derogative										-	1.63	.35

Bold typeface indicates significance: \*  $p < .05$ , \*\* $p < .001$  (Bonferroni)

#### *Owner Dog Caregiving Style and Dog Attachment Style*

Table 6.14 compares owner dog care scores with dog attachment clusters. A one-way between clusters ANOVA with Bonferroni post hoc comparisons did not find significant differences. It is interesting to note that owners of Anxious dogs scored lowest on Affectionate dog care and highest on Derogatory dog care, whereas owners of Avoidant dogs score higher on Firm but Fair dog care. Secure dog owners score highest on over-reactive (fear and aggression), but this was found not to differ significantly between clusters.

Table 6.14

*Comparison of one-way ANOVA scores for dog care styles by dog clusters.*

Dog Attachment DCS	Avoidant		Secure		Passive		Anxious		$F_{(3, 47)}$	$P$
	M	SD	M	SD	M	SD	M	SD		
Lax	1.78	.54	2.16	.49	2.20	.61	2.32	.64	1.91	n/s
Over-reactive (fear)	3.66	.68	4.31	.70	3.95	.86	4.18	.44	1.99	n/s
Over-reactive (aggression)	2.68	.35	3.08	.80	2.82	.55	2.89	.53	1.02	n/s
Firm but fair	3.78	.53	3.56	.64	3.67	.51	3.34	.88	.95	n/s
Affectionate	4.16	.51	4.15	.72	4.09	.53	2.77	1.02	.78	n/s
Derogatory	1.56	.27	1.68	.41	1.58	.38	1.71	.28	.55	n/s

#### *Owner behaviour in the Strange Situation Test*

Owner talk, touch and the use of frightening behaviours (FR) in the SST (Chapter 4) were assessed with ECR and CAR scale scores in a Pearson correlation with Bonferroni corrections. No significant relationships were found.

However, significant relationships were found with the DCS (Table 6.15). Owner talk levels significantly positively correlated with an Affectionate dog care style ( $r = .32, n = 52, p < .05$ ). Owner touch was significantly positively associated with a Lax dog care style ( $r = .37, n = 52, p < .01$ ), although these do not suggest causality.

Table 6.15

*Pearson correlation with Bonferroni corrections for owner talk and touch scores from the Strange Situation, and six dog care styles, with means and standard deviations.*

	1	2	3	4	5	6	7	8	M	SD
Dog owner dyads, $n = 52$										
1. Talk	-	<b>-.32*</b>	-.15	.12	<b>.32*</b>	-.03	.00	-.01	14.09	3.96
2. Touch		-	<b>.37**</b>	-.09	-.05	.01	.01	.10	13.67	4.12
3. Lax care			-	-.15	.16	.03	<b>.39*</b>	-.12	2.12	.59
4. Firm/fair				-	<b>.34*</b>	-.05	-.12	.06	3.59	.64
5. Affection.					-	-.20	.05	-.18	4.06	.70
6. Derogatory						-	.16	<b>.48**</b>	1.63	.35
7. O/R Fear							-	.09	2.31	.82
8. O/R Aggre.								-	1.44	.68

\*  $p < .05$ , \*\* $p < .01$  (Bonferroni)

Owner frightening behaviours (FR) were assessed in an independent samples  $t$ -test with dog caregiving style. One trend was found between the use of FR behaviours and a

Lax DCS (Table 6.16). Owners who operated a Lax style were more likely to use FR behaviour ( $M = 2.88$ ,  $SD = .66$ ) than not ( $M = 2.21$ ,  $SD = .54$ ;  $t_{(50)} = -1.86$ ,  $p = .07$ ) although this was not significant at the  $p < .05$  level. In contrast O/R Fearful owners *not* using FR ( $M = 2.34$ ,  $SD = .82$ ) scored higher means than those who did use FR behaviours ( $M = 2.19$ ,  $SD = .97$ ). Similarly, the means for O/R Aggression revealed that the mean of those not using FR ( $M = 1.49$ ,  $SD = .74$ ) was slightly higher than the mean of those who used FR behaviours ( $M = 1.32$ ,  $SD = .62$ ) but this did not differ significantly.

Table 6.16

*Independent sample t-test results of dog owner caregiving styles and the use of FR owner behaviour in the SST (YES/NO), with means and standard deviations for each dog caregiving style.*

Dog Caregiving Style	Yes		No		$t_{(50)}$	$p=$
	M	SD	M	SD		
Affection	4.00	.90	4.08	.63	-.34	n/s
Lax	2.88	.66	2.21	.54	-1.86	.07
Over-reactive	2.19	.97	2.34	.82	-.60	n/s
fear						
Over-reactive aggression	1.32	.62	1.49	.74	-.77	n/s
Firm but Fair	3.55	.63	3.61	.66	-.30	n/s
Derogatory	1.67	.34	1.62	.35	.46	n/s

#### *Task solving and Dog Caregiving Style*

Variables from task solving in Chapter 5 were then assessed with dog caregiving style to determine relationships between DCS, dog success in task solving and owner behaviour. The aim was to determine if owner self-reports of dog care behaviours mirrored a behavioural analysis in task solving. Table 6.17 is a summary of a Pearson correlation with Bonferroni corrections of owner and dog variables in task solving. Owners with a Lax dog caregiving style were less likely to grab their dogs legs ( $r = -.26$ ,  $n = 52$ ,  $p = .06$ ) or control them ( $r = -.26$ ,  $n = 52$ ,  $p = .06$ ) but this is not significant at the  $p < 0.05$  level. Owners operating a Firm but Fair caregiving style, were significantly positively associated with giving dogs orders ( $r = .34$ ,  $n = 52$ ,  $p < .01$ ) as well as praise ( $r = .27$ ,  $n = 52$ ,  $p < .05$ ). Affectionate dog care ( $r = .29$ ,  $n = 52$ ,  $p < .05$ ) was also positively significantly associated with praise, whereas Derogative dog care was weakly negatively associated with praise ( $r = -.24$ ,  $n = 52$ ,  $p = .08$ ). Affectionate dog care was most associated with dog task intensity ( $r = .27$ ,  $n = 52$ ,  $p = .06$ ), orientation ( $r = .24$ ,  $n = 52$ ,  $p = .09$ ) and proximity seeking with the owner ( $r = .27$ ,  $n = 52$ ,  $p = .06$ ), although the

association is weak. Neither Over-Reactive fear nor aggression care styles yielded trends towards associations (Table 6.17).

Table 6.17

*Summary of Dog Caregiving Styles and significant Pearson Correlation coefficients for task solving variables.*

	Lax dog care	Firm but fair dog care	Affectionate dog care	Derogative dog care
Owner supportive presence			-.25( $p = .08$ )	
Quality of owner assistance		-.25 ( $p = .08$ )		
Owner grabbing dog's leg (no. instances)	-.26 ( $p = .06$ )			
Total: Owner control of dog	-.26 ( $p = .06$ )			
Giving dog orders (no. of instances)	-.35* ( $p = .01$ )	.34* ( $p = .01$ )		
Praising dog (no. of instances)		.27* ( $p = .05$ )	.29* ( $p = .04$ )	-.24 ( $p = .08$ )
Total scores: orientation to task			.24 ( $p = .09$ )	
Total scores: intensity			.27 ( $p = .06$ )	
Total scores: prox. seeking			.27( $p = .06$ )	

Table 6.18 provides a text summary of significant, or trends towards significant, variables in this Chapter in relation to Dog Caregiving Styles. It also reveals discrepancies. For example, owners with an Affectionate dog care style were more (but not significantly) likely to have Secure dogs: they engaged in moderate talk during the SST and used more praise in task solving. Their dogs sought more proximity, and were more focussed on task solving. Those with a Lax dog care style were more likely (but not significantly) to touch their dogs more in the SST and were less likely to grab, control or order their dogs during the task but they also used slightly more FR behaviours. Those with a Firm but Fair care style, had a lower quality of support in task solving, were more likely to give orders, but also more likely to praise. High derogative dog care scores were only slightly more associated with the use of FR behaviours, and less likely to employ praise. Neither the Over-Reactive (fear or aggression), Firm but Fair nor Derogatory dog care styles were favoured by one dog cluster over another.

Table 6.18

*Summary table in text comparing dog caregiving style categories with dog cluster, ECR, CAR, owner behaviour scores in the SST (talk, touch and FR) and task solving variables.*

Dog caregiving style:	Affectionate	Lax	O/R Fear	O/R Aggression	Firm but Fair	Derogatory
Dog Clusters (all ns)	High = S High Av High/Mod = Anx Low = P	High = Anx High/mod = P Low= S, Av	High = S High/mod = Anx Mod = P Low = Av	similar scores all Moderate	similar scores all Moderate	similar scores all Low
Owner ECR Scores (all ns)	High =Dismiss. Mod =Fear Mod = Preocc. Low = Secure	High = Fear Mod = Secure Mod = Dismiss. Low = Preoc.	High = Fear Mod = Preocc. Low = Secure Low = Dismiss.	Mod = Secure Mod = Fear Mod= Preocc. Low = Dismiss	All moderate	All low
Owner CAR scores	High = Proximity	ns	Low = Proximity	ns	ns	Low cooperation/High controlling ns
Owner in SST: Touch	ns	Moderate	ns	ns	ns	ns
Owner in SST: Talk	Moderate	ns	ns	ns	ns	ns
Owner in SST: FR	ns	More likely to use	ns	ns	ns	ns
Task: Owner support	Low support	ns	ns	ns	ns	ns
Task: Owner quality	ns	ns	ns	ns	Low quality	ns
Task: Owner Grabbing	ns	less likely to grab	ns	ns	ns	ns
Task: Owner Controlling	ns	less likely to control	ns	ns	ns	ns
Task: Owner ordering	ns	less likely to order	ns	ns	ns	ns
Task: Owner praising	more likely to praise	ns	ns	ns	more likely to praise	least likely to praise
Dog orientation to task	high orientation to task	ns	ns	ns	ns	ns
Intensity of focus on task	High intensity of focus	ns	ns	ns	ns	ns
Task: Proximity seeking to owner	High proximity seeking	ns	ns	ns	ns	ns

Key Dog Clusters S= Secure. Av = Avoidant, Anx = anxious, P = passive

## Discussion

The first aim of this chapter was to determine if self-reports of owner-to-dog caregiving were related to dog attachment style. It was hypothesised that a relationship would be found between dog attachment style and owner self reports, which was partially supported. The second aim was to determine whether attachment styles in close adult relationships inform owner-to-dog caregiving, as found in parent/child studies. It was

hypothesised that self reports of owner attachment style would predict their dog caregiving style, and this was also partially supported. Finally the third aim was to determine if self-reports of dog caregiving style reflected behavioural data from owner behaviour in the SST (Chapter 4) or task solving (Chapter 5). It was hypothesised that behavioural assessments would mirror self reports, and this hypothesis is rejected for the alternative hypothesis: whereas there are correlations between behavioural and self-report data in relation to dog attachment style, owner self-reports of their caregiving behaviours do not reflect behavioural data from the Strange Situation and Task Solving.

### *Self-reports of Dog Caregiving and Dog Attachment Style*

The hypothesis was partially supported as dog attachment style related in a non-linear fashion to self-reported owner-to-dog caregiving. Secure dogs were more likely to have owners who were more over-reactive (fearful) as well as more affectionate. They are more likely to worry excessively about their dogs, as well as train them, cuddle them and profess to a strong bond. Secure dogs are therefore a major focus in the lives of owners who are over reactive (fearful) and affectionate in dog caregiving.

Less explainable is the relationship of Avoidant dogs with Affectionate, Firm but Fair and Over-reactive (fear) DCS mean scores. The results could be due to methodological issues: the on-line accessibility of the study, its length and the population sample. Firstly, the set up of the questionnaire responses on-line did not enable easy viewing of the Likert scale options and participants reported that they often “lost their place.” Secondly, the length of the questionnaire, taking 40 minutes to complete may have affected the truthfulness of the responses as participants tired when completing it. Another flaw in the DSC scale was the lack of negatively worded items. Most owners scored high on Firm but Fair or Affectionate items, as could be expected from the self-selected sample. As the survey was completed before the Strange Situation session, there may have been some socially desirable responses chosen.

Although not statistically significant, Anxious dog owners were more likely to score low on Affectionate dog care and high on Derogatory dog care, which could indicate owner frustration and powerlessness over their dog’s anxiety. They also scored high on Lax dog care, which might be a contributory factor. Lack of owner response could be maintaining dog sympathetic arousal.

Passive dogs’ owners scored moderately on all DCS scales, which again may be due to the role of social desirable responses or other flaws in the scale.

### *Self-reports of Adult Attachment Style, Dog Caregiving and Dog Attachment Style*

It was hypothesised that the type of strategy owners employ in close adult relationships and dog care would predict attachment security in dogs as they have been found to do in children (Dickstein et al. 2009; George & Solomon, 1996; Shaver & Fraley, 2000). Although not significant, there was a trend towards those operating a Dismissive strategy in adult relationships and Avoidant dogs. Avoidant dogs were almost four times more likely to have owners with Dismissive ECR styles than Secure dogs' owners.

There was also a trend towards Security in adult relationships and Passive cluster dogs. In the SST, Passive dogs showed evidence of attachment system activation combined with behavioural inhibition. When the owners reappeared, they showed a high need for physical contact, at the expense of other behaviours. Over the following 3 minutes of the dog/owner reunion episodes, this need did not diminish; the dogs remained in close proximity to the owner. Emotional homeostasis was not re-established. The owners of Passive dogs were significantly more likely to pet them but not speak to them. Hence, there is no evidence of rejection – owners were responding to the attachment needs of their pets, which is a characteristic of Security in romantic attachment relationships. Such activation of the owner response is unconscious, and this link therefore between Secure ECR scores and Passivity in dogs could be an indication of owner lack of awareness of species differences. Pacifying a child or romantic partner when frightened with gentle touch might be reflective of sensitivity in human relationships and be a species-specific behaviour. However, it may serve to prolong attachment system activation in dogs, rather than deactivate it.

A trend suggests a transmission of owner attachment style that is reflected in dog attachment. Using the ECR to measure romantic attachment style and an adapted ECR measuring pet attachment, Beck and Madresh (2008) found a significant but weak correlation between Preoccupied and Avoidant scores in the ECR and their self-devised pet attachment scale. Although the current study did not adapt the ECR as in Beck and Madresh, the results suggests that transmission of working models may be responsible for a proportion of the variance in dog attachment style, although behavioural assessment in addition to self-reports may provide clearer evidence of a link.

It was surprising to see the lack of significant correlations between ECR and CAR scores. This is uncharacteristic of other results in which the two scales were highly inter-correlated (Carnelley, Pietromonaco & Jaffe, 1996; Feeney, 2004; Feeney & Collins, 2004;



Kunce & Shaver, 1994). In human attachment literature, the caregiving system is activated in response to external threats to the careseeker (Kunce & Shaver, 1994) and is defined as an overall ability to empathise, respond flexibly and orient oneself to the careseeker when necessary. It was expected that individuals rated as Secure in the ECR would score high on sensitivity, proximity and cooperation in adult romantic relationships but this was not the case. Methodological flaws as previously mentioned could be responsible. As participants were self-selected because of their interest in the human/dog bond, they may have felt that questions about significant human relationships were not relevant, and as a result did not apply care in completing this section.

### *Owner Behaviour and Self Reports*

Further discrepancies are also evident between self-reports of owner dog care style and behavioural observations in the SST and task solving. The most interesting pertains to the Lax dog care style. Those scoring high in Lax dog caregiving, had higher touch levels in the SST, as did owners of Passive cluster dogs. This could be because Lax owners were more likely to give into their dog's requests for attention, and Passive dogs, who were touched the longest in the SST, also demanded their owners' attention at high levels in the SST, indicative of their need for comforting.

Those with a Lax dog care style were more likely use FR behaviours in this study. It could be that O/R (aggressive) or Derogatory owners will use FR behaviours more in certain contexts (e.g. if a chewed shoe is found), and therefore may be predictable, whereas Lax owners may not be as predictable both in regards to their caregiving approach (no boundaries, no re-training for inappropriate behaviours) and their use of FR behaviours. It could be that the Lax system is revealing an underlying inconsistency, which is also indicated by greater likelihood of showing 'misplaced' behaviours such as the use of FR during normal interactions, because these owners are not concentrating or not "in tune" with the context or interaction.

Although owner behaviours in task solving, such as grabbing paws or restraining dogs may seem frightening to dogs, this was not found to significantly relate to any particular care style, although Lax owners were less likely to use restraint or control in the task solving experiment. They were also less likely to use praise than those with a Firm but Fair dog care style. In relation to task solving, it appears as though an Affectionate dog care style is most associated with traits of Secure cluster dogs in that it is associated with greater task orientation and intensity, with some owner proximity seeking.

The hypothesis that self-reports would produce different results to those obtained by behavioural observations is supported in this study. The affectionate DCS in particular reveals these discrepancies. The self-reported affectionate DCS contained items such as “I know my dog looks to me for guidance” and “I enjoy a cuddle with my dog” and “I spend time training this dog, ” items indicative of a strong owner/dog bond. Although only a trend, it appears that the self-reported Affectionate dog care style was more related to an *Avoidant* dog cluster. In Chapter 4 owners of Avoidant dogs were significantly lower on touch levels in the SST, with little behavioural evidence of “enjoying a cuddle”. In addition, while the self-reported Affectionate DSC was also significantly associated with praising the dog in task solving, it also revealed a trend towards a lower supporting presence ( $p = .08$ ) indicative of lower sensitivity in task solving (more invasiveness, less reading of the dog’s signals). These behaviours in task solving were also related to the *Avoidant* dog cluster.

An explanation of differences between self-reports and behavioural data may be found in owner belief in what they do and in their interpretation of what they believe their dogs are signalling. Firstly, they may believe they are answering the questionnaire accurately (e.g. “My dog and I have a strong bond”, or “I have confidence in my dog’s quick response to my commands.”) However, it is known from clinical work that owners are often unaware of their behaviour around their dog, for example stroking it when it walks by. This is shown by the behaviour analysis in Chapters 4 and 5. The owner’s *perception* of their care style is to some degree unrelated to behaviour *observation* of their care style. In addition, owners frequently misinterpret how the dog perceives their behaviour, and what the dog’s behaviour means. This is often due to anthropomorphism (Serpell, 2003). Owners may hold the belief that it would be perceived by a child as helpful to manipulate their hands when task solving, so the same would be true for manipulating the dog’s paws.

This leads us to suggest that self-reports from human studies, such as Baumind’s (1971) Parental Authority Scale or Arnold et al. (1993) Parenting Style Scale cannot be translated to dog owners and dogs because of the differences due to owner performance of unconscious, species-specific behaviours, anthropomorphism (the owner interpreting their behaviour as helpful) and of misinterpreting the species (what the owner deems as helpful is invasive and fear-provoking in dogs). For that reason it is fundamentally more important to look at owners’ behaviours than it is to look at owners’ self-reports.

## Conclusion

Self-reports of owner caregiving style show little relationship to owner behaviours observed in the SST (Chapter 3) or Task Solving (Chapter 4). This could be due to the differences between owner perception of their dog care style and behavioural observations, but also to an anthropomorphic misinterpretation of what their behaviour may mean to the dog and of the dog's signals. Secondly, although there is a trend towards a relationship between adult attachment and caregiving styles with dog attachment style and exploratory behaviour, the links are tenuous. Owners who operate distancing strategies in their romantic relationships may also be employing similar strategies in relation to their dogs. Video assessment of behaviour and interviews may provide a clearer picture of the type of social strategy owners operate with regards to dogs and its impact on dog attachment style.

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## The Relationship between Unresolved Pet or Human Loss in Owners and Dog Attachment Style

### Introduction

Previous chapters have found a relationship between owner behaviour in the Strange Situation Test and Task Solving which is related to dog attachment style. As unresolved loss is associated with disorganised behaviour patterns in parents (Main & Hesse, 1995) and as dogs are often perceived as, if not children, then “other” family members (Archer 1997), behaviours associated with owner unresolved loss (e.g. lack of behaviour monitoring) may impact dog attachment style as they do infant attachment style. This chapter explores the role of unresolved pet or human loss, measured quantitatively from the Pet Owner’s Interview, on dog attachment security and behavioural organisation from the Strange Situation Test (SST).

### *Pet Grief*

Some dog owners grieve when their dogs die in a similar way to the death of a human significant other, with the same stages of protest, despair and detachment found in human loss. The strength of the attachment bond (Brown et al. 1996; Gosse & Barnes, 1994), the role the pet played in the owner’s life (dog as “child” or “companion”), and the degree to which the owner relied on the dog for emotional and social support (McNicholas & Collis, 1995) impacts the intensity of pet grief. Archer & Winchester (1994) found that owners who live alone experience more intense responses to pet loss. Loss of a pet may result in unresolved or complicated pet bereavement. Pet loss can also exacerbate previous unresolved human grief (McNicholas & Collis, 1995)

In a questionnaire study completed by 88 respondents who had lost a pet in the previous year, Archer and Winchester (1994) found that 74% thought about their deceased pet often, and 60% often noticed other animals that reminded them of their pet. This could be due to differences in the depth of the dog/owner bond. Those who characterise themselves as having a deep relationship with their pets are significantly more affected by

pet loss than those who do not (Gerwolls & Labott, 1994). Such deep attachments to the pet may indicate an Insecure adult attachment style in human relationships.

Field et al. (2009) assessed the role of owner adult attachment style in regards to pet grief, using the Relationship Scales Questionnaire (RSQ; Griffen & Bartholomew, 1994) which categorises subjects into Secure, Anxious or Avoidant styles, based on two dimensions of fear or anxiety in adult relationships. They found a significant positive relationship between owners operating an insecure attachment model such as Anxious or Avoidant attachment and the depth of pet loss. This indicates that some features of human/human attachment are found in the human/pet bond and that grief at pet loss is influenced by styles of relating in important human relationships.

The work of Field et al. (2009) indicates that unresolved loss is linked to adult attachment style. It is known that attachment style has an inter-generational effect (Main et al. 1985) and unresolved human grief predicts disorganised attachment behaviours in children (Main & Hesse, 1995). It is hypothesised that owner grief with respect to human and/or pet grief may predict the attachment status of their current dog as measured by its behavioural organisation in the Strange Situation Test (SST).

#### *Dog Attachment Style and Owner Unresolved Loss*

There is no previous research relating to owner unresolved status in the AAI with respect to *human bereavement*, trauma or abuse, and dog attachment security. Neither is there research on the contribution of *pet bereavement* to unresolved status in owners. In human studies up to 18% of infants have been found to have disorganised attachment (van IJzendoorn & Bakermans-Kranenburg, 2009). In this thesis, behavioural disorganisation was evident in only 2 of 52 canine participants (Chapter 3) but there is a link between Avoidant attachment and the use of owner FR behaviours in the SST (Chapter 5) which could be indicative of owner unresolved status.

Therefore the aims of this study are to determine: if unresolved grief with respect to human loss, trauma or abuse predicts higher levels of unresolved pet loss; if either pet or human unresolved loss is related to dog attachment style; if attachment and caregiving in human relationships is related to unresolved pet loss; and if unresolved human or pet loss is related to owner behaviours in the SST and task solving.

It is predicted that unresolved pet and/or human loss will be related to dog attachment style, as well as owner behaviours in task solving, with unresolved owners displaying less sensitivity. It is also predicted that owners' sensitive and cooperative in

human relationships will be less affected by pet loss, whereas high anxiety and avoidance in adult relationships may be correlated with unresolved pet loss status. In other words, it is expected that there will be a relationship between unresolved pet loss and dog attachment style which is informed through both owner adult attachment style and owner/dog interaction.

## Method

### *Participants*

The participants were the same owners as in earlier chapters ( $n = 52$ ), 82.7% were female ( $n = 43$ ) and 17.3% were male, with ages ranging from 25 to 72 years, ( $M = 47$ ,  $SD = 11.51$ ).

### *Procedure*

The Pet Owners Interview (POI) was developed by the researcher adapted specifically for pet owners from the Adult Attachment interview. There were 12 primary questions, with subsequent follow-up questions which addressed: the participants' history of pet ownerships (any species of pet); positive and negative experiences of dog ownership; loss of prior dog (or other pet is the current dog was their first) and fear of loss of current dog; the role of the dog in their household; their involvement level on a day-to-day basis; their use of discipline; feelings of anger towards their dog; and idealisation of the relationship with their dog. This structured interview was approximately 30 minutes long. It took place immediately after the SST and dog task filming protocol, was audio taped and transcribed verbatim into Word 2007. Appendix I contains the full list of questions, what they measure and complete scoring guide.

### *Data analysis*

Data were assessed for both unconscious and conscious meaning within the transcript text. Not only was overall coherency coded, but also actual text related to pets was thematically coded. For example, "dog as child" was scored as 1 ("yes"), 2 ("no") or 3 ("uncodeable") from text such as "she's just like my baby". This allowed a quantitative analysis.

In the first instances scores for unresolved human loss and pet loss were derived from the transcripts. There was no specific question in this study regarding human bereavement, which was a major flaw in the questionnaire protocol. However, this

information was requested in the survey study in Chapter 6 (“Could you indicate if you were subjected to trauma, loss or abuse in your early life, or any recent human loss”). The survey also included items relating to types of trauma (stay in hospital as a child, divorce of parents, fostering, looking after ill parent). In addition, recent bereavements or other trauma were volunteered by participants. Each reference to trauma or loss was scored 1 (no indication of unresolved status) to 9 (high unresolved status) based on the coherency in describing the loss as per the Adult Attachment Interview (see Chapter 8). The highest of these scores then represented the score for Unresolved status. If human or dog bereavement took place within the last two years, the transcript was automatically assigned an Unresolved score.

Data were assessed for normal distribution, with non-normal variables square root or log transformed to enable the use of parametric statistics throughout. Data was then explored for outliers. The main variables of unresolved pet and human loss did not contain outliers, although a large standard deviation reflects the spread in scores: in human loss, 41 participants scored 0.

To test reliability between two independent judges, scores for all variables were entered into a Pearson correlation which revealed significant between rater correlations ( $r = .84$ ).

One-way analyses of variance (ANOVA) with Bonferroni post hoc comparisons was used to analyse multi-categorical data such as dog clusters or marital status, independent sample *t*-tests for 2 category data, such as gender or “yes/no” variables, chi-square for associations between categories, and Pearson correlation coefficients to investigate associations between scale scores. Data was analysed using SPSS v.16.

## Results

Totals for each variable were recoded into different variables using low medium and high scores based on values representing 33% of the total score. Table 7.1 shows the frequencies of each category. Scale items are derived from the POI questions in Appendix I, based on coding themes in the Adult Attachment Interview (see Chapter 8 for full coding procedure for the Adult Attachment Interview).

Table 7.1

*Scale items recoded into Low Medium and High frequencies, with percentages and numbers of dog owners in each category.*

Pet Owner's Interview Scale item	Low		Medium		High	
	%	<i>N</i>	%	<i>N</i>	%	<i>n</i>
Involvement	17.3	9	32.7	17	50	26
Rejection	84.6	44	13.5	7	1.9	1
Role Reversal	63.4	33	30.8	16	5.8	3
Derogation	61.5	32	32.7	17	5.8	3
Emotionality: current dog	63.5	33	17.3	9	19.2	10
Emotionality: prior dog	48.0	25	21.2	11	30.8	16
Fear of current dog loss	44.2	23	25	13	30.8	16
Unresolved dog loss	40.4	21	19.2	10	40.4	21
Unresolved human loss or trauma	73.1	38	11.5	6	15.4	8

High scores for unresolved human loss or trauma occurred in 15.4% of the sample. High scores for Emotionality (evidence of emotion, e.g. crying, when discussing loss) regarding prior dogs were found in 30.8% of the sample. High fear of current dog loss was also found in 30.8% of the sample. Just under a third of participants showed evidence of grief for prior dogs. An additional 10% of the sample showed disorganised thought processing in the transcripts when discussing prior dog loss, although they remained largely unemotional when discussing this prior dog, hence the resulting 40.4% high in unresolved dog loss. This means that 40% of dog owners were still involved in mourning for a prior dog, which could affect their bond with the current dog.

Thirty-three percent of owners relied on their dogs as a type of therapy (i.e. they would talk to or cuddle dogs when troubled) and 35% stated they had used physical punishment at least once with their current dog. Forty percent felt that the current dog was superior to the previous dog whereas 23% said that the prior dog was the superior dog (37% of participants could not be rated in this category because of a lack of information).

Thirty-five percent considered their dog as a child, whereas 65% considered them part of the family but not a child, and 89% considered their dog as their companion.

In an independent samples *t*-test, participants who had experienced trauma (death of a significant family member as a child or within the last year, parental divorce, fostering when a child, severe illnesses as a child) ( $M = 4.38$ ,  $SD = 2.52$ ) significantly differed from those who had experienced no trauma or significant loss ( $M = 2.42$ ,  $SD = 2.98$ ), in the degree of emotionality expressed when talking about the future loss of their current dog ( $t_{(50)} = 2.53$ ,  $p = .02$ ). There was a trend towards a significant difference between those who had suffered both human bereavement *and* serious illness and higher levels of emotionality



in discussing the current dog ( $F_{(3, 48)} = 2.20, p = .10$ ) than those suffering either human bereavement, serious illness or one of the other trauma types.

Emotionality for the current dog was related to both unresolved pet and human loss (Table 7.2). Owners who had suffered low or nil levels of human loss or trauma were more likely to score low on emotionality when discussing the current dog, however this was not significant in a chi-square analysis ( $\chi^2_{(4)} = 8.04, p = .09$ ).

Table 7.2

*Pearson chi-square analysis relating percentage of participants high/medium/low emotionality in discussing the current dog, with unresolved human loss or trauma.*

Emotionality when discussing current dog:	Unresolved Human Loss or Trauma		
	Low	Medium	High
Low	50.0%	9.6%	3.8%
Medium	11.5%	1.9%	3.8%
High	11.5%	0.0%	7.7%

A Pearson correlation (Table 7.3) with Bonferroni corrections revealed significant correlations between unresolved human or pet loss and attitudes towards prior and current dogs, despite the fact that emotionality did not significantly reflect unresolved loss.

Table 7.3

*Pearson correlation coefficient of all scale items, with mean score and standard deviations.*

	1	2	3	4	5	6	7	8	9	M	SD
Dog owners, $n = 52$											
1. U/R Human Loss	-	.14	-.00	.08	<b>.29*</b>	.10	-.11	<b>.29*</b>	-.03	1.42	.76
2. U/R Pet loss		-	<b>.33*</b>	<b>.66**</b>	<b>.27*</b>	.17	.20	.07	-.21	2.00	.01
3. Fear of dog loss			-	<b>.41**</b>	<b>.54**</b>	-.05	-.20	.15	<b>-.52**</b>	1.87	.86
4. Emotionality Prior dog				-	<b>.42**</b>	.26	-.02	.14	-.22	1.83	.88
5. Emotionality Current dog					-	.24	-.23	<b>.52**</b>	<b>-.36*</b>	1.56	.80
6. Involvement						-	<b>-.37*</b>	.25	.02	2.32	.76
7. Rejection							-	<b>-.29*</b>	<b>.38*</b>	1.17	.43
8. Role Reversal								-	<b>-.31*</b>	1.42	.61
9. Derogation									-	1.44	.61

Bold typeface indicates significance: \* $p < .05$ , \*\* $p < .001$  (Bonferroni)

Table 7.3 shows that owners who have experienced important human losses are significantly but weakly associated with high emotionality when discussing deceased pets ( $r = .28, n = 52, p < .05$ ), and are also associated with higher levels of current dog role reversing behaviours, in which owners place dogs' needs above their own ( $r = .29, n = 52, p < .05$ ). Those owners still grieving for deceased dogs were significantly more likely to emotionally discuss these dogs ( $r = .66, n = 52, p < .01$ ) and express fear regarding future dog loss ( $r = .33, n = 52, p < .01$ ). Owners' scores for role reversing were positively related to unresolved human loss and to emotionality, with owners significantly more likely to be emotional when discussing their current dog ( $r = .52, n = 52, p < .01$ ) and significantly but weakly associated with lower rejection scores ( $r = -.29, n = 52, p < .05$ ). Owners' scores for current dog derogation were found to significantly negatively correlate with the fear of the loss of the dog ( $r = -.52, n = 52, p < .001$ ), role reversal ( $r = -.31, n = 52, p < .05$ ) and emotionality ( $r = -.36, n = 52, p < .05$ ), but positively correlate with rejection of the current dog ( $r = .38, n = 52, p < .05$ ). Therefore pet owners with unresolved grief in this study were more likely to be role reversing, which involved using the dogs as a source of comfort and putting the dog's needs above their own.

The data set was then split to explore variables associated with unresolved pet loss, unresolved human loss and trauma. First, owners who had experienced human loss were separated in a new data set. In an independent samples t-test those unresolved in respect of human bereavement ( $n = 10$ ) were significantly more likely to be emotional when discussing future dog loss ( $M = 2.10, SD = .88$ ) than non-bereaved owners ( $M = 1.43, SD = .74$ ;  $t_{(50)} = 2.50, p = .02, \eta^2 = .11$ ). They were significantly more involved with their dogs on a daily basis ( $M = 2.70, SD = .48$ ) than those who were not bereaved ( $M = 2.24, SD = .79$ ;  $t_{(22.158)} = 1.76, p = .03, \eta^2 = .13$ ), and significantly more likely to seek out their dogs for comfort and support, or role reversing ( $M = 1.80, SD = .79$ ) than non-bereaved owners ( $M = 1.33, SD = .53$ ;  $t_{(50)} = 2.28, p = .03, \eta^2 = .10$ ). Owners with evidence of continued bereavement through human loss relied on their dogs more as a source of support, were more involved in their care, and were more likely to be emotional when discussing their concerns about this dog or future dog loss.

Comparing owners with unresolved pet loss with those who had not recently lost a significant pet showed similar levels of involvement or role reversing, although the former displayed high emotion when discussing this prior pet ( $M = 2.43, SD = .81$ ) compared with the latter ( $M = 1.42, SD = .67$ ;  $t_{(50)} = 4.89, p = .01, \eta^2 = .16$ ) and a trend towards a higher

fear of current dog loss ( $M = 2.14$ ,  $SD = .79$ ) compared with the latter ( $M = 1.68$ ,  $SD = .87$ ;  $t_{(50)} = 1.96$ ,  $p = .06$ ,  $\eta^2 = .04$ ).

Other owner traumatic events were investigated including early hospitalisation, parental divorce or fostering, but none of these were found to be significantly associated with role reversal, involvement, rejection of current dog, emotionality of current or past dogs, or pet loss.

When owner demographic variables were assessed with variables in this study there was a significant relationship between dog owners who were parents ( $M = 1.26$ ,  $SD = .51$ ) and those who were not ( $M = 1.05$ ,  $SD = .22$ ), and rejection scores for the current dog in an independent samples  $t$ -test ( $t_{(44)} = 2.03$ ,  $p < .05$ ,  $\eta^2 = .04$ ) with a moderate effect. Participants who were parents were therefore more critical and rejecting of the current dog.

There was no significant relationship between owners who lived alone and unresolved human or dog loss, or fear of future dog loss. The only variable found to significantly relate to owners living alone was role reversing. In an independent samples  $t$ -test, owners who lived alone ( $M = 1.73$ ,  $SD = .70$ ) were found to have significantly higher levels of role reversing from those who did not live alone ( $M = 1.30$ ,  $SD = .52$ ;  $t_{(50)} = 2.47$ ,  $p < .05$ ,  $\eta^2 = .12$ ).

In addition, in an independent samples  $t$ -test, there was no significant relationship between owners who were parents themselves and their scores for “dog as child”. For example those who did consider their dogs as their children ( $n = 18$ ,  $M = 1.72$ ,  $SD = .67$ ) were more likely to role reverse than those who did not ( $M = 1.26$ ,  $SD = .51$ ;  $t_{(50)} = 2.75$ ,  $p < .01$ ,  $\eta^2 = .10$ ). They were also more likely to score higher on emotionality when discussing their dog ( $M = 1.94$ ,  $SD = .87$ ), than those who did not consider their dogs as children ( $M = 1.35$ ,  $SD = .69$ ;  $t_{(50)} = 2.68$ ,  $p < .01$ ,  $\eta^2 = .09$ ).

The only dog variable to correlate with unresolved pet loss was the age of the current dog. There was a significant negative but weak correlation between the current dog's age and owner grief for previous dog loss ( $r = -.28$ ,  $n = 52$ ,  $p < .05$ ) suggesting that the current dog was acquired while the owners were still grieving prior pet loss.

#### *Owner Attachment Style and Interview variables*

Categorical data was entered into a chi-square analysis to determine the relationship between romantic attachment (ECR) categories and the role of the dog in the household.

Table 7.4

*Adult attachment categories of Secure, Fearful, Preoccupied and Dismissive with owner view of the dog as “child” within the family.*

	Owner Secure	Owner Fearful	Owner Preocc.	Owner Dismissive	<i>n</i> =
Dog as child	9.6%(5)	5.8%(3)	13.5%(7)	5.8%(3)	18
Dog not child	25%(13)	15.4%(8)	5.8%(3)	19.2%(10)	34
<i>n</i> =	18	11	10	13	

Table 7.4 indicates that Secure, Fearful and Dismissive dog owners are less likely to consider their dogs as children. Preoccupied owners were 7.77 times more likely to consider their dogs as children than Dismissive dog owners ( $\chi^2_{(3)} = 6.93, p = .07$ ), although this association was not significant at the  $p < .05$  level.

There was a trend towards a difference between ECR attachment styles and owners' scores for role reversing, in which the dog's needs are placed above the owner's. In a between group ANOVA with Bonferroni post hoc comparisons, Dismissive ( $M = 1.31, SD = .63$ ) and Secure owners ( $M = 1.28, SD = .60$ ) differed from those with a Fearful attachment style ( $M = 1.82, SD = .60; F_{(3, 48)} = 2.21, p = .09$ ) although this was not statistically significant. Owners with a Fearful attachment style were more likely to be less self-confident, tended to need approval from significant others and experienced greater anxiety from personal relationships. These owners were more likely to place their dog's needs above their own and rely on them more as a source of comfort than Secure, Preoccupied or Dismissive owners.

In a Pearson correlation, there was a significant negative relationship between owners who were still grieving for deceased dogs and three ECR attachment styles. Secure ( $r = -.31, n = 52, p < .05$ ), Fearful ( $r = -.30, n = 52, p < .05$ ) and Preoccupied ( $r = -.31, n = 52, p < .05$ ) in which higher scores in all three categories were significantly associated with lower levels of unresolved pet loss. In other words Security, Preoccupation and Fear in adult human relationships is associated with a *resolved* strategy in relating. It may therefore also imply that Dismissive individuals could be more unresolved in respect to pet loss in this study. No other variable was related to owner attachment style.

When the Avoidance and Anxiety dimensions were analysed with variables, no significant relationships were found. However, mean scores for those who considered their dog as a child differed between the Avoidant dimension ( $M = 2.72, SD = 1.00$ ) and Anxious dimension ( $M = 3.20, SD = 1.13; t_{(50)} = -1.71, p = .09$ ).

### *Caregiving in Adult Relationships (CAR) and Unresolved Loss*

The Caregiving in Adult Relationships scale from Chapter 6 was found to relate to one item in this study, fear of loss of the current dog. In a Pearson correlation with Bonferroni corrections, there was a significant negative relationship in fear of current dog loss between those who scored high on cooperation in adult relationships (  $r = -.35, n = 52, p < .01$ ) and a trend towards significance for those high in sensitivity (  $r = -.27, n = 52, p = .06$ ). There was no significant relationship between unresolved dog loss, unresolved human loss and caregiving in adult relationships.

### *Dog Care Style (DCS) and Unresolved Loss*

When dog care styles from Chapter 6 were compared to variables in this study in a Pearson correlation with Bonferroni corrections, Lax, Over-reactive and Derogatory dog care styles revealed significant associations (Table 7.5).

Table 7.5.

*Pearson correlation coefficient of dog care categories and four variables (dog as child, role reversing, fear of dog loss and unresolved human loss), with significant correlations, with means and standard deviations.*

	1	2	3	4	5	6	7	M	SD
Dog owners ( $n = 52$ )									
1. Lax dog care	-	.16	-.01	-.08	<b>.40*</b>	.00	.08	2.09	.68
2. Over-reactive		-	<b>.46**</b>	<b>-.33*</b>	<b>-.36*</b>	-.02	.25	2.04	.61
3. Derogatory			-	.04	-.05	<b>-.28*</b>	<b>.27*</b>	1.62	.51
4. dog as child				-	<b>-.36**</b>	-.21	-.24	1.65	.48
5. Role reversing					-	.15	<b>.29*</b>	1.42	.61
6. Fear of dog loss						-	-.01	1.87	.86
7. Unresolved human loss							-	1.42	.75

Bold typeface indicates significance: \* $p < .05$ , \*\* $p < .002$  (Bonferroni)

In Table 7.5, owners operating a Lax dog care style are significantly associated with high role reversing (  $r = .40, n = 52, p = .004$ ). Those operating a Derogatory dog care style are negatively significantly associated with fewer fears of future dog loss (  $r = -.28, n = 52, p < .05$  ), although this is a weak relationship. However, those derogatory about their dog are also significantly but weakly associated with unresolved human loss (  $r = .27, n = 52, p < .05$  ), a trend also shown for Over-reactive dog owners (  $r = .25, n = 52, p = .08$  ).

This trend is confirmed in independent samples *t*-test results in which those unresolved in human loss ( $M = 2.35, SD = .74$ ) were more likely to be over-reactive in dog care than those not unresolved ( $M = 1.96, SD = .56, ; t_{(50)} = 1.86, p = .07$ ). Similarly, those who were bereaved ( $M = 1.90, SD = .53$ ) were more likely to operate a Derogatory dog care style than those who were not ( $m = 1.56, SD = .50, ; t_{(50)} = 1.94, p = .06$ ). These results do suggest that those operating a Derogatory or an Over-reactive dog care style could be suffering from unresolved human loss, and that might be affecting their interactions with their dog. In contrast Lax dog owners are more likely to let their dog assume control in the household, which is in contrast to both Over-reactive and Derogative dog owners who are not high role-reversing. Neither Firm but Fair, nor Affectionate dog care styles were significantly related to variables in this study.

#### *Owner Behaviour in the Strange Situation and Unresolved Loss*

Owner behaviour in the SST was then assessed in conjunction with interview variables in a Pearson correlation with Bonferroni corrections. Owner talk in the SST was significantly correlated with emotionality when discussing prior dogs ( $r = .33, n = 52, p = .02$ ), although there was also a trend towards high owner talk and unresolved pet loss ( $r = .26, n = 52, p = .07$ ). There was no association found for owner touch.

The use of owner frightening behaviour (FR) in the SST was also assessed in an independent samples *t*-test. There was no significant relationship or trends between the use of frightening behaviour and variables in this study. Of those unresolved in pet loss, 7 used FR behaviours in the SST, versus 6 who were resolved. Of those unresolved in regards to human loss, none used FR behaviours. Therefore, it appears that those unresolved in pet loss may be more likely to use frightening behaviours with their current dogs than those unresolved in human loss, however in *t*-tests this is not a significant difference. Nonetheless, Table 7.6 shows that the mean scores of those more inclined to use FR behaviours are higher if they are unresolved in pet loss.

Table 7.6

*T-test results of unresolved pet and human loss means for owner use of frightening behaviour in the SST, plus means and standard deviations,  $t$  and  $p$  values.*

	Owner Use of Frightening (FR) behaviour in the SST					
	Yes		No		<i>t</i>	<i>p</i>
	M	SD	M	SD		
Unresolved Pet Loss	5.50	3.21	4.53	3.17	.96	n/s
Unresolved Human loss	2.62	3.36	1.78	3.15	.80	n/s

Owner behaviours in the task solving experiment in Chapter 5 were then assessed to determine relationships with variables in this study (Table 7.7)

Table 7.7

*Pearson correlation with significant associations between owner variables from task solving and involvement, derogation, unresolved pet loss and unresolved human loss variables from current study.*

	Owner Control $r$	Grab dog leg $r$	Restraining dog $r$	Touch paw $r$	Quality of support $r$
Involvement with current dog	<b>-.28*</b>	-.24	-.22	.03	<b>.33*</b>
Derogation current dog	-.01	.17	-.14	<b>.33*</b>	.19
Unresolved pet loss	<b>-.34**</b>	-.23	<b>-.30*</b>	.04	.03
Unresolved human loss	.08	.24	-.04	-.15	.04

Bold typeface indicates significance: \*  $p < .05$ , \*\*  $p < .01$

Table 7.7 shows that owners who used high control during task solving (restraint, grabbing, attempting to grab and touching paws) were significantly negatively associated with low involvement scores ( $r = -.28$ ,  $n = 52$ ,  $p < .05$ ). This contrasts with owners exhibiting a high quality of support during the task, which positively correlates with involvement scores ( $r = .33$ ,  $n = 52$ ,  $p < .05$ ). Involvement refers to the focus the owners place on their dogs' activities, such as exercise and additional shared activities such as agility. Involvement is negatively related to control, in that owners who are more likely to spend a large part of their lives on dog-related activities are less likely to adversely control their dogs. Interestingly, owners who are unresolved with respect to prior dog loss, are significantly negatively associated with control ( $r = -.34$ ,  $n = 52$ ,  $p < .01$ ). In other words, they show lower levels of control over their dogs, in particular, restraining of their dogs ( $r = -.30$ ,  $n = 52$ ,  $p < .05$ ). Owners who scored high on derogation of their current dog were

significantly positively associated with paw touching ( $r = .33, n = 52, p < .05$ ). The lack of theme to these results suggests that owners were linking control of their dogs during the task with task success, when the opposite actually occurred: high owner control was associated with less play duration, intensity and task orientation. Table 7.7 also indicates that owners unresolved in human loss were somewhat more likely to grab paws ( $r = .24, n = 52, p = .09$ ), but this represents a trend, not a significant association.

#### *Dog Characteristics and Unresolved Loss*

As length of ownership and the number of previous owners were significant for cluster membership in the SST, these were assessed in a Pearson correlation with Bonferroni corrections. A shorter length of ownership was significantly but weakly associated with higher levels of unresolved pet loss in owners ( $r = -.27, n = 52, p = .05$ ). Unresolved pet loss also significantly but negatively correlated with dog age ( $r = -.28, n = 52, p = .04$ ).

#### *Dog breed groups*

Dog breed groups were then analysed in a one way ANOVA with Bonferroni post hoc tests (Table 7.8). The following variables were significantly related to breed groups: Rejection of the current dog was significantly higher in owners of Utility breeds ( $M = 2.00, SD = 1.41, p = .02$ ) than Terrier or Gundog owners ( $M = 1.00, SD = .00; F_{(5, 46)} = 2.80, p < .05, \eta^2 = .23$ ) although there were only two dogs in the utility group. Similarly, Utility dog owners were significantly less fearful of dog loss ( $M = 1.00, SD = .00, p = .05$ ) than Terrier dog owners ( $M = 2.80, SD = .45; F_{(5, 46)} = 3.13, p < .05, \eta^2 = .25$ ). Owners of Pastoral dogs were more likely to derogate their dog ( $M = 1.78, SD = .35$ ) than Terrier owners ( $M = 1.00, SD = .00; F_{(5, 46)} = 2.55, p < .05, \eta^2 = .22$ ).



Table 7.8

*A one-way ANOVA of dog breed groups and related significant trends from variables in this study, with  $F$ ,  $p$  values and effect sizes.*

Variables	Cross breed ( $n = 16$ )		Gundog ( $n = 15$ )		Pastoral ( $n = 9$ )		Utility ( $n = 2$ )		Hound ( $n = 5$ )		Terrier ( $n = 5$ )		$F$ (5,46)	$p$	$\eta^2$
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD			
Rejection of current dog	1.19	1.00	1.00	.00	1.33	.50	2.00	1.41	1.20	.44	1.00	.00	2.80	.03*	.23
Derogation current dog	1.63	.62	1.13	.35	1.78	.35	1.50	.71	1.60	.89	1.00	.00	2.55	.04*	.22
Fear of dog loss	1.81	.98	2.13	.74	1.44	.53	1.00	.00	1.40	.89	2.80	.45	3.13	.02*	.25
Emotionality current dog	1.44	.81	1.93	.96	1.33	.50	1.00	.00	1.00	.00	2.00	.70	2.04	.09	.18

### *Dog attachment style and Owner Unresolved Loss*

In a one-way ANOVA with Bonferroni post hoc comparisons, with dog clusters as the grouping variable, there was a trend towards a significant relationship between clusters and the fear of dog loss ( $F_{(3, 48)} = 2.50, p = .07$ ) between owners of Avoidant dogs ( $M = 1.55, SD = .82$ ) the least fearful and owners of Secure and Passive dogs the most fearful of future dog loss ( $M = 2.13, SD = .83$ ).

In relation to unresolved human or pet loss, there was no significant relationship with dog attachment clusters. Table 7.9 depicts the chi-square cross-tabulation of number and percentage of scores relating to unresolved human loss by dog cluster.

Table 7.9

*Unresolved human loss chi-square cross-tabulation with number and percentages by dog cluster*

Dog Clusters	Unresolved Human Loss	
	Yes	No
Avoidant	2 (3.8%)	9 (17.3%)
Secure	5 (9.6%)	10 (19.2%)
Passive	2 (3.8%)	13 (25%)
Anxious	1 (1.9%)	10 (19.2%)

In Table 7.9 it can be seen that owners of Secure dogs were more than twice as likely to be unresolved in respect of human loss compared with dogs in other clusters, but this was not statistically different. However it does suggest that the dogs could be a positive buffer against the effect of human loss, which is revealed through the strong dog/owner bond characteristic of the Secure dog cluster.

A similar result is found when investigating unresolved dog loss on dog attachment style (Table 7.10).

Table 7.10

*Unresolved pet loss chi-square cross-tabulation with number and percentages by dog cluster*

Dog Clusters	Unresolved Dog Loss	
	Yes	No
Avoidant	4 (7.7%)	7 (13.5%)
Secure	9 (17.3%)	6 (11.5%)
Passive	6 (11.5%)	9 (17.3%)
Anxious	2 (3.8%)	9 (17.3%)

In Table 7.10 it can be seen owners of Secure dogs are more likely to have unresolved dog loss, although this was not found to be statistically significant. When grouping clusters by Secure ( $n = 15$ ) and Insecure ( $n = 37$ ), an association approaching significance ( $p = .06$ ) is revealed. It suggests that dog owners who are unresolved in respect of pet loss, were twice as likely to have dogs rated Secure than Insecure,  $\chi^2 = 3.67$ ,  $p = .06$ .

## Discussion

The aims of this study were to determine if unresolved grief with respect to human loss, trauma or abuse predicts higher levels of unresolved pet loss; if either pet or human unresolved loss is related to dog attachment style; if attachment and caregiving in human relationships is related to unresolved pet loss; and if unresolved human or pet loss is related to owner behaviours in the SST and task solving.

In human studies unresolved status in the parent is associated with infant disorganised behaviour (Jacovitz et al. 2006). Dogs in the SST showed little evidence of behavioural disorganisation, but it was hypothesised that dog avoidant status could be a possible behavioural equivalent of a disorganised status in infants. It was thus hypothesised that unresolved loss in the owner would be associated with Avoidant cluster dogs. However, the hypothesis was not supported as there was no evidence from this study that dog attachment style is informed by owner unresolved pet or human loss.

### *Unresolved pet loss and unresolved human loss*

It was predicted that owners unresolved with respect to human loss, trauma or abuse would have higher levels of unresolved pet loss. That prediction was not supported in this study as there was no evidence that the impact of prior pet deaths was greater for those owners who were unresolved in respect to human loss. However, unresolved human loss was significantly associated with role reversing, in which the owner uses the dog as a comfort and support, which could be expected if they are grieving human loss.

Unresolved pet loss was not related to the number of people in the household, findings which differ from previous research (Archer & Winchester, 1994). The main difference between previous research on pet bereavement and this study is the amount of time between the death occurring and the study. For example, Archer and Winchester (1994) as well as Field et al (2009) both investigated the effects of pet loss within one year of the death. In this study, unresolved loss was reflected in the low dialogue coherency when discussing loss in general, and not just within the previous 12 months. Participants were not asked when their significant losses occurred, a variable which should be included in future studies.

### *Dog Attachment Style and Unresolved Human/pet loss*

It was predicted that pet or human unresolved loss would be related to dog attachment style. While statistically significant results were not found, there was a trend towards owners of Secure dogs having higher unresolved levels of both pet and human loss. This is an interesting link that should be explored further, as it suggests that the human/dog bond may be strengthened when an owner is bereaved, rather than the opposite. Dogs may therefore not only be an important social support for grieving owners, but their bereavement behaviours may encourage dog security (allowing dogs to use them as a secure base or safe haven).

The lack of significant association between unresolved loss and dog attachment may be due to small sample sizes of unresolved owners in regards human loss ( $n = 10$ ) and pet loss ( $n = 19$ ) and therefore the results must be viewed with caution. Replication increasing the sample of unresolved owners may provide a larger effect. For example, a larger sample of bereaved owners in human or prior pet loss should be administered the AAI with questions pertaining to pet loss, alongside the SST measuring attachment style in their current dog.

### *Adult Attachment Style, Caregiving and Unresolved Pet Loss*

It was also predicted that attachment and caregiving in human relationships would be related to unresolved pet loss: owners who were sensitive and cooperative in human relationships would be less affected by pet loss, whereas high anxiety and avoidance dimensions would be correlated with unresolved pet loss status. Although Field et al. (2009) found a relationship between anxious and avoidant attachment dimensions and depth of pet loss, the current study found the opposite. The comparable groups of this study, those with Secure, Preoccupied and Fearful attachments were associated with lower levels of unresolved pet grief indicating that unresolved pet loss could be related to a dismissive style of relating, but this was not statistically significant. As previously mentioned, the difference may be due to timing as Field et al.'s research took place within several weeks of the pet death.

The significant association between a low fear of future pet loss, and sensitivity and cooperation in caregiving in adult relationships suggests that those with Secure adult attachments fear future dog loss less. This may be because individuals in mutually satisfying relationships which provide strong emotional as well as social support would be more likely to resolve and not suffer a complicated pet loss than owners without the emotional and social support. This supports the findings of McNicholas and Collis (1995) who proposed that those without strong human relationships are most at risk for complicated pet loss. Archer and Winchester, (1994) found that grief at the loss of a pet was significantly more intense for individuals living alone. This was not borne out in this study. Instead, individuals who lived alone were more likely to rely on their pets for social comfort in a type of role-reversal, but were not more likely to think about future pet loss or be linked with unresolved human or pet loss.

### *Owner Behaviour in the SST, Self-reported Caregiving and Unresolved Pet/human loss*

Another aim of this study was to uncover whether unresolved human or pet loss was related to owner behaviours in the SST (Chapter 4) and task solving (Chapter 5). Owners unresolved in human loss displayed less sensitivity in the task solving study by grabbing paws whereas this was not the case in unresolved pet loss. This could have been due to the disorganising effects of bereavement (Main & Hesse, 1995) which created a momentary lapse in behaviour monitoring in task solving, as the owners were focussed on their dog's success at the task. It does however indicate a possible difference in the effects of loss of a human and loss of a pet.

The positive styles of dog caregiving, Affectionate and Firm but Fair were not related to unresolved pet or human loss. The negative styles of dog caregiving, Over-reactive and Derogatory, were related to unresolved human loss. Over-reactive dog care shares many traits with Derogatory care such as thoughts of rehoming the dog, and a lack of patience or application of training. This suggests that owners unresolved in terms of human grief may be less patient and less sensitive, although this is not found in relation to dog attachment clusters. A study with a larger number of bereaved pet owners through human loss would provide clarity.

### *Study Limitations*

This study employed questions that related specifically to pet ownership to elicit responses that would enable coding of unresolved loss. Although using methodology developed by Main et al. (2002) in the AAI enabled assessment of unresolved status with respect to pet loss, it did not ask specifically about human loss. Therefore unresolved human loss status may have been missed in some cases. If recent human bereavements were expressed to the interviewer, these cases were assigned to the Unresolved category, as Main et al. automatically categorise individuals as Unresolved if the loss has occurred within 2 years of the interview. Other category assignments required careful analysis of Pet Owner Interview transcripts, AAI transcript from chapter 8, in addition to scores on the survey study relating to owner trauma, loss or abuse. It is recommended that replication of this study use the AAI protocol adding questions relating to pet ownership.

### **Conclusion**

There was no evidence that unresolved human or pet loss is related to dog insecurity in the Strange Situation. However, there is a trend towards a relationship with dog security which suggests that a strong/human dog bond may mitigate the effects of pet and human loss for bereaved owners that appears to also be beneficial to the dog. Not only does the dog use the owner as a secure base, display pleasure in greeting the owner, and interest in play and exploration, but the owner also uses the dog as a source of comfort. While a larger sample may provide further evidence, the results suggest a symbiotic relationship between the unresolved owner and the companion dog.

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## Predicting Dog Attachment Style from the Adult Attachment Interview

Previous chapters have employed experimental and self-report protocols to investigate links with dog attachment style from the Strange Situation Test (SST). This chapter investigates the relationship between attachment classifications in the Adult Attachment Interview (AAI), owner behaviour in the SST and task solving, and dog attachment style.

### Introduction

The AAI is an interview protocol of 20 questions that taps into working models of attachment relationships through an analysis of patterns and coherency of speech. Interviewees are asked about early childhood memories with each parent, separations from parents, any history of trauma and abuse, reasons why they feel their parents acted as they did, and the nature of the current relationship with parents. Main and Goldwyn (1984) found that interviewees recounted their early life histories in ways that reflected working models of attachment relationships, or “their state of mind”. For example, the discourse of those rated *secure/autonomous* valued attachment relationships and they were objective in recounting negative and positive experiences. Those rated *dismissive* devalued attachment relationships, and were derogative or idealising. Those rated *preoccupied* were incoherent and rambling with evidence of anxiety, anger or preoccupation with past attachment relationships.

Parental states of attachment in the AAI were found to relate to infant responses in the SST (Ainsworth et al. 1978). Parents rated as *secure/autonomous* in the AAI were more likely to have Secure infants in the SST. Although these infants were distressed by the caregiver’s departure, they quickly rebounded upon their return and, after a short episode restoring proximity, played/explored using the parent as a secure base. Parents, who were *dismissive* in the AAI, were more likely to have children rated as Avoidant. These children showed little distress at the departure of the parent, no reunion behaviours

and no distress from the protocol. Those parents preoccupied with prior attachment relationships in the AAI, had infants who were categorised as Ambivalent/resistant. They failed to play and explore, were highly distressed upon separation and could not settle upon the parent's return remaining anxious throughout the protocol (Main & Goldwyn, 1984). A meta analysis of 18 samples of 854 parent/infant dyads found that in 75% of cases, a secure parental attachment style matched their infant's secure SST classification (van IJzendoorn, 1995).

The AAI also uncovers the equivalent to the child disorganised category in the SST, which is *unresolved in respect of prior trauma, abuse or loss* (U/d). In these instances speakers suffered a decrease in coherency in the monitoring of discourse due to the activation of dissociated fear when discussing these experiences (Hesse & Main, 1999). Hesse (1999/2008) also found that some interview texts could not be classified in any of the four categories because the interviewee was inconsistent and the interview contradictory. These texts were rated as *Cannot Classify*. Both Unresolved (U/d) and Cannot Classify (CC) parents in the AAI were associated with disorganised infants in the SST (van IJzendoorn, 1995).

In child task solving studies, Madigan Moran and Pederson (2006b) found that the mothers coded as *Unresolved* in the Adult Attachment Interview employed an invasive support style during interactions with their infants. This was seen in high levels of disruption during play which was related to a break down of organised behaviour patterns in infants. Unresolved mothers exhibited interactive behaviours with their infants, characterised by disorientated behaviours, role reversing, errors in communicating, fear-provoking behaviours and were overly intrusive during play (Goldberg, Beniot, Blockland & Madigan, 2003; Madigan et al. 2006b).

No published research exists using the AAI in exploring relationships with pets. Therefore, a pilot study involving a small random sample of previous participants in the SST would initially investigate the applicability of this methodology to owner/pet relationships. The aim of this pilot study was to determine if a pet owner's experience of early attachment relationships is related to dog attachment style in the SST. It was hypothesised that there would be a relationship between owner AAI and dog attachment style in the SST. It was predicted that owners of Secure dogs would be Secure/autonomous, owners of Avoidant dogs would be Dismissive and owners of Anxious or Passive dogs would be Preoccupied speakers in the AAI. It was also expected that both Unresolved and Cannot Classify status would be related to dog insecurity and

associated with the use of frightening (FR) or insensitive/invasive behaviours in task solving (Chapter 5).

## Method

### *Participants*

In response to an email sent one year after the original 52 Strange Situation participants, eight participants responded to a request to participate in a one-hour long face-to-face interview (6 female and 2 male), with an age range of 33 to 66 years ( $M = 47.75$ ,  $SD = 12.03$ ). Whilst it would be expected that those most interested in human/animal bond research might respond to the solicitation, this would only result in a selection bias had the research been based their relationship with their pet. In this random response sample, all participants were all blind to the coding methodology of the Adult Attachment Interview which is based on representations of early human attachment relationships, and therefore participant recruitment was deemed not to represent a selection bias.

### *Procedure*

The AAI interview consists of 20 questions (Appendix B) which takes an hour to administer. The interview was conducted face-to-face with only the researcher and participant present. The participants were blind to the questions.

The first question asks the participant about their relationship with their family from their earliest memories (up to 7 years of age). This question not only serves as an introduction to the interview but forces the participant to delve back to their earliest memories to tap into experiences from their unconscious (George et al. 1985).

The participant is then asked to describe their relationship with their parents as a child, and provide five adjectives that reflect their relationship with their mother, giving examples of episodic memories that best match those adjectives. This is repeated for the father.

The interviewee is then asked to which parent they felt the closest, what they would do when they were emotionally upset, physically hurt or ill. These would provide details of the participant's behaviour during activation of the attachment system, and the subsequent response of the parent.

The participant is then asked to describe instances when they were separated from the parent during childhood (up to the age of 12), how they felt about the separation, and



how their parents responded to the separation. They are then asked if they ever felt rejected as a young child.

Participants are asked if they were ever frightened as a child, whether parents were threatening, and for specific memories of trauma, abuse or loss of a significant figure. They are asked if these events influenced their adult personalities or were a set-back to their development.

Interviewees are then asked to reflect on the reasons for their parents' behaviour during their childhood. This question is useful in investigating the participant's reflective functioning, by putting themselves in the parent's place and to determine the extent to which early experiences motivate adult functioning. The interview ends by asking the participant about their current relationship with their parents (if alive) to determine residual anger or resentment.

### *Data Analysis*

The data from the AAI was analysed based on Grice's (1975) maxims of coherency, rationality and cooperation in conversation. Grice's (1975) four maxims are *quality, quantity, relation* and *manner*. Quality refers to the truthfulness of the discourse. For example, a speaker may provide a term to describe a parent, but not be able to provide examples, and the text may be internally inconsistent. Dismissive speakers' transcripts are characterised by low consistency. Quantity refers to the succinctness of the text. A Dismissive speaker claims lack of recall or fails to provide believable descriptions. Relation refers to the relevancy of responses, in which speakers move away from responding to painful questions to other topics. Dismissive speakers would bring another individual or their own children into the discussion, whereas a long, rambling text presents evidence of preoccupation with attachment figures. Manner refers to the clarity and order of text, such as the use of jargon, nonsense words, entangled sentences or unfinished sentences in Preoccupied transcripts (Grice, 1975; Hesse, 2009; Main, Goldwyn & Hesse, 2002).

The interview is transcribed verbatim and coded on the basis of language alone using a 9-point scale (in which 1 is very low and 9 is very high) for experiences of parental loving, rejection, pressure to achieve, role reversing and neglect. The modal score is taken as the score for that category. Interviewee's states of mind in discussing parents in terms of idealising, involving anger and derogation are also scored on a 9-point scale. Any instance of unresolved trauma or loss is scored individually and the highest score

taken as the overall score. Lack of recall, passivity of text (long rambling, incoherence, use of nonsense words, uncompleted sentences), metacognitive processes (evidence of monitoring speech during the interview, overall coherence of transcript and coherence of mind) are scored on a 9-point scale. Due to the complex nature of coding AAI transcripts, the researcher obtained AAI coding reliability training at an accredited AAI institute. Transcripts were blind rated by another trained AAI rater, and 100% consistency in ratings was obtained.

### *Ethics*

Participants signed a statement of consent prior to the interview, and were debriefed afterwards. Full ethical approval was granted by the University of Southampton.

### *Results*

Each of the participating dog owners in this pilot study will be discussed individually in terms of their overall score on the AAI, and then in relation to their Experience in Close Relationships (ECR) and Caregiving in Adult Relationship (CAR) scores. Their dog's profile in the SST will then be discussed in relation to AAI scores and owner behaviours (talk, touch and FR behaviours) in the SST and the task solving study. Finally, owner's experience of dog loss and the quality of their dog-owning experience from the Pet Owner's Interview will be reviewed in conjunction with their AAI scores. Owner and dog names have been changed and all identifying characteristics except gender removed to protect the anonymity of participants.

#### *Dyad 1: June and "Duke"*

June is single and does not have children. June's experience of early childhood is marred by her mother developing an illness at the end of June's childhood. When June is asked for five adjectives to describe this parent, although "loving" is mentioned, it is without specific episodic memory, though she has a memory of an overall feeling of warmth. Other adjectives are not positive, reflecting pressure for June to conform to the parent's ideal. However negative adjectives do not suggest insecurity. Rather, it is the way in which they are described that provides meaning in the AAI. For example, in June's case, there is evidence of persistent anger as she moves into the present tense:

*I hated all that...I never had a normal relationship with them. I often think that she wanted me to be a different kind of person, not the kind of person that I turned out to be.*

There appears to be no praise for achievement, just pressure to be better.

Reoccurring through the transcript is parental *role reversing*. In role-reserving the parent typically takes on the role of the child, or in extreme cases, uses the child as a surrogate spouse or confidant. Role reserving places the child at the centre of the parent's life, where the child is expected to be the central figure in the provision of the parent's happiness. In June's case, one parent repeatedly tried to make her "feel guilty", which is evidence of role reversing.

This was combined with a feeling of inadequacy of not living up to parental expectations that has persisted into adulthood due to on-going relationship issues with the remaining parent. In parts of the transcript when parental role reversing is discussed, text becomes *passive*. Passivity refers to a lack of cognitive monitoring of the dialogue, resulting in rambling, often contradictory passages in which the present often invades the discussion of the past:

*... and I hated all of that-to play with dolls. I literally mutilated all of them. Part of the reason why I look like this now because I never really had a normal relationship with food because it's always been some issue of concern...not behaving the right way.*

There is evidence of on-going preoccupation with the past and concern over a lack of recall for the events of early childhood which were "wiped out" due to the trauma of her parent's illness. There is no evidence of "loving" behaviour. There is parental concern and sensitivity, but in this case it becomes role-reversing:

*What is it? What is it? What has happened to you?" And at some point it changed from, "Why are you upset?" to "What have I done to you?" So she obviously took the blame for it so then that made me feel doubly guilty as well.*

There is a theme in the transcripts of parental rejection, which has affected her self worth. She felt that she was harshly criticised throughout her childhood:

*I didn't feel as a whole person-I wasn't quite what they wanted but I think early on it wasn't so all encompassing, I think it was more specific and it was related to particular incidents.*

The most important marker in this transcript is the evidence of preoccupying anger directed, not only at the deceased parent, but the remaining parent. The transcripts as a whole are moderately coherent except for passages which evoke preoccupying anger. One passage continues for 121 lines of transcript. This is evidence of a lack of cognitive monitoring of dialogue. There are several outbursts of current anger directed at the remaining parent. When recalling a conversation with this parent, June expresses her anger in the present tense, a sign of recurring preoccupation with attachment relationships.

*I just remember staring at my dad in horror because he didn't deny it. So I thought it must be true. Shit! It's such a pre-edited way of seeing the world and feeding me that image which is why I am angry that I just took everything he said and didn't question it.*

Fear invades the discourse in reoccurring dreams in which she would scream and neither parent would hear her. This suggests that neither parent was considered a secure base, although a relationship with an older sibling provided a surrogate secure base. Therefore, low coherency of transcript seen through several long rambling passages featuring current preoccupying anger directed at attachment figure: the present invading discussion of past events; long conversational turns and lack of linguistic monitoring (suggesting low coherency of mind). These are evidence of ongoing preoccupation with attachment figures. This combined with high evidence of role-reversing, low parental loving, low to moderate rejection scores is enough to place this participant in the Preoccupation with mild rejection (E2) category.

A final interesting point in June's case is her reaction to prior dog loss. When asked about significant human loss, initially she acknowledges feeling ongoing grief at the loss of a dog:

*I think the first time I really had to deal with it was when the second dog died. I felt...even now, I sort of have dreams about him occasionally, you know, it was a good fifteen years now.*

Discussion of the death of her parent was succinct and coherent with episodic memories, and was therefore not deemed Unresolved. However it was interesting to note that the more significant death for June was the death of the dog, primarily because of the shock of its death and the preoccupying anger directed towards her parents that lingers:

*That was another chip in the relationship with my parents. They didn't tell me that they had put him to sleep they said, oh by the way Dog X is dead, so I had no time*

*to prepare for it and I really hated crying in front of other people-in front of them, so I was fighting it down as best I could.*

In the ECR, June was rated as operating a fearful style in regards to adult relationships, but with high sensitivity and proximity in caregiving. This is reflected in her caregiving style to her dog Duke.

#### *“Duke”*

June’s dog Duke is a 5 year old neutered male, whom she has owned for 2 years. He had been obtained directly from the previous owners, who re-homed him because of family problems.

In the SST Duke was placed in the prototype Secure category: although he displayed reactivity at the absence of his owner, he recovered quickly to play and explore upon her return. Duke exhibited some greeting behaviours upon reunion with the owner and low physical contact scores. Proximity restoring behaviours could be interrupted by the stranger, shown by moderate play and exploration scores in the dog/stranger condition.

In the Pet Owner’s Interview, June discussed the lack of displays of emotion within her family, but that by owning Duke, her first dog as an adult, it had allowed her to express herself emotionally, and often –

*I get sad and start crying about him which I would have been really cynical about a few years ago until I got him. ...and that involves being more susceptible to the fear, the worry when he’s ill or something, but I see that as a positive because I’ve not been able to feel that before. So I see that, yeah, its good for me I think.*

She discusses how she has relied on Duke for emotional support during difficult times with her parent. She takes her role as dog owner seriously and this is reflected in her attitude:

*I think it’s good for people to have it within their power to make someone or something else completely happy.*

Duke is not considered a child substitute however –

*Somewhere between a comfort blanket and the clown I think. He’s part of the family as well.*

June is a highly involved owner: Duke is walked twice daily for an hour. He has regularly been enrolled in training, obedience, agility and relay races. June is a gentle disciplinarian using tone of voice to reprimand and ignores bad behaviour. Positive behaviour is

reinforced with clickers and treats. Although Duke is 5, June is already concerned about his death:

*I'm worried about that, I don't want him injured or to suffer. I know he's got another 6 years which is not a lot really....again I can start to cry at the drop of a hat just thinking about that.*

In the Pet Owner's Interview, June is able to engage in metacognitive monitoring and reflection in discussing Duke whereas this eluded her in the AAI.

*It's also positive I think ..i'ts a good thing to love someone, something to be able to miss and fear, so I think it's sad, but I think its positive at the same time. It's part of it-owning a dog. It's sad really because it means I will be losing him... It wouldn't put me off getting another dog.*

In the SST June displayed moderate to low levels of talk and touch throughout. In task solving, June scored high on owner support and quality of owner assistance with the lowest owner control scores. She did not grab or move Duke's leg, nor restrain him. As a result, Duke's scores for play duration were high. This was combined with high proximity seeking scores. Duke made the choice (without the owner restraining him) to maintain physical contact with her while task solving. Duke was further encouraged to play, with high scores for order giving and praise.

In summary in discussing significant human attachment relationships, June is coded in the Preoccupation with mild rejection (E2) category. However, preoccupied status in human relationships in this case, does not translate to dog insecurity. Rather, the commitment June is making to Duke could be seen as a conscious attempt to distance herself from her preoccupation with her early life and the relationships with her remaining parent

#### *Dyad 2: Robert and "Pepper"*

Robert is married with children. The prominent theme in Robert's transcript is the lack of emotional connection to past traumatic experiences, with no articulation of distress or his own needs. Negative experiences in Robert's life were described as having had no effect on his adult personality. Having lost three important individuals in traumatic circumstances some articulation of emotion would have been expected, but this was not the case.

There are two classifications from this transcript. Robert is Unresolved because of a traumatic series of events surrounding the death of one parent within one year of the AAI interview. Transcripts which contain the loss of an important attachment figure within the 2 years preceding the AAI are automatically assigned an Unresolved status with a secondary classification. In Robert's case, the secondary classification is Dismissive. Robert is classified as Dismissive for the following reasons: when describing his parents, Robert is highly idealising. Idealising occurs when words are substituted for other words instead of providing episodic memories in support of adjective descriptors of parents. For example, Robert is asked to provide an example of an experience to describe the word "nurturing" in relation to one of his parents:

*Nurturing in that you were being shown things and the way you were treated, is as close to a description of nurturing that I can (get).*

When asked for an example, he replies:

*Well, I guess there must be loads but its kind of an overall feeling. I couldn't pick one out of the air to be honest with you.*

Another facet of dismissive interviews is the claim of lack of memory, or bringing children into the conversation. When discussing what Robert would do as a child when he was hurt or ill, he acknowledges that he would go to his mother and she would "*wipe your fevered brow and all the rest of it...*" but again with no episodic memory. When asked if his parent's were threatening he responds. "*They would um, they could be fierce but it wasn't a regular thing.*" When probed about the use of the word "fierce", he says "*I suppose I wouldn't have pocket money that week.*" Later on in the transcript when asked what he would like for his children in the future, he says, "*that they are not beaten to within an inch of their lives*". He later recounts that his father would use a tool to punish them but "*don't ask me for an example because they never seemed justified to me.*" He does explain his father's behaviour- "*it was really bad but I kind of feel sorry for them in a way. They were the product of their times.*" There is evidence of compassion and understanding for his parents and their behaviour but also of confusion in the transcript. At first he said he was never punished but later said that he was. His transcript therefore lacked believability.

Furthermore, a main characteristic of a dismissive transcript is the minimising of negative events in which the speaker implies that events have had no major impact. They appear emotionally remote from the experience. For example, Robert describes three

major losses which all occurred in tragic, sudden circumstances with little emotion: “*I’m not prepared to spend the rest of my life beating myself up over it*”. And later in relation to a parent’s death:

*I’m quite a hard...I don’t open up too much to things that particularly distress me...so it’s kind of a cold pragmatism. I would be a basket case really so I kind of think, well I’ll try to rationalise it out and put it in a little box and move on.*

There is also still a prevailing anger at the loss of the other parent, which occurred more recently. In this instance there is a lack of cognitive monitoring indicative of unresolved loss, for example, talking to deceased as though they are in the room and in referring to the dead as though they were still alive:

*I’m a burden to you. No, ... you’re not, if you don’t like (it here) then we’ll sell it and find somewhere else.*

In summary, Robert is a Dismissing speaker (Ds1) in which the interviewee is dismissive of attachment relationships to prevent activation of the emotional system. There is a marked lack of recall of early childhood, which could have been masked by the intervening trauma. A characteristic of dismissive texts is the lack of recall and insistence upon normality, as an attempt to keep the attachment system inactive during the interview. While childhood experiences on the whole appear uneventful, other events have intervened which have resulted in Robert building a wall between events and his emotions. There is little evidence that he had examined the effects of his experiences on himself, instead referring to normality throughout.

In the ECR, however, he is coded as preoccupied with respect to adult attachments, although he scores low on sensitivity, proximity, and cooperation in adult caregiving, which may be related more to his Ds AAI rating than his preoccupied ECR rating.

Robert’s unemotional narrative in the AAI is in stark contrast to his highly emotional narrative in the Pet Owner’s Interview one year earlier, in which unresolved dog loss is highly prevalent. Although the Pet Owner’s Interview occurred within months of the death of an attachment figure, this was not mentioned in the POI at the time. What is striking is his admittance that he is unemotional when discussing traumatic human loss as mentioned above by “*moving on*”, this is not the case in discussing pet loss. He is highly emotional when discussing his previous dog.



*“Pepper”*

Robert’s dog Pepper is a 2 year old neutered male owned by Robert for 21 months, and obtained directly from a breeder as a puppy. Pepper was a replacement dog to a much beloved dog that had died, purchased as a surprise for him by his wife and children shortly after the previous dog’s death. The previous dog was referred to as a “baby” and during the Pet Owner’s Interview, Robert admitted that Pepper could not “live up to the perfection” of the prior dog.

*This one is totally different, as I say he's he's he's a kind of hard act to follow, and I think inevitably you do make comparisons I mean, he does do the same things that Toby used to do as well.. But I can't believe I'm still crying it was over 2 years ago and I'm still – it's really really hard.*

More importantly, he acknowledges that he has very high expectations of Pepper and that he hasn’t yet met the standards of the prior dog. When asked what Pepper means to him, he says:

*He means a hell of a lot. I mean the first few days that we had him I was kind of in shock and I didn't really sort of feel myself bonding with him at all... you know he's he's Pepper, he's not Toby and you know you get, you get tuned in to them. It's difficult it's difficult, I could say he means the world to me, I'm not.....(5) he he means an awful lot to me, but I don't think he... I still get emotional about Toby but I don't think he means any the less.*

In the Pet Owner’s Interview there was evidence of unresolved pet loss, and of unresolved human loss in the AAI.

Pepper was rated as Avoidant in the Strange Situation, exhibiting very low greeting and comfort seeking behaviours. However, Pepper also displays some fear of the owner rather than pleasure at reunion. In the first reunion episode, Pepper approaches in a submissive stance and upon approaching the owner, rolls onto his back in a classic submissive posture. In the second reunion there is no greeting and no attention seeking behaviours directed at the owner. Proximity to the owner does occur but at the owner’s request. During the reunion episodes, the owner is highly involved in initiating and maintaining play to the degree that Pepper retrieves the toy but takes it to the far side of the room or under a table, appearing to escape the owner. The owner is relentless in command giving. Play is therefore not relaxed. The owner continues to pursue play without awareness that the dog had reached play satiation, indicating a lack of sensitivity as to Pepper’s state. Even when the dog refuses to respond, the owner persists with various

commands to the end of the episode without the dog responding. This behaviour was coded as threatening FR owner behaviour (see Chapter 4). As the proximity seeking was the result of owner command and not of the dog's own accord, proximity seeking is misleading and must be viewed with caution. It is also revealing that Pepper approaches and maintains contact with the *stranger* of his own accord, when this does not occur with his owner.

During task solving, Pepper is highly absorbed in the task, but remains outside the reach of the owner and does not seek owner proximity. The owner provides some guidance but with a high level of control by grabbing his paws on several occasions. Nonetheless, this does not interrupt play.

There is a relationship between Robert's unresolved pet loss and his frightening (FR) behaviour towards Pepper which is unrelenting, unemotional and invasive as he attempts to recreate the bond he had with his deceased dog. The lack of emotion in his relationship with Pepper is mirrored in his Dismissive narrative in the AAI, and Pepper's rating as Avoidant in the Strange Situation. There was little evidence of a strong dog/owner bond. Pepper actively avoided the owner on several occasions, and there was evidence of fear, although no evidence of disorganised or dissociative behaviours on Pepper's part. In summary, Robert is a Dismissing speaker (Ds1) and Pepper was Avoidant in the Strange Situation Test.

### *Dyad 3: Beth and "Barney"*

Beth is single and does not have children. In the AAI transcript, the tone is of high derogation: Beth's mother in particular is described as being "argumentative", "spiky" and an "embarrassment." With negative descriptors as these, the task for a secure/autonomous speaker is to contain anger when describing the parent. It is not the negative experiences of the attachment relationships per se that is coded, it is the way in which they activate the attachment system during the AAI that defines the transcript as secure, preoccupied or dismissive. In this case Beth describes an incident in which she overhears a conversation between her parents in which her mother is highly critical of her:

*I remember being upstairs and hearing my mum ranting at my dad about what a (deleted for confidentiality) I'd been...I remember I was four or five and she was desperate to get back to work so possibly slightly less tolerant of a four or five year old who was being a typical four or five year old.*

Not only does Beth contain her anger, but offers a compassionate explanation of her mother's behaviour. Her descriptions of her father are succinct and episodic. Although neither parent is described as loving, there are several examples given of instrumental loving:

*I grew up feeling like he was proud of his girls, he didn't necessarily say anything but we always got the impression that he was always really proud of us. He would spend time with us and take us out and show us off to people.*

She explains the problems with her mother sympathetically as a difference in personality types. Again, anger and derogation are contained. What is striking is that she did not use her parents as a secure base when she was emotionally upset. Instead, she would go off alone – “*and think about things-got things straight in my head and then I'd come home again.*”

Beth also contained her anger in discussing the fact that she felt rejected during childhood. As the youngest of several children her successes at school were largely unacknowledged. She quotes her mother:

*You can't expect me to be interested for a third, when I've already been through it with two.*

Her rationalisations of her mother's comments is termed a “metacomment” (Main & Goldwyn, 1984), which is indicative of the ability to empathise, show compassion for an alternative viewpoint, and in the AAI is evidence of a strong personal identity:

*That made me feel not as good as the other two and quite hurt by it, really at the time. Looking back at it now, I really just think she was trying to explain it but not very well.*

Although there are examples throughout the transcript of parental role reversing and mild indices of rejection, she nonetheless presents an autonomous picture of her early life:

*I think it has made me quite driven because...I have spent my life trying to be what they want me to be which is daft, you know, you have to be happy with your own life but its very difficult to leave the child behind sometimes. There's an awful lot that I look at in my life and thinking had I felt more secure, then my life would be different now. It's a terrible thing to say, isn't it?*

Other examples of autonomous metacognitive comments appear throughout:

*...you take your childhood experiences and only later in life that you can look back and say well I thought I'd learnt from that wasn't what I learnt, you know?*

In general Beth felt rejected in childhood by her mother but she had the strong support of her father and two older sisters. She grew up without the use of a parent as a safe haven, and as a result, relies on herself. Early life events are described without anger or idealisation, and she provides strong evidence of balance and proportion in describing events. In describing the effects of her experiences on herself, her speech remained contained and there were no indices of preoccupation. Therefore Beth is an autonomous (F1) speaker. The sub-type 1 refers to some overlap with dismissing speakers. Although she describes some dismissing of attachment relationships, her transcript differs from Dismissive (Ds) transcripts in that she shows great thoughtfulness and depth, and has re-evaluated the harsh experiences of her childhood, creating new experiences and relationships.

In the ECR Beth is rated as Fearful, with some Avoidance. In the adult caregiving scores she scores moderate in all four categories of proximity vs. distance, sensitivity vs. insensitivity, cooperation vs. control and compulsive caregiving. In the SST she displayed moderate levels of talk and touch. During task-solving with her dog, Beth exhibited a sensitive supporting presence, restraining her dog on one occasion.

The theme of Beth's Pet Owners interview is in contrast to her marginal dismissal of human relationships. It contains high preoccupation with her dog's well-being and fear of dog loss:

*I worry about um, losing him. I worry about something happening to him. And I also worry about not doing the best for him...those are the negatives but that's probably just a part of me because I lack confidence probably.*

She is highly involved in his care, walking him three times a day, and taking him to training. To her, Barney is a companion, and not a surrogate child. He is also a member of the family, as she describes here:

*... obviously my family means an awful lot to me but they are not a daily part of my life, I see them much less frequently, um and I think that does make a difference to your relationship.*

*"Barney"*

Her dog Barney is a three year old neutered male obtained from a breeder at the age of 10 weeks. Barney experienced one early trauma at the age of 5 months: an accident that

required a stay at the veterinary surgery but this was not a protracted stay and she reports no change in his behaviour as a result.

In the Strange Situation Test, Barney was in the Secure cluster, with some overlaps with passivity. He exhibited high exploration rates when with the stranger, and the stranger could interrupt his low level distress and proximity restoring behaviours with play. He exhibited no owner or stranger attention seeking, although in the absence of the owner he stood next to the stranger and allowed himself to be petted. Once the owner returned to the room, he acknowledged and greeted the owner briefly and then recovered quickly to explore the room. He used Beth as a secure base for exploration, often stopping and observing her before continuing exploration.

During the task, he actively played and was highly focussed on the task. He sought the proximity of the owner intermittently during the last 2 minutes when he began to be frustrated by the task. The owner provided an equal number of orders and praise, and restrained Barney on one occasion.

Although there is some evidence of a Dismissive style in Beth's human relationships, she has largely reconciled her difficult relationship with her mother as an adult and was therefore rated Secure/Autonomous in the AAI. Furthermore, there is evidence that she is operating a sensitive, responsive care style to her dog which is correlated with Barney's Secure attachment style. In summary, Beth is an autonomous (F1) speaker and her dog Barney is Secure in the SST.

#### *Dyad 4: Pamela and "Rusty"*

Pamela is married and is not a parent. In the AAI, Pamela's transcript shows strong evidence of disorganised thought processes in regards to her mother. Her adjectives are positive, except for one: "fear":

*I've always been scared of her because she was quite strict, on the other hand, I just loved her, I wasn't really scared-it wasn't an abusive kind of scared, I mean she wasn't abusive or anything.*

Therefore it appears as though her mother may have used FR behaviours, even though these were not abusive. It is interesting to note that she was one of 13 owners who displayed FR behaviours (threatening) in interacting with her dog in the SST.

The use of the positive adjectives of "love", "respect" "understanding" and "friendship", are idealised. There are no episodic memories provided and there is a

discrepancy between positive adjectives and “loving” behaviour. In the AAI, loving behaviour encompasses either direct loving (parent telling child s/he loves them, is tactile and affectionate, open and supportive) or instrumental loving (driving them to friend’s homes, making clothes for them, cooking them favourite foods). In Pamela’s case, when asked to provide an example of her mother’s loving behaviours she says:

*I remember always mother’s day-I was spending lots of hours looking for presents and flowers and drawing things...I was always making cards myself with hearts and flowers and things like that.*

She instead recounts her own behaviour but there is no evidence provided of her mother being loving. She describes an episode which evoked great fear when she was 4 years old. Her mother retreated to her own room crying when Pamela became frightened, screamed and ran outside. This is an example of maternal role reversing and there is a theme running through this interview of a continual need to please the parent, and of hurting the parent’s feelings:

*I was lying there and crying and then I went to my mum and apologised and said I was wrong, that I was a naughty girl, and she said “Do you know how you upset me?”*

Pamela was forced to apologise to her mother, but there is no acknowledgement of Pamela’s own fear as a 4 year old. In another example, in response to the question of the use of the silent treatment by parents, Pamela says:

*It only happened five or six times in my whole life, but I remember it was a really painful experience for me, so I tried not to upset my mum that much. I must have really, really upset her big time when she did that.*

Another example of role reversal concerns the death of her maternal grandfather when Pamela was seven:

*I was more concerned with my mums being upset, with my mum’s feelings than the actual loss of my grandfather.*

There is also an underlying theme of parental rejection and extreme pressure to achieve. There are untruths (violation of the quality maxim throughout). In relation to her mother, she says “*She never punished me really for anything because I did everything straight away*”, a statement which is later contradicted when she says that her punishment consisted of the “*silent treatment*” which occurred often when she was a child:

*I was trying to be a rebel, and after three or four hours when she didn't talk to me, ignored me...I went to her and said I was sorry.*

Despite high idealisation of her mother, there is no indication of anger or preoccupation with her parents in the transcripts. There is evidence though of several indicators of a dismissive transcript (Ds3). In Ds3 transcripts, the speaker recognises aspects of role reversing or rejection but normalises these experiences returning ultimately to examples of positive attachment relationships. Hurt and resentment is down-played and minimised, without any apparent effect on development or personality. There is repeated endorsement of negative aspects of the parent's behaviour, with parenting viewed as normal or exceptional:

*I think they taught me to be happy. I don't know if they meant to do that or if they were just lovely people but I think I had a good example (of parenting.)*

The other aspect of a Ds3 transcript is that these speakers occasionally appear autonomous, which is the case here. However, the main difference between a dismissive and an autonomous speaker is the endorsement of the parent's negative behaviour throughout the transcript. Pamela was therefore rated low on both coherence of transcript (violating maxims of truthfulness and quality for lack of episodic memory) and coherence of mind.

In the ECR Pamela was overall Secure but high in anxiety in romantic relationships. She scored low on proximity-distance, moderate on sensitivity, moderate on cooperation and low on compulsivity.

In the Pet Owner's Interview, Pamela acknowledges that Rusty fulfils the role of surrogate child. She uses physical punishment on occasion: *"I smack him, but not strongly, its just a little gesture and he knows he's been naughty."* Due to stress within the household, she also admits to being short tempered with him on occasion. Rusty was not taken to training as an adult dog, but Pamela reports moderate and consistent care, including one 40 minute walk per day.

*"Rusty"*

Her dog Rusty is a 5.5 year old cross breed dog, obtained from a rescue centre at 6 months, with one previous owner. Rusty had puppy training. He has had one trauma in his life: the death of his previous owner which occurred prior to puberty.

In the SST Rusty was rated as Passive 3 (prototype Insecure/Passive category). He displayed low levels of play, but high levels of exploration when the owner was present. When not exploring, Rusty was standing touching the owner. Pamela displayed very high levels of owner touch and very low levels of talk. On two occasions Rusty's behaviour appeared disorganised. When the owner's behaviour becomes invasive, he ran to the opposite side of the room behind a chair for several seconds, but then returned to the owner. The first occurrence was when the owner was trying to elicit a play response, which involved hovering over Rusty, an example of FR threatening behaviour. Initially his behaviour appeared apprehensive. He ran to the corner, watched the owner and then returned to her. In the second instance, the owner was kneeling on the ground petting Rusty. He suddenly ran behind the chair again, but after a few seconds ran to the door, but Pamela interrupted his trajectory to continue petting him, which he accepted in this instance.

In the stranger condition, Rusty displayed low reactivity, and low play/exploration, preferring to lie within touching range of the stranger. When on his own, Rusty exhibited low levels of distress and proximity restoring behaviours but was fixated on the door.

In task solving, Rusty scored low on task duration. Pamela was highly invasive, grabbing Rusty's paw 24 times and physically restraining him 6 times. As a result there was high owner avoidance, no proximity seeking, and low play intensity. By the second minute of the task, Rusty's behaviour was focussed on evading Pamela's grasp.

Pamela acknowledges in the AAI that she operates a similar disciplining method to that operated by her parents, which generated fear in her:

*She was very strict and I had to listen to her the first time she said something, not in a minute, not five minutes...she'd use that tone, like I use with Rusty, no negotiations... now! And I was scared of what she might do if I didn't do that.*

While valuing attachment, Pamela is rated as a Dismissive speaker in the AAI. She experienced some frightening parental behaviours which appear to be mirrored in her relationship with Rusty. For example, her play is characterised by aggressive postures and she was highly invasive in task solving with Rusty. Rusty shows some, albeit limited disorganisation and limited behavioural expression, characteristic of the Passive cluster, despite visual suggestions of sympathetic nervous system activation. In summary, Pamela is a Dismissive (Ds3) with some recognition of rejection, and her dog is Secure in the Strange Situation Test.



*Dyad 5: Carolyn and “Benji”*

Carolyn is single and is a parent. In the AAI, Carolyn gives the adjective of “loving” for her mother but provides no support, and “*can’t think of one instant that stands out*” but instead replaces loving for “homely”:

*Homely is a word I could choose for her but she’s not very homely now that she’s got rid of us all.*

That last statement is indicative of mild derogation, a characteristic of a dismissive speaker. In describing why she picked the word “close” to describe her mother, Carolyn provides an example of the exact opposite violating the maxim of quality and relevance:

*We were quite close as a family, although she had a closer relationship with my sister than me...my mum is very into (deleted) and that doesn’t really interest me.*

When asked for an example, she says “No. Sorry.” which serves to block the discourse, also a characteristic of a dismissive speaker, a speech style found throughout the transcript. There is a repetitive theme of an unloving relationship with her mother because of maternal role reversal, as her mother was largely incapacitated. She did, however, have a strong bond with her father and valued that attachment relationship. She recounts an incident when she cut her leg:

*I cut my leg and my dad carried me back (to the house) because my leg was bleeding really badly. My mum wouldn’t have been there, she would have been hiding somewhere till it was over.*

When asked if she ever felt rejected, she oscillates:

*Yeah...um, no, I can’t think of anything that sticks out really. I felt a bit strange when my mother had another baby.*

When asked if her early upbringing was a setback, she reflects on her mother’s role reversing behaviours:

*The only thing I remember is that my mum was (deleted) and I also tried very hard not to be. So it doesn’t set me back because it’s a positive thing. Because if someone shows you examples for what you don’t want to be for long enough you try very hard....*

The lasting effect from her childhood is her independence:

*I could probably do most things for myself. Whether that’s made me a bit too self-contained, I don’t know. Because I can’t bear that...to be helpless.*

It could be that her mother's illness made her less sensitive or consistent as a caregiver. This was exemplified in substantial role reversing and a sense of rejection. Carolyn appears remote from maternal memories, and there is an overall sense that she was unloved by her mother in childhood. This alone would not have placed her in the dismissive category. However her transcript contains high idealisation of one or both parents, mild annoyance with parents, and negative experiences or feelings are minimally discussed or absent, characteristics which place her in the Ds1 category.

Her AAI score is similar to her avoidant/dismissive ratings in the ECR. In adult relationships (CAR), her caregiving is characterised by distance over proximity, although she scored moderate on sensitivity, cooperation and compulsivity.

### *"Benji"*

Her dog Benji is a 3 year old entire male, obtained from the breeder at 8 weeks of age. He had not experienced trauma in early life. He is one of several dogs in the household. He was chosen for this study because Carolyn stated that she has the closest bond with him. Benji was Avoidant in the SST, with a tendency towards the anxious cluster (A1). In the SST, Carolyn exhibited one of the highest levels of owner talk with no touch. Benji showed higher levels of attention seeking from the stranger than owner. The stranger was able to interrupt distress behaviours to engage him in high levels of play. When not playing he was within petting distance of the stranger, which is in contrast to nil levels of owner touch recorded. When alone he exhibited low levels of proximity restoring and distress behaviours.

In the task, Carolyn was non-invasive, but not supportive either. She gave Benji orders but no praise. Benji showed moderate interest in the game, which declined steadily. He scored nil on proximity seeking.

The overall impression from this dyad is the lack of emotional connection. In the Pet Owner's Interview, there were low levels of emotion recorded for prior and future dog loss, however she had witnessed a number of dogs being euthanized and has found a way of dealing with these losses:

*I always think that the outside is just an empty case. When they're gone, when they die, their spirit goes, so I don't feel attached to the body after they've died. That's my way of coping with it.*

Carolyn is a highly experienced dog owner and this might affect her behaviour towards her dog. She uses positive reinforcement for praise and negative reinforcement for discipline. It would have been expected therefore that Benji would be in the Secure cluster as Carolyn is an informed dog owner. The results suggest however that the distancing strategy she operates in her human relationship may be having an effect on the owner/dog bond as Benji was Avoidant in the SST.

In addition, she describes Benji as more “*sensitive*” than her other dogs: “*You just have to look at him the wrong way and he’ll run out into the garden.*” He is also afraid of the dark and occasionally nervous about going outside. It could be that his heightened sensitivity has made him more alert to her behaviours, resulting in a higher sensitivity to context. This might make him more cautious and therefore appear avoidant in his relationship with her.

In summary Carolyn’s dismissive idealisation of attachment relationships places her in the Ds1 category, while Benji is Avoidant in the Strange Situation Test.

#### *Dyad 6: Janet and “Buddy”*

Janet is single and is not a parent. In the AAI, Janet describes her parents as consistent caregivers but highly controlling, particularly her mother: “*At one stage she used to come into school and help the teacher, so I couldn’t escape from her then either.*” This is an example of Gallows Humour, which appears periodically throughout the transcript in relation to her mother’s controlling behaviour. Asked to provide an example, she replies: “*Just everything...her life’s work.*” In providing an example of “*close*”, she refers to the lack of emotional closeness, with the present invading the past, which is a mild indication of a preoccupied speaker:

*You know to this day I’ve never had a very emotional relationship with Person 1. I can’t discuss anything personal.*

There is also reference to occasional disorganised/frightening parental behaviour:

*Occasionally (Person 1) could be very moody-he would just sort of freak out for no apparent reason. It wasn’t very often but it was kind of odd because it was so different to what he was normally like.*

Nonetheless there is no impact of this on her outlook towards the person, although she mentions that her brother had much more vivid memories of that time period being “*awful*”, but no further descriptions of the behaviours are provided. Later, when quizzed

about experiencing frightening behaviour as a child, she cannot recall any frightening childhood experiences. There is an overall feeling of a lack of openness and emotional connection with both parents that borders on rejection. When asked what she would do differently with children of her own she replies:

*I wouldn't want to have the sort of relationship with anyone close to me where we didn't discuss stuff, or we felt that we couldn't discuss important stuff. I would want my children to feel like they were valued, and (that I as a parent) was a positive force rather than a negative force.*

There is some lingering resentment of the parents, and another example of Gallow's humour which is indicative of rejection of attachment relationship: "*You know they'd be in intensive care before they admitted that there was anything wrong.*" Although there is evidence that she is preoccupied with her relationships with her parents, this is nonetheless coherently described, with anger contained and occasionally, humour. Although elements of mild rejection are present, and she indicates that she is still involved in difficulties, there is more self-awareness, more containment of anger and a greater coherence of transcript in this case than in the Preoccupied Case 1 transcript, which contained long unfocussed texts and high degree of involved anger. Therefore, Janet is categorised as a Secure/Autonomous, with some resentment/conflict in attachment relationships (F5).

In the ECR, Janet was rated as Fearful/Anxious in romantic relationships. In adult caregiving she scored high for proximity, moderate on sensitivity, high on cooperation and low on compulsivity, scores reflected in her sensitivity with Buddy in task solving.

#### *"Buddy"*

Her dog Buddy is a 12.5 year-old neutered male obtained at 6 weeks of age from a breeder. He had not been exposed to trauma in early life.

In the SST, Buddy is in the Passive cluster (with some secure behaviours). He displayed some distress behaviours when with the stranger, but very low levels of distress and proximity seeking when alone. No attention seeking was recorded from the owner or stranger, but he generated high touch levels from the stranger. The stranger was also able to engage him in some play. Janet scored high on touching Buddy but low on talk.

In the task, he was occupied for a moderate duration, although focus on the task waned over the 3 minutes. He remained in close physical proximity to Janet throughout. When Janet grabbed his leg once in the second minute, it interrupted his focus, which was

not regained. So, although Janet was largely supportive in the task, and only grabbed his leg once, this was enough to stop play.

In the Pet Owner's Interview Janet is very emotional when talking about the future loss of Buddy, which was in stark contrast to the largely unemotional account of her experience with her parents and the reported lack of emotional closeness. When he was younger she was highly involved in his care and stimulation, taking him to training and agility. More recently because of the fear of illness, she has organised full-time care for him when she is at work and he is therefore never left alone. It is interesting that she describes his reaction to thunder:

*He doesn't like thunder, so even if he thinks its going to thunder, he gets quite sort of quiet and he'll curl up in a corner.*

So, Buddy's behavioural reaction to fear is to exhibit passivity, instead of reactivity, which is replicated in his behaviour in the SST. His reaction to something fearful is not to go to her but to hide in a corner or under furniture. His passivity in the SST does provide evidence of the activation of the attachment system, although low behaviour expression could be correlated with his age. Despite this, he plays in the task until interrupted by Janet. In summary, Janet is categorised as Secure/Autonomous, with some resentment/conflict in attachment relationships (F5) and Buddy is Passive in the Strange Situation Test.

#### Dyad 7: Judy and "Tiggy"

Judy is single and is a parent. Judy was rated Secure in terms of adult attachment relationships (ECR) although anxious. She did not complete the online caregiving in romantic relationship (CAR) scale, therefore cannot be assessed on caregiving. Nonetheless her Secure ECR rating is in contrast to her AAI transcript.

Throughout the transcript, she refers to herself as "*the favourite*" of her grandparents, favoured by her parents over her other siblings and given a position of privilege over her siblings. When a speaker describes themselves as the parent's favourite while indicating rejection of other siblings, and the transcript lacks evidence that this favouritism was based on parental affection, the transcript is scored high on parental rejection. Judy's transcript is filled with veiled examples of feelings of rejection throughout childhood. For example, in discussing her mother, she is derogating. In discussing the activities that she and her mother would engage in together:

*...cooking, washing children, how to be pregnant. We didn't do fun things. She put me to bed at 7:30...so she would have time for herself.*

When asked specifically if she ever felt rejected as a young child she replies:

*Loads and loads and loads and loads of the opposite. I was the favourite of the grandparents and an auntie and my mum and dad.*

In the next sentence she describes being taken to hospital when she was 3 or 4 at the time her mother was giving birth to a sibling: *"I can see my mummy standing there and I'm going away from her,"* and in total that meant a separation of about 5 weeks from her mother. The next time she saw her, her mother's focus was on the baby. Instead of describing that experience, the transcript incoherently moves to a detailed description of her early life. This is a distancing strategy which prevents activation of the attachment system in discussing negative or traumatic events.

When choosing adjectives that describe her mother she says:

*Close, well close isn't the right word because it's almost like we were the same person.*

There are however no examples given of an emotionally close relationship.

There is the theme of the young child as a companion-substitute for the mother, *"She didn't have any friends so occasionally we did do naughty things together"*. She describes an incident involving her second sister as an illustration of the special bond she had with her mother:

*Somehow Person 1 got in the way, I must have been about 7. And she would look at me as she was saying something and we would have a joke against Person 1 and that was sort of the naughty things that she would do.*

Later on, she provides a very confusing and incoherent response to the adjective for her mother of *"being a friend"*: *"Well, I don't know if I was a friend or an assistant really,"* because of the chores she was forced to perform, and later in the transcript says: *"There was no maid really, only me."*

Evidence of rejection is seen in the following quote:

*We went out on bicycles...then I fell off, which was quite fun. She laughed as far as I can remember.*

In the example above, rejection is involved when an attachment figure minimises a child's distress, or laughs when the child is upset or in difficulty.

There is also a significant lack of recall, indicative of an attempt to distance herself from painful emotional memories. When asked what she would do when emotionally upset, she replied:

*I don't remember being emotionally upset. Sorry. That's part of the same security (I felt), I don't actually remember being emotionally upset. Probably not a particularly significant answer for you.*

Yet there is resentment of her siblings throughout. When asked if she ever felt pushed away or ignored by her parents, she replies in reference to her siblings:

*They feel that about me, but I don't feel that about them. They had to live (with being my sister), that they weren't as good as me at school. There were teachers at school who used to tell me they were not as good as me...*

This is typical of persistent feelings of rejection in which the self is made to seem strong, normal and in a more highly favoured position than siblings. Had this statement been truthful, she would have been rated an autonomous speaker. However, throughout the transcript there are many incidents of feelings of rejection, specifically in relation to the birth of siblings, and there was strong evidence that she was not favoured, as her transcript moves to the present tense:

*I couldn't do things unless we had money for all. So I couldn't take lessons. So I take that as something I have to bear for siblings, being told they could never live up to being my sister.*

In paragraph marked by low coherency at the end of the transcript, she mentions a "traumatic" incident that occurred when she was a child which almost killed a sibling. She is then reprimanded by her mother for "almost killing her sister" and said she realised then that she had to be "different with children", but confusingly, she was a child herself. This could be interpreted as rejection, where the younger sibling was perceived as worthy of care and attention, but she was not.

She describes herself and her experiences as normal, stressing her normality and family security.

*(When I went to university), I know that a lot of other people when they went to a strange place, weren't as secure as I was.*

There is avoidance of all emotional events. In discussing death she avoids reflection on the effects that her grandparents' deaths had on her: "*We accepted death, death happens, death is part of life.*" This statement is scored high on derogation as she is blocking discussion as though the topic is being brushed away or not worth talking about.

In continuing to discuss death she says

*The dogs' deaths were more significant deaths than people. I assisted the vet in the first, and the second and the third died in my arms, so. And my mother died, and my father died but I wasn't there. My mother died and I was there until the undertakers came. I just get on with it. It doesn't frighten me.*

She then changes the subject to talk about dogs, including a description of 30 lines of an incident involving her daughter unrelated to either dog or parental bereavement. There is no further discussion about either parent's death. As a result a high unresolved score is given, reflecting the local or temporary disorganisation in discussion. Even more indicative of her unresolved state is the discordance in respect of her mental states representing attachment. On the one hand, there are several demonstrated indices of dismissal of attachment relationships: high derogation of parents, rejection, and idealisation. On the other hand, the text is rambling, and either highly preoccupied or evasive, specifically in relation to significant losses, such as parental death. This is indicative of unresolved status in respect of loss. Therefore, Judy's transcript would be scored Unresolved (U/D/Ds2). Her overall strategy in approaching the interview is one of Dismissing and devaluing of attachment relationships (Ds2), combined with evidence of preoccupation with loss. It may also explain why she failed to complete the on-line questionnaire items on romantic relationships, as questions referring to close personal relationships could have activated her attachment system, when she works hard to bury distressing feelings, characteristics of dismissive speakers.

### *"Tiggy"*

Her dog Tiggy is a 5 year old spayed female, obtained at 6 weeks of age. She has not been exposed to trauma. In the SST Tiggy's cluster was Secure with a tendency towards avoidance (B2). She exhibited low levels of owner contact, and no owner-directed attention seeking. In contrast, she exhibited very high levels of attention seeking with the stranger, combined with moderate levels of touch and play with the stranger. When alone,



she scores low on distress and proximity seeking behaviours. Judy's behaviour in the SST was characterised by moderate levels of talk and touch.

In the task Tiggy scored low on play duration. Judy was highly invasive grabbing paws several times, giving orders but no praise. Tiggy was initially game orientated but this declined as Judy's invasive control increased. There was no proximity seeking. Tiggy displayed some appeasement behaviours (submissive grin), vigilantly observed Judy, then ceased play.

In the Pet Owner's Interview, Judy comments that Tiggy does not show affection to her:

*She doesn't come to greet me. Do you? I have to come and say hello to you. You're such a superior little thing.*

The same pattern exists in the Pet Owner's Interview as in the AAI. There is high passivity: change of topic, not focussing on questions or skirting around the question to prevent activation of emotions. This occurs when talking about prior pet loss, which is full of technical descriptions of the dog's illness, but remote from actual feelings surrounding the death:

*She had a blood transfusion in the morning and she died, she died at noon and my husband came home from (deleted) and was pissed off that I couldn't sound cheerful when he found me and then he was in tears because his dog had died. So that was difficult, I suppose.*

She then goes on to describe the dog's training history.

In another instance she says,

*Those were quite traumatic deaths but you know, he died at 15. I cremated him and put him on the mantelpiece.*

She then goes on to talk about her daughter's reaction to the death but not her own.

There is little evidence of training or enriched care in this dyad. Judy comments on her lack of surprise that Tiggy was not interested in the task. Tiggy is also described as generally "independent". She is also surprised that Tiggy sought her out for comfort and reassurance in the experiment, whereas this does not happen at home:

*It's only because we're here. She normally doesn't want this much (affection). If I wanted to cuddle her this much, she wouldn't let me. I mean she'll go off in the middle and not be interested, so she's very independent.*

Therefore, the SST activated Tiggy's attachment system whereas her normal behaviour at home is more aloof and independent. This type of response would be consistent with the Dismissive style which characterises Judy's AAI and ECR results. In summary, Judy is Dismissive and devaluing of attachment relationships (Ds2) in the AAI and Tiggy is Secure (with some avoidance) in the Strange Situation Test.

*Dyad 8: Frank and "Missy"*

Frank is married with children. In the AAI Frank is rated a prototype Secure/Autonomous (F3) speaker. He describes strong attachment relationships with episodic memories. He describes his mother as supportive:

*She was happy with what I achieved or didn't achieve. There was never any recrimination because you didn't achieve something. (It was a) if you're happy, I'm happy attitude.*

For the word dependable he says, *"I always know she would support me or help me, if I needed."*

In regards to a grandmother's death, he recounts that his parents displayed sensitivity in dealing with it:

*She died in the night which was pretty upsetting but my parents-this is part of the caring bit really -said, you know she's peaceful now, no pain and she's happy, and that helped a great deal. They must have felt terrible as well, but you know they were keen to help me handle it.*

He recalls an early separation, a forced stay in hospital. He hated it and was aware that they hated it:

*I was really upset when they left and used to cry, was very lonely. And I hated it. They were very concerned. They didn't like it either.*

Overall, there are strong examples which support the positive descriptors of both parents, no evidence of rejection, neglect, undo pressure to achieve or parental role reversing. He was not subjected to trauma or abuse.

In discussion of the loss of significant attachment figures, he says:

*They are missed so much but that's life, isn't it. I coped quite well with it, the funeral... that was no problem for me....it's more when I see something happy, someone achieving something, deep down I wish my parents could see it.*

This statement is evidence of the strong valuing of attachment figures, but there is no evidence of unresolved loss. He displays high coherence of mind and transcript.

However, in discussing dog loss, he presents unusual attention to detail:

*You're going to hate me for this, I mean it's the animals really, isn't it? It's the dogs really, I've had to cope with their losses over the years, I mean (the death of) mum and dad were different but it's the pet's deaths that have affected me the most.*

This is further described in the Pet Owner's Interview:

*Well, I think with dogs you miss them as much as anybody else really I mean you keep hearing them or, thinking they are in the room and um, it's a hell of a wrench, and you know, we spent 10 or 12 years with that dog and you just have to be grateful for what you have but you don't want to see them suffer in any way either but yeah it's very traumatic, but uh, it's worth the pain.*

He is also very emotional when discussing dog loss, although this does not appear to be unresolved. For example, his transcripts are largely coherent, truthful and display evidence of a strong human/dog bond for the current dog.

Although rated Secure in the AAI, Frank scored Anxious in the ECR, with a Preoccupied romantic attachment style. He was moderate on proximity, but high on sensitivity, cooperation, and low on compulsiveness in romantic relationships.

### *"Missy"*

Frank's dog Missy is a 5.5 year old obtained at 9 weeks of age from a breeder, and has experienced no trauma. Missy was classified as Anxious in the SST (in the anxious prototype category). She exhibited very high distress and proximity seeking behaviours when alone, no exploration and no play with stranger. The stranger was not able to interrupt her distress behaviours, although she would stand within petting distance, fixated on the door. She exhibited the slowest recovery to homeostatis and showed high sympathetic nervous system activation throughout the experiment. Frank recorded very low levels of talk and touch during the SST

Missy was highly focussed on the task, exhibiting high play duration, high intensity and orientation. Frank exercised some limited physical control (grabbing paws), with orders and praise. Missy did not seek proximity, which Frank describes as unusual. In stressful situations, Missy would normally be *"very clingy"*, and despite the low levels of

proximity recorded in this study, Frank interpreted Missy as being clingy: “*she’s not usually as clingy as this*”. Therefore, in Missy’s case the experimental protocol may have resulted in hyper-activation of the attachment system.

### *Summary of results*

Table 8.1 provides a summary of the demographic characteristics of each dog/owner dyad

Table 8.1

*Summary table of characteristics of each owner/dog dyad.*

Dyad:	1. June Duke	2 Robert Pepper	3 Beth Barney	4 Pamela Rusty	5 Carolyn Benji	6 Janet Buddy	7 Judy Tiggy	8 Frank Missy
Owner Gender	Female	Male	Female	Female	Female	Female	Female	Male
Marital status	Single (in relationship)	Married	Single (divorced)	Married	Single (divorced)	Single (in relationship)	Single (divorced)	Married
Children No. of	0 1	2 1	1 3	0 1	1 6	0 1	1 1	2 2
dogs in household								
Dog’s age	5 years	2 years	3 years	5.5	3 years	12.5 years	5 years	5.5 years
Dog’s gender	male	male	male	male	male	male	female	female

Appendix J contains a summary of the dog cluster, owner AAI, ECR and CAR and variables from the Strange Situation and Task Solving experiments. Although generalising from a sample of 8 participants would be misleading, interesting trends for further research are evident. In all cases in which owners operate a distancing or dismissing strategy with regard to human relationships, their dogs presented insecure attachment behaviour strategies in the SST, with two in the Avoidant and one in the Passive cluster. In the fourth Dismissive owner dyad, the dog was rated as Secure with avoidant tendencies, although the owner reports the dog as operating as generally Avoidant.

A Preoccupied owner attachment style was not related to attachment insecurity, nor was an Anxious dog cluster related to owner AAI scores. In one instance, a Dismissive ECR score predicted dog avoidance, but in the remaining dyads, ECR and dog attachment style scores were unrelated, as are Caregiving in Adult Relationship scores.

Three of the four Dismissing owners in the AAI used frightening behaviours (FR) at some point during the SST. In these cases threatening behaviour elicited a behavioural reaction in their dogs (submissive postures or attempts to flee owner). One owner was largely dissociative (appeared trancelike, deep in thought) and did not respond to the dog's attention seeking. The results therefore provide some evidence of a trend that owner behaviour, both in terms of sensitivity in caregiving to dogs, and in terms of the type of social strategy employed in human social relationships, is loosely related to dog attachment style.

Table 8.2 provides a comparison overview based on the original human infant SST category descriptions (including subgroups), the equivalent dog attachment style groups, and matching AAI rating (See Appendix C for full description of behaviours associated with each category).

Table 8.2

*Comparisons of infant SST, parental AAI and equivalent dog SST categories by attachment style.*

Infant		Dog Strange Situation	Parent	
Category & Sub- category	Description		Category & sub-category	Description
Secure (B)			Secure/ Autonomous(F)	
B1	Positive interaction across distance .Little distress. Delight when parent returns	Secure with some avoidance Tiggy (dyad 7) Prototype Secure Duke (Dyad 1)	F1	Some setting aside or lack of attachment to attachment, rather than focussing on poor parenting
B2	Avoids on first reunion, seeks proximity on second		F2 Beth (dyad 3)	Some avoidance of attachment, with some lack of memory or idealisation but overall valuing of attachment
B3	Very secure with no resistance or avoidance on reunion		F3, Frank (dyad 8)	Very or prototypically secure. High coherence, no idealisation, no preoccupation even when experiences are negative.
B4	Exaggerated concern with maintaining proximity to parent	Secure with passivity Barney(dyad3)	F5 Janet (dyad 6)	Somewhat resentful, mild preoccupation with past failings or current relationship, moderately coherent. Anger is contained or accompanied by humour.
			F4	Slightly preoccupied, either sentimentally involved with supportive parents, or slightly preoccupied by difficult experiences.
Avoidant (A)			Dismissing (Ds)	
A1	Highly Avoidant, no distress shown when parent departs. No reaction upon reunion.	Prototype Avoidant Pepper (Dyad 2)	Ds1, Carolyn (dyad 5)	Dismissing of attachment, idealising of parent with no supporting statements, Self and experiences portrayed as normal, often lack of memory blocks discourse
A2	Moderately avoidant, some distress when alone but not distressed with stranger. May show some anger when approached by parent	Avoidant (with anxiety) Benji (Dyad 5)	Ds2 Robert (Dyad 2) Judy (dyad 7)	Devaluing attachment, an uninvolved and cool devaluing of at least one attachment relationship and emphasis on own strength.
		Avoidant with some Security	Ds3 Pamela (dyad 4)	Restricted in feeling, direct evidence of rejection, neglect or role reversing. Expressions of hurt are absent although some resentment is expressed. Some idealisation. Self as normal.
A1 or A2			Ds4 (rare)	Fearful regarding possibilities of loss (death) of child, without cause or consciously identifying the source of fear.
Resistant/ Ambivalent (C)			Preoccupied (E)	
C1	Angry, seeks proximity upon reunion but vacillates between reunion and rejection	Insecure/Anxio us Missy (dyad 8)	E2 (angry) June (dyad 1)	Passive, ill defined experiences of childhood, speech is confusing, vague or child-like. Anger present but primarily confusing and long, rambling discourse (low coherence of transcript and mind).
C2	Passive. Highly distressed on separation, weak crying rather than active. Few reunion behaviours, slight or absent exploration	Insecure/ Passive Rusty (dyad 4) Buddy (dyad6)	E1 (passive, rambling discourse)	Angry, one or both parents portrayed as responsible for current problems, with long passages describing parental behaviour.
C1 or C2			E3 (rare)	Overwhelmed or fearfully preoccupied, in regards to traumatic events (flooded with traumatic memories).

## Discussion

The aim of this pilot study was to determine if dog attachment style was related to working models of early attachment relationships in the AAI with additional questions regarding pet loss. It was hypothesised that dog attachment style in the SST would be related to owner AAI classification. Although based on a small sample of 8 participants drawn randomly from 52 dog owners, this hypothesis is partially supported as there appears to be a relationship which warrants further investigation.

Four participants were rated as Dismissive speakers with regard to early attachment relationships. Two of these Dismissive speakers were also Unresolved due to recent loss of attachment figures. Three dogs belonging to these four Dismissive speakers were found to exhibit varying degrees of avoidant behaviours in the Strange Situation Test. Dog owners with dismissive working models of early attachment relationships may be operating a distancing strategy which is transmitted to their pet dogs. This supports many parental/child findings in which Dismissive AAI speakers are significantly more likely to have infants scored Avoidant in the Strange Situation Test than other categories (Hesse, 1999).

Although this pilot study consisted of only 8 participants, when compared with the general population in the non-clinical meta-analysis of van IJzendoorn and Bakermans-Kranenburg (2008), the results are particularly revealing. In this pilot study, 37.5% were rated as secure/autonomous versus 56% in the general population (non-clinical, including Unresolved) and one participant was rated as Preoccupied (12.5%) compared with 9% in the non-clinical population. Two speakers were Unresolved, (25%) compared with 18% in a non-clinical sample. The biggest difference was found in the high number of speakers ( $n = 4$ ) rated as Dismissive (50%) in this study, compared with 16% in the non-clinical population. These results therefore suggest a higher representation of dog owners as Dismissive with regard to attachment working models than in a general sample of the population. Whilst it would be erroneous to suggest that pet owners are therefore more likely to have dismissive working models of early attachment relationships, based on this small sample, this link, although tenuous, should be addressed in further research. It could be that those operating a dismissive strategy may not be highly interactive with either humans or dogs. However, they may still be interpreting the dog's signals, such as tail wagging for food, or obeying commands, or working with the owner on an agility team, as "loving."

Van IJzendoorn (1995) and Hesse (1999) found a 75% secure/insecure match of owner AAI and child Strange Situation Test. In this pilot study, we found a direct match in 3 of the scores (37.5% concurrence) and 50% concurrence when assessment was based on secure/insecure matches instead of individual insecure categories of dismissive or preoccupied.

With regard to the non-matched cases, in dyad 1 (June/Duke), Duke was rated as Secure and June was Preoccupied with her human attachment relationships. There was no indication from this dyad that preoccupation as a working model was associated with inconsistency or insensitivity in relation to dog attachment. June was sensitive and non-invasive while Duke was task solving. This suggests that preoccupation with human relationships may not be related to dog caregiving sensitivity in the way that parental preoccupation is related to infant Resistance/ambivalence. Furthermore, the high anxiety found in the dog "Missy" (dyad 8) does not relate to owner security on a number of indices. In Missy's case, the interaction with the owner, Frank, is based on high owner sensitivity characterised by low invasiveness in the task. Frank also scored very low on both owner talk and owner touch, therefore it would be interesting to see if more active interaction in the SST would have resulted in a reduction of anxiety for Missy. It could be that Missy's attachment security is related to conspecifics and not human caregivers, as she is part of a multi-dog household (which includes her mother), although it was found in Chapter 3 that the number of dogs in the household did not relate to dog attachment style. It could be that she did not experience broad enough socialisation to novelty, including places during the sensitive stage of socialisation to neurologically prepare her to adapt to stresses and novel stimuli (Serpell & Jagoe, 1995). Further research involving a broader spectrum of early socialisation variables that contribute towards individual differences in dog attachment style should be considered.

In the case of Judy and Tiggy in dyad 7, Judy was both Unresolved due to recent bereavement, but also Dismissive in human relationships. As maternal role reversing was evident in her early childhood, it could be that she is now role reversing with her dog Tiggy. She was highly invasive in task solving, and dissociative when Tiggy sought proximity. Although Tiggy was rated as Secure in the SST, her scores show some avoidance. She does not seek proximity with Judy as much as other dogs in the Secure prototype category. This is an example of a dyad that might benefit from filming in the owner's home to determine a general interaction style rather than in an experimental protocol. Home video assessment in child studies have provided links between attachment



styles and actual parental behaviour (Dickstein et al. 2009) and therefore might be useful in dog attachment studies.

Chapter 4 found that owner FR behaviour was associated with dog attachment insecurity. In this study, three of the eight human participants were rated as showing some FR behaviours. These dogs are in the Avoidant, Passive and Secure clusters, therefore 66% were rated as Insecure. However, there was little evidence of disorganised dog behaviour. This is contrary to the evidence in child studies, in which parental frightening or anomalous behaviour is associated with disorganised child behaviour strategies (Hesse and Main, 2006). Instead, it appears from this study that when fearful of owner, they maintain their critical distance, operating an interaction strategy based on avoidance of the owner.

Two of the three owners who exhibited FR behaviour were also the only participants classified as Unresolved in respect to human loss, trauma or abuse. The third had herself experienced parental FR behaviour. All were rated as Dismissive. This suggests there could be a relationship between unresolved loss and the application of frightening behaviour in relationships with companion animals. Unresolved parental status is seen in a number of studies involving maltreated infant samples (Carlson, Cicchetti, Barnett & Braunwald, 1989; Hesse & Main, 1999). Thus the use of the adapted AAI used in this study could have applications to further research in the area of animal abuse and bestiality, possibly as a tool in predicting animal abuse (Adams, McBride, Carr & Carnelly, in press).

As there is a strong link between animal abuse and domestic violence including child abuse (Ascione et al. 2003; Ascione & Shapiro, 2009) and the AAI has been found to be a reliable tool in predicting child abuse from parental disorganised transcripts (Stovall-McClough, Cloitre & McClough, 2008), this model using dogs could predict families at risk before violence has occurred. For example, animal abuse is associated with a family history of anti-social behaviour, as well as personality disorders, substance abuse, and conduct disorders (Vaughan, et al. 2009). These psychopathologies are also associated with early instability of attachment and specifically disorganised parental attachment (van IJzendoorn & Bakermans-Kranenburg, 2008). Such intergenerational patterns of attachment are uncovered in the AAI (Benoit & Parker, 1994; Fonagy, Steele & Steele, 1991, Ward & Carlson, 1994). Thus, administering the AAI to insecure adolescents and adults, and analysing both their dogs and their behaviours in the Strange Situation may provide a warning of future abuse which would benefit from early therapeutic intervention.

### *Owner Sensitivity versus Insensitivity*

There is a relationship between owner sensitivity in task solving and owner AAI classification that warrants further investigation. Of the eight participants, the three who employed highly invasive behaviours, such as restraining the dog or grabbing its paws, were all found to be Dismissive speakers in the AAI and in two of these cases, it was related to dog avoidance (with the third case secure/with some avoidance). Therefore if such highly invasive behaviour is indicative of owner *insensitivity*, it could be argued that behaviour insensitivity in owners is related to a Dismissive attachment style. The fact the two Dismissive participants were also Unresolved and displayed frightening behaviours is indicative of a web of interaction between working models and behaviour. Steele and Steele (2008) found that Insecure parents lack an ability to reflect on their own behaviours, which may include FR and the behaviour of their parental figures who also might have employed FR behaviours.

This study also found that self-reports of romantic attachment (ECR; Brennan et al. 1998) did not inform dog attachment style, nor were they related to classifications in the AAI, findings that fuel the debate regarding the convergence of self reports versus the AAI.

### **Conclusion**

This pilot study of eight participants drawn randomly from 52 dog owners, presents interesting themes for future research investigating the link between owner working models of early attachment relationships, unresolved loss, trauma or abuse measured using the Adult Attachment Interview, and dog attachment style. For example, there is potentially a relationship between owner dismissive working models, unresolved loss, and avoidant dog attachment strategies. It appears that dog owners with dismissive working models of early attachment relationships may be operating a distancing strategy which is transmitted to their pet dogs. Furthermore, as in child studies, unresolved loss predicted some FR behaviours in owners. Unlike child studies, there was little related disorganisation in dog behaviour. Instead, owners using FR were more likely to have dogs in the Avoidant cluster. Future research with a statistically powerful sample using the AAI and the SST with dogs may provide more robust evidence of links between Unresolved owner transcripts, owner use of FR behaviours and dog avoidance to predict families at risk of domestic or animal abuse.

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## General Discussion and Conclusions

### Purpose of Thesis

The purpose of this thesis was to examine the hypothesised link between owner working models of attachment and dog attachment style through an in-depth mixed-methodological study of a cohort of owner-dog dyads. Using the Strange Situation Test (SST) four categories of dog attachment were found, one Secure and three insecure categories: Avoidant, Anxious and Passive (Chapter 3). Relationships between owner behaviour in the Strange Situation and dog attachment were investigated (Chapter 4), and between owner behaviour, dog attachment and success in task solving (Chapter 5). Links between dog attachment, owner behaviour during task solving and self-reported owners' working models of adult attachment relationships and dog caregiving were investigated in Chapter 6 and in Chapter 7, whether unresolved loss predicted owner behaviour and/or dog attachment style. Finally, the Adult Attachment Interview (AAI) was used in a pilot study to explore the role of owner early attachment relationships in the transmission of owner caregiving and dog attachment style (Chapter 8).

It was hypothesised that dog attachment style would be related to owner working models of attachment relationships. The null hypothesis is rejected as a tenuous link was found. Stronger evidence of an inter-species transmission of working models was found in the relationship between owner caregiving behaviours, particularly owner sensitivity and dog attachment style. Thus the alternative hypothesis is accepted, namely that working models, through the evidence of owner behaviour, predicts dog attachment security.

### Summary of Findings

#### *Attachment Security in Dogs*

There were parallels found between owner/dog and parent/infant attachment security (Table 9.1), particularly in relation to dog security and owner sensitivity. Sensitive

owners responded to the dog when there was evidence of attachment system activation in the SST. Owners of secure dogs knew when their dogs were stressed, would acknowledge their attention seeking by comforting them enough to reassure them, which then deactivated the attachment system, enabling a return to play and exploration (evidence of the provision of a secure base). They also provided sensitive and supportive intervention in task solving and avoided invasive or controlling behaviours. As a result Secure dogs were highly task focussed.

Caregivers of Secure infants are sensitive to their infants signals, providing appropriate responses in a warm, involved fashion (Pederson et al. 1998; Slade et al. 1999), interact more frequently and are supportive in play (Isabella & Belsky, 1990). Sensitive caregivers pre-empt an escalation in distress behaviours by being alert to their infants' emotional states (Grossman et al. 1999). The same mechanism appears to be at work with owners of Secure dogs.

Table 9.1

*Comparison of parental and owner characteristics in infant and dog attachment security*

<i>Secure Infant</i> <b>Primary caregiver is:</b>	Attachment Security <i>Secure Dog</i> <b>Owner is:</b>
Sensitive to infants signals and communication	Sensitive to dog's signals especially in task solving through low levels of interference. Sensitive to dog's attachment system activation and will provide comfort.
Warm and accepting of child and child's attachment behaviours	Accepts dog's comfort seeking but will also actively try to redirect dog to play when there is evidence of dog stress.
Accessible	Not dissociative. Evidence of communication between dog/owner.
Responsive	Accepts attention seeking behaviours when there is evidence of attachment system activation
Interacts with appropriate timing	Responds with appropriate level of comforting (moderate talk and touch) instead of prolonging dog's distress.
Allows child to explore, task solve	Allows dog to explore or task solve without invasive interaction, takes joy in dog's success

A self-reported affectionate dog care style was most associated with traits of Secure dogs, which includes many elements indicative of a strong dog/owner bond. Only one owner of a Secure dog used frightening behaviours even though many were unresolved in human or pet loss. FR behaviour is a characteristic of Unresolved loss (Hesse & Main, 2006). The lack of FR behaviour suggests that the underlying attachment style of these owners was Secure, even with unresolved loss. In the Adult Attachment Interview, high transcript coherency is the hallmark of a secure/autonomous speaker. A lapse in cognitive

monitoring of dialogue *only* when discussing loss, trauma or abuse may result in an “unresolved” but ultimately secure classification (Hesse & Main, 2006). For the Unresolved/Secure owners, their dogs were a source of comfort, especially after human bereavement. Whether the dog’s security contributed to the owner’s sense of comfort, or whether owner attachment security contributed to dog security is not definitive from these results. It is likely that it is reciprocal and mutually beneficial.

Overall there is a trend that suggests that secure working models, which inform security in adult relationships, could be associated with dog attachment security.

#### *Dog Attachment Insecurity: Avoidant*

There is evidence that dogs belonging to owners with dismissive attachment styles are more likely to be Avoidant (Table 9.2). Both dismissive attachment in adult relationships (ECR/CAR) and AAI dismissive transcripts may be related to dog avoidance, although a larger sample is required to confirm this effect. Nonetheless, this is a relationship warrants further investigation. Dog owners with dismissive working models may be operating a distancing strategy not only in human relationships but also in relation to their dogs, perhaps unconsciously. In parent/child findings, Dismissive AAI speakers are significantly more likely to have Avoidant infants in the SST than other categories (Hesse, 1999).

Avoidant dogs tended to have been re-homed and to have had a shorter relationship with their owners at the time of the study than all other clusters of dogs. In Fraley and Shaver’s (1997) study of human romantic relationships, when relationship length was controlled, avoidant individuals failed to form attachments. It is possible that, in the current study, Avoidant dogs were avoidant due to a combination of a shorter period of bonding and owners’ caregiving style. In new relationships there could be initial avoidance and therefore a weaker bond. Dogs with previous re-homings could be more anxious, especially if this occurred during the sensitive periods of social development (McBride, Bradshaw, Christians, McPherson & Bailey, 1995). However, owners dismissive in human relationships may not encourage dog bonding, thus ensuring neither feels comfortable with the other’s behaviour and the situation self-perpetuates. This in turn may lead to eventual breakdown of the owner/dog bond and the dog being put back into the rescue/re-home cycle.

Table 9.2

*Comparison of parental and owner characteristics in infant and dog insecure/avoidant attachment*

<i>Avoidant Infant</i> <b>Primary caregiver is:</b>	<i>Avoidant Dog</i> <b>Owner is :</b>
The least sensitive	The least sensitive to dog's signals and unaware of dog's stress from experimental protocol.
Rejecting generally and of attachment behaviours	Insensitive to difference between attention seeking due to activation of attachment system and general attention seeking.
Least accessible	Although characterised by high play, there is no emotional connection between owner/dog.
Least responsive (more ignoring)	Most dissociative
More controlling than cooperative	Highly invasive in task solving
More anger, silent treatment	Higher use of FR behaviours, including threatening or disorganised owner behaviours
Least physical contact and more unpleasant encounters.	More talk and least touch in general interactions, and highly invasive in task solving.

All owners who used FR behaviours ( $n = 13$ ), (e.g. play postures that were out of context, looming threateningly over their dogs, or being dissociated from the dog by not responding when attachment system activation occurred), had Insecure dogs. Owners of Avoidant dogs were five times more likely to use FR behaviours than those of Secure dogs.

Forty-five percent ( $n = 5$ ) of Avoidant dog owners displayed FR behaviour in the SST and were significantly more intrusive in the task solving game, grabbing or restraining their dogs more frequently than those of Secure dogs. This was significantly correlated with dog distress in task solving, evidenced by the dogs immediately ceasing interaction and suddenly moving away from owner and game. Although Avoidant dogs seemed initially motivated to task solve, as soon as owners became invasive, this motivation extinguished and was replaced by anxiety and consequent behavioural inhibition, and increased observation of the owners. This indicated heightened arousal and increased vigilance in preparation to flee from owner restraint (Gray, 1987).

Owner FR behaviour as a predictor of dog avoidance is a new finding not seen in infant/parent dyads. While caregivers of Avoidant children also become over-involved and interfere with the pattern of play, distressing the children (Grossman et al. 1991), studies investigating the use of FR in parents found it to be linked to child Disorganisation in the SST. They appear to cognitively dissociate from their conscious state, with displays of

disorganised, out of context behaviours, such as freezing, rocking, and other repetitive behaviours, in an otherwise organised behaviour strategy of either Secure, Dismissive or Ambivalent/resistant. While, the methodology did not allow for testing to determine if dogs dissociated from their conscious state, Avoidant dogs displayed some 'Disorganised' behaviour (e.g. freezing, indicating the fear of the attachment figure) which deactivated the exploratory system, particularly noticeable in the task-solving game. This however, was an *organised* strategy. It did not appear out of context given the owners' behaviours, rather avoidance could be a learnt protective response in anticipation of aversive stimuli.

It may be that the behaviour seen in infants has been misinterpreted as cognitive disassociation and rather it is an innate or learnt reaction to a fearful stimulus intended to defuse parental FR behaviour. Freezing may reduce stimulation for Parental FR behaviour and repetitive behaviour may redirect it. In either case the infant may be very aware of its surroundings.

The methodology did not test the hypothesis that dogs avoid owners in anticipation of aversive stimuli, however, the possible similarities with maltreated children and avoidance warrants further investigation. Low parental sensitivity and empathy is a predictor of violence towards children (McPhedran, 2009) and FR owner behaviours are related to low owner sensitivity in task solving and dog avoidance. In the absence of evidence of disorganised dog behaviours, the equivalent appears to be owner FR predicts dog avoidance.

Further studies involving high risk samples from centres homing families of domestic violence might elucidate the link between parenting and owner caregiving style. Dogs from homes where domestic violence is high might be expected to show high SST avoidance, which may assist social services in predicting families needing support. In these cases, dog avoidance could be indicative of either owner insensitivity or intentional positive punishment which may flag a potentially abusive environment. Such studies may lead to revision of the definition of avoidance in infant studies in low risk samples.

#### *Dog Attachment Insecurity: Anxious*

Anxious dogs exhibited high distress and proximity restoring but also failed to be comforted by the owner, similar to Ambivalent/resistant children. The owners were ineffective in calming Anxious dogs, which could be due to low owner sensitivity and poor timing (Table 9.3). A sensitive owner is aware of signals that precipitate fear or anxiety and divert the dog's attention. Timing therefore is paramount as once nervous system

activation has occurred, it becomes virtually impossible to extinguish until the animal perceives the environment as no longer threatening. Thus attempting to pacify a dog once the sympathetic nervous system is activated may not reduce anxiety.

Mothers of Ambivalent/resistant infants were also ineffective in calming their infants when they became distressed and also interfered in the progress of exploration, in favour of the mother's rather than the child's need (Cassidy & Berlin, 1994). Likewise, owners of Anxious dogs also interfered with dog task-solving.

Table 9.3

*Comparison of parental and owner characteristics in infant and dog insecure/anxious attachment*

<i>Ambivalent/Resistant/Avoidant Primary caregiver is:</i>	<i>Anxious Dog Owner is :</i>
Less sensitive to signals	Less sensitive to signals
Generally rejecting of attachment behaviours	Generally unresponsive to attention seeking in an attempt to stop active dog behaviours.
Inconsistent accessibility	Some dissociative and deferential behaviours in response to attention seeking.
Inconsistent responsiveness	Deferential or dissociative
More interfering or intrusive in task solving	More interference in task solving than secure owners
Problem solving characterised by confusion/frustration and less cooperation	Task solving characterised by less cooperation, confusion and frustration, with some invasive behaviours.
Less physical contact and more unpleasant encounters.	Less physical contact, some use of FR behaviours

Anxiety can result from genetic and environmental factors (Goddard & Beilharz, 1984). Anxious dogs may be predisposed to high reactivity by being more sensitive to contextual cues of potential danger such as novelty through a genetic expression of serotonin or dopamine transporter genes (Barry et al. 2008). Environmental factors such as early trauma during sensitive periods of development can heighten reactivity and sensitivity to threat (Jagoe & Serpell, 1996). In this study significant determinates of Anxious cluster membership did not include breed, origin, the number of prior owners nor ownership length. However, the sample was small and not all data on traumatic experiences was available.



Humans with a genetic predisposition towards sensitivity to context have an increased risk of developing insecure attachments when maternal responsiveness is low (Barry et al. 2008) and the same is found in primates (Suomi, 1997). It may be also the case for dogs. Although not tested in this study, research exploring owner nurturing and neurotransmitter associations might elucidate a link between genetic sensitivity, anxious attachments and owner behaviour in the SST and task-solving. It may be further hypothesised that sensitive dogs would benefit from enriched nurturing.

Heightened owner sensitivity may be one component of enriched care. It was found that low talk and touch in the SST did not reduce dog anxiety, and may be a component of low nurturing. Training owners how to appropriately increase talk/touch interaction could be used as a means of strengthening the dog-owner and owner-dog bond.

#### *Dog Attachment Insecurity: Passive*

Passive dogs could be behaviourally inhibited Secure dogs. However, they are defined as *Insecure* because there is evidence of attachment system activation which is not alleviated through the comfort of the dog/owner bond. Proximity to the owner does not restore homeostasis. Owners are passive themselves, with the occasional expression of dissociative or deferential behaviours (Table 9.4).

The behavioural inhibition of Passive dogs could be due to learnt helplessness, either an inability to sustain high arousal from sympathetic nervous system activation over long periods (Seligman & Maier, 1967) or from poor early environmental conditions particularly during the early sensitive period at around 8-12 weeks. Owners were asked to identify early trauma events but this was not a significant predictor of cluster membership. However, some dogs were obtained from rescue and there was missing data regarding early environments which is a potential confounding variable. Future studies could use samples of assistance or laboratory dogs, where early environments are more controlled and trauma recorded.

Table 9.4

*Comparison of primary infant caregiver and dog owner characteristics in infant and dog insecure/passive attachment*

<i>Ambivalent/Resistant Child</i> <b>Primary caregiver is:</b>	<i>Passive Dogs</i> <b>Owner is :</b>
Less sensitive to signals	Owner is primarily passive. Too sensitive to signals, or misinterprets signals.
Generally accepting of infant	Generally accepting of dog
Inconsistent accessibility	Highly accessible, reacts to dog's attention seeking and prolongs the contact through the highest levels of petting remaining passive otherwise.
Inconsistent responsiveness	Inconsistent, as occasionally disorganised or FR (dissociative or deferential) behaviours were seen.
More interfering or intrusive	Moderate to high interference in task solving. More likely to restrain and hold dog than secure or anxious clusters.
Problem solving characterised by confusion/frustration Less cooperation in exploring, task solving	Problem solving characterised by low owner interest  Less cooperation and interest in task solving. Owner does not encourage dog to task solve. Accepts dog's behavioural inhibition.

Owners touched Passive dogs significantly more than other dog clusters, yet are largely sensitive in task solving. Some studies have found that owner petting reduces evidence of stress (Odendall & Meintjes, 2003). However, Passive dogs may also have a genetic predisposition to increased sensitivity to contexts of threat, resulting in owner inability to deactivate the attachment system. Some studies have found that owner petting reduces evidence of stress (Hennessy et al. 1998). In this study, two contrasting scenarios could be occurring: owning petting is deactivating the sympathetic response in dogs normally behaviourally passive; or owner behaviour is prolonging passive anxiety reinforcing the dog's fear when attachment system activation occurs. Further studies using salivary cortisol analysis<sup>12</sup>, may confirm sympathetic activation in Passive dogs. However, the most parsimonious explanation is that the owner petting behaviour is maintaining or increasing the sympathetic response. Passive dogs display low play and exploration levels. This suggests that internalising stress is a normal behavioural response for these dogs. It is proposed the Passive dogs' proximity seeking behaviour induces owner petting. Touch in the early stages of attachment system activation, *along with* a diversion to play would have

<sup>12</sup> Salivary cortisol collection would be less invasive for the dog than blood cortisol collection.

been a sensitive caregiver's response. Two-thirds of Passive dog owners responded to their dogs but did not initiate petting which could be evidence of insensitivity.

It could be that the Passive dog's lack of behaviour is due to the dogs' dissociation from stressful events. Interestingly, owner dissociation was found in Passive and Avoidant dogs only. Of the 15 Passive dogs, 5 (33%) had owners with FR behaviours, which could be positive punishers for the dogs. It is proposed that whereas the stress of the protocol was related to passivity in 10 dogs, dissociative passivity could be related to owner FR behaviours in 5 Passive dogs.

### *Owner Sensitivity and Dog Attention Seeking*

Secure owners were more sensitive in responding to dog attention seeking upon attachment system activation. Attention seeking is seen as an undesirable behaviour that owners should control or extinguish through operant conditioning (Appleby, 1997). Dogs learn that standing in front of owners, whining, pawing or climbing on them is a successful strategy in obtaining owner attention, play or food (increasing resource holding potential), enabling the dog to dictate when important resources are provided. Training protocols (Appleby, 1997; Lindsay, 2000; Overall, 1997) tell owners that responding to dogs' attention seeking behaviours creates expectations of owner response that weaken owner resource holding potential, creating conflict in the home pack hierarchy. This may be the case when the dog is not in sympathetic arousal. However, if the dog attention seeks *while the attachment system is activated*, and the owner recognises this and responds with sensitive, measured petting or talking, it leads to *greater dog security* and a stronger human/dog bond. In this case, the owner is monitoring the dog's sympathetic nervous system arousal and adapts their behaviour reducing the charged atmosphere. They then employ a diversion technique, such as play, to reduce the aversive emotional state.

Sensitivity in responding to real instances of distress differed significantly between owners of Secure versus Insecure dogs. Owners of Avoidant dogs displayed reduced sensitivity in noticing distress, as seen in higher owner dissociation and lack of interaction. Passive dog owners displayed the opposite: a lack of sensitivity by overreacting to proximity-seeking with prolonged petting with little attempt to divert the dog's attention to play. Anxious dog owners notice their dog's anxiety, but their strategies in calming their dogs were ineffective.

### *Relationship of Owner Adult Attachment Style on Dog Attachment Style*

Although there were trends suggesting that owner working models of attachment inform sensitivity to dogs in similar ways that it informs sensitivity in caregiving to children, increased statistical power is needed to reject the null hypothesis.

There was a trend suggesting that those operating a dismissive strategy in human romantic relationships or who have AAI dismissive transcripts are more likely to have Avoidant dogs. Of this self-selecting sample of dog owners, 25% were rated Dismissive in human relationships in the ECR. In the AAI, 50% of the 8 participants' transcripts were coded Dismissive. This is an interesting result, as in the general low risk population, only 27% are coded Dismissive (van IJzendoorn & Bakermans-Kranenburg, 2008). Based on this small sample, generalisation is not possible. However it does suggest a need to investigate dismissive working models among dog owners in further research.

### *Unresolved Owner Status and Dog Attachment Security*

An unexpected result from this research was a trend linking dog attachment security and owners unresolved in human and/or pet loss. Secure dogs may be providing an important means of social support for grieving owners, seen in high role-reversing levels, in which the owner seeks out the dog for comfort and support. Although not statistically significant, this is an interesting link, as it suggests that the human/dog bond may be strengthened from the owner's perspective when an owner is bereaved, rather than the opposite. To test this hypothesis further, a larger sample of bereaved owners in human loss could be administered the AAI alongside the SST measuring their current dog's attachment security. A larger sample of unresolved owners would increase power and enable generalisation.

Unresolved adult attachment status is seen in many studies involving samples of maltreated infants (Carlson et al. 1989; Hesse & Main, 1999). While only 13 owners exhibited FR behaviour in the SST, only one was unresolved due to loss. While statistically too weak to suggest a relationship between unresolved loss, FR and abuse, it nonetheless could have applications to further research in the area of animal abuse and zoophilia/bestiality. For example, the AAI and SST could be used in at-risk samples in further studies as a tool in predicting animal abuse.

Previous studies have suggested that those who live alone have higher levels of grief (McNicholas & Collis, 1995). However, within this psychosocial framework, pet grief will differ in intensity between individuals largely as a result of the existing social

support within close relationships, including a network of other individuals (versus social isolation) and other human or non-human companionship. It would therefore seem logical that those living alone or with a limited social network would experience more extreme reactions to pet loss (Archer & Winchester, 1994; McNicholas & Collis, 1995). This thesis found that the number of people in the household did not relate to unresolved grief.

### *Study Limitations*

A limitation of all studies in this thesis pertains to possible confounding variables. While we were able to control the experimental environment, there was no similar control of the participants' early social and physical environments. Although early trauma was not a significant predictor of group cluster membership, if the dog was obtained from rescue, early environmental information may not have been available. These between-participant differences may explain a significant variance in dog behaviour. A replication of this study with a sample of dogs with complete early history profiles may produce different results. In addition, as male owners were under-represented in this study, replication with more male dog owners may provide different results regarding both dog cluster membership, and owner behaviour towards dogs.

Another limitation of this thesis is the self-report study in Chapter 6. It presented inconclusive results that did not support previous findings. This could have been due to the length of the on-line survey, the fact that dog owners had not anticipated answering questions about significant human relationships, and the desire to provide socially desirable responses.

Lack of correlation between the romantic attachment (ECR) and caregiving (CAR) scales was surprising and could be due to the above factors, or the age of the sample. With a mean age of 47, this sample is older than the original ECR (Brennan et al. 1998) (Median = 18 years), the Adult Caregiving Scale (Kunce & Shaver, 1994) ( $M = 22.4$  years) and that of Beck and Madresh (2008) ( $M = 27$  years), who used the ECR in assessing dog attachment. Although not specifically measured in this thesis, as this sample was older, relationship duration between it and the ECR (15 months median relationship length) and the CAR (mean relationship length 2.87 years) could have differed significantly. Therefore, the older profile of this thesis' sample could have been responsible for the differences in results.

The Dog Caregiving Style scale elicited unexpected results particularly in relation to high lax and affectionate dog care scores. High Lax dog caregiving was associated

with more attention giving but also more use of FR behaviours. This suggests that FR for Lax owners is not as predictable as it would be for Derogatory or Over-reactive (aggressive) owners. The Affectionate DCS was more related to an *Avoidant* dog cluster. Even though they scored high on a “strong owner/dog bond” in self-reports, they were also invasive in task solving, owner behaviours that were related to the *Avoidant* dog cluster.

An explanation of differences between self-reports and behavioural data may be due to owner misinterpretation of dog behaviour. Therefore, owner *perception* of dog care style may be unrelated to behaviour *observation* of their care style. In addition, owners frequently misinterpret how the dog perceives their behaviour, and what the dog’s behaviour means. This is often due to anthropomorphism (Serpell, 2003). Owners may hold the belief that as it would be perceived by a child as helpful to manipulate their hands when task solving, so the same would be true for manipulating the dog’s paws.

A more robust measure of dog care style should involve a video behavioural assessment of dog/owner interactions at home. In this study care style was more usefully exemplified through actual owner behaviour in task solving than questionnaire responses.

### *Further Research*

Dog adaptation to owner caregiving and early socialisation issues were not measured in this study. A home assessment of both owner and dog behaviour may provide greater insight, as found by Dickstein et al. (2009) in child/parent studies. Genetic testing in conjunction with the SST may also provide greater insight into optimum environments for highly anxious dogs with a genetic predisposition towards a higher sensitivity to contexts of threat. Lee et al. (2008) found variations in dopamine reuptake which were associated with the expression of fear in dogs, research that could be applied to dog attachment security. While this thesis suggests that owner sensitivity is responsible for a proportion of the variance in dog attachment behaviours, genetic effects may be responsible for the rest. This should be explored in further studies using the SST and AAI in conjunction with testing for the genetic expression of sensitivity to context.

In addition, a simple experiment, such as increasing owner touch for anxious dogs, and decreasing owner touch for passive dogs in situations that activate sympathetic arousal in acute situations, such as veterinary visits, may show evidence of reduced anxiety. Additional physiological parameters such as cortisol analyses are recommended to confirm chronic anxiety in Anxious and Passive cluster dogs.

### *Applications of this Research*

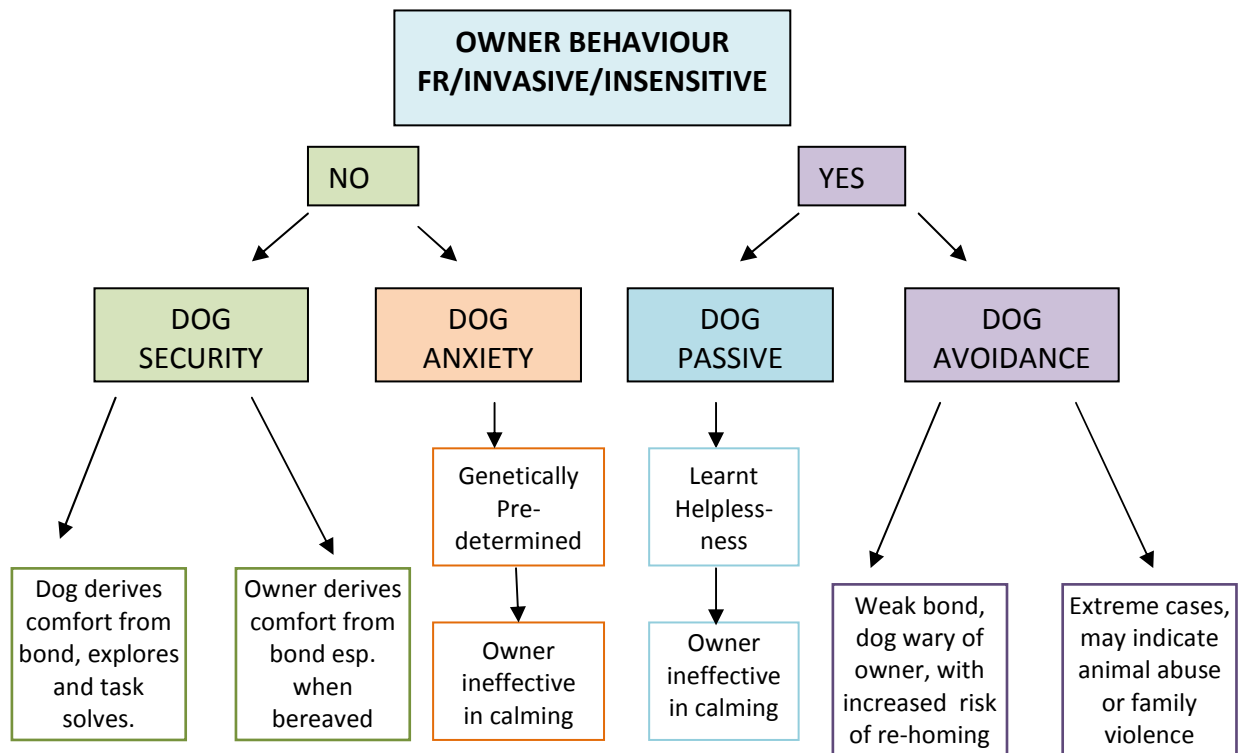
The results from this experiment could be generalised to situations involving minor stressors, such as visits to the veterinarian, where high levels of owner touch are more likely to increase rather than decrease dog anxiety. In these cases, owner talk alone may be more calming. Experiments involving the moderation of owner behaviour in stress-inducing situations over time may provide insights into the effects of reduced levels of touch on dogs exhibiting high levels of anxiety. Studies exploring the occurrence of anxiety-related separation problems in dogs with high-petting owners versus low-petting owners may explain the effects of owner interaction on the initiation and maintenance of sympathetic arousal in dogs.

As this thesis found that the dog is perceived by owners as being a member of the family (69%) and in some cases a surrogate child (35%), studies relating to the transmission of working models from parents to adoptive children are particularly relevant. For example, in Dozier et al.'s (2001) and Steele et al.'s (2008) studies of adoptive children it was shown that previously abused children were found to significantly benefit when placed with a secure/autonomous adoptive caregiver. The fact that early trauma and origin of the dog (e.g. from rescue or breeders) were not found to be significant predictors of dog attachment style in this study, suggests that the placement of traumatised dogs in sensitive adoptive homes may reduce the effects of the early trauma, replicating the results of child adoption studies. Anecdotal evidence from those working in dog rescue suggest that, despite early traumatic events, if dogs are placed with owners who are secure and sensitive caregivers they can overcome early setbacks and develop strong owner/dog bonds. This should be substantiated by further research in which previously abused/traumatised dogs are re-homed to autonomous households, using the AAI to identify autonomous owners. Bakermans-Kranenburg, van IJzendoorn and Juffer's (2003) meta analysis of the effectiveness of programmes aimed at improving maternal sensitivity, found increased child security. Similarly in animal behaviour counsellor's work with owners of dogs displaying problem behaviour, improving owner sensitivity is integral to behaviour modification programmes. Although human intervention in clinical research using the AAI to identify attachment insecurity followed by interventions to increase parental sensitivity are in early phases, and there is no research on the effectiveness of dog/owner interventions, there is a potential for cross-fertilisation of ideas and techniques for improving caregiver sensitivity, be that for child or dog care.

The extent to which owner FR behaviours contributed to dog avoidance cannot be ascertained accurately in a laboratory procedure. To test these hypotheses, an analysis of both owner and dog behaviour should take place in the home environment, rather than a laboratory. In addition the AAI should be used to investigate the link between insecure working models and FR behaviours in owner/dog interactions as a predictor of animal abuse and domestic violence or child abuse. As there is thought to be a strong link between animal abuse and domestic violence including child abuse (Ascione & Shapiro, 2009), and the AAI has been found to be a reliable tool in predicting child abuse from parental disorganised transcripts (Stovall-McClough et al. 2008), this model using dogs could predict families at risk before violence has occurred. As intergenerational patterns of attachment are uncovered in the AAI (Benoit & Parker, 1994; Fonagy et al. 1991, Ward & Carlson, 1994), administering the AAI to insecure adolescents and adults, and analysing both dog and owner behaviours in the Strange Situation Test may provide a warning of future abuse which would benefit from early therapeutic intervention.

The model in Figure 9.1 depicts two differing scenarios that may occur based on the application of/absence of owner use of FR/Invasive/Insensitive behaviours in owner/dog interactions.



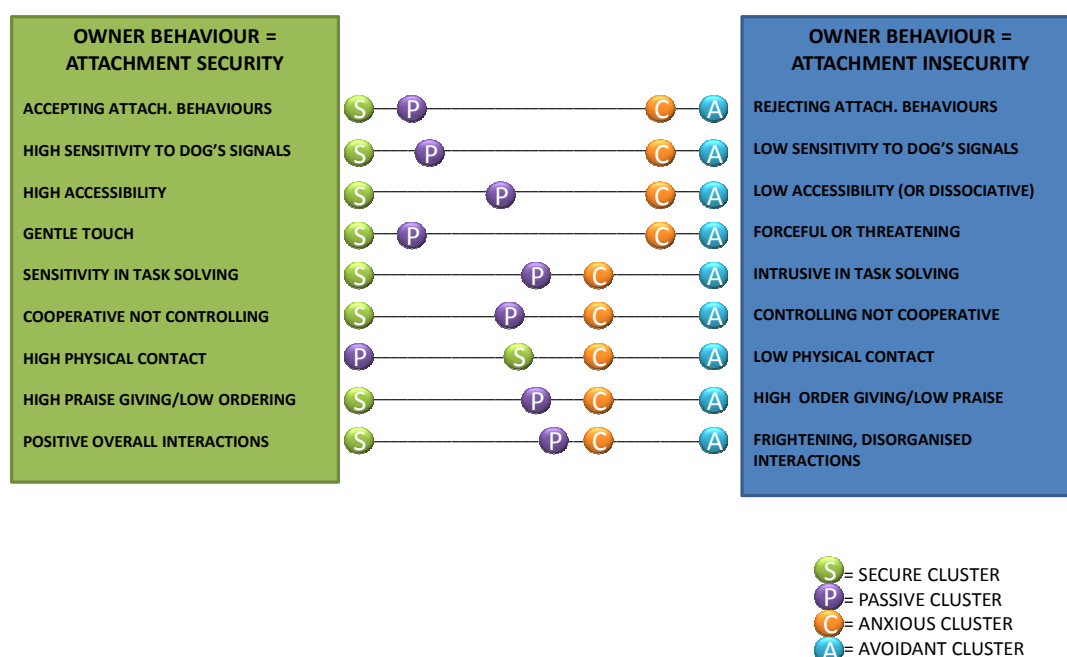


*Figure 9.1.* Model depicting the relationship between owner application or absence of frightening, invasive (e.g. in task solving) and insensitive behaviours in relation to dog security, anxiety, passive-insecurity and avoidance.

The model in Figure 9.1 highlights the relationship between owner behaviours and dog security, anxiety, passivity and avoidance. Owners who are more sensitive, less invasive in task solving and less likely to use FR behaviours have dogs who are fundamentally Secure. Both derive comfort from the bond. In contrast, owners of Avoidant dogs are more likely to use FR and invasive behaviours, which is an indication of greater insensitivity to dog signals. As a result the owner/dog bond is weaker, which could lead to relinquishment. Dog anxiety may be more related to nature than nurture, but it appears that owners are ineffective in deactivating the attachment system in anxious dogs. Passive dogs may be exhibiting a type of learnt helplessness response as a result of owner FR or invasive behaviours. Their owners also appear ineffective in deactivating the attachment system.

Figure 9.2 depicts the role of specific owner behaviours indicative of attachment security or insecurity as a reflection of owner caregiving style, measured through

behavioural analyses. Behaviours indicative of owner sensitivity are related to Secure dogs, and to a lesser degree Passive dogs, while behaviours indicative of owner insensitivity are related to the Avoidant and Anxious dog clusters.



*Figure 9.1.* Model of owner behaviours as they relate to attachment security and insecurity, and dog clusters.

## Conclusion

This thesis proposed a model of owner effects on dog attachment security. Figures 9.1 and 9.2 depict the influence of owner caregiving behaviour style in relation to dog attachment security or insecurity, measured through behavioural analyses. Behaviours indicative of owner sensitivity are related to Secure dogs, while behaviours indicative of owner insensitivity are related to the Avoidant, Passive and Anxious dog clusters.

As the results suggest that owner sensitivity is related to dog attachment security, this may be useful in two ways. First, it could assist in detecting potential issues relating to human/animal abuse and second, in re-homing dogs. As shown in adoptive studies, previously abused children were found to significantly benefit when placed with a secure/autonomous adoptive caregiver (Dozier et al. 2001; Steele et al. 2008). This

suggests that rescue dogs placed with owners who are secure and sensitive caregivers, could potentially overcome early setbacks and develop strong and supportive owner/dog bonds. Identifying such owners could reduce re-admission to rescue centres and euthanasia rates thereby improving the welfare of the dogs, adopting owners and rescue centre staff. A behaviour analysis of owners as insensitive or inconsistent is related to dog insecurity in the Strange Situation Test. Dog insecurity was also more likely to occur in dyads where owners operate a dismissive attachment style in human relationships. While there is evidence of a transmission of working models from owner to dog that is reflected in dog attachment security, a larger sample of participants is needed to confirm these findings.

It is hoped that the results will improve welfare for dogs by enabling greater owner understanding of dog behaviour which will lead to a more satisfying human/dog bond. The application of this research may result in fewer relinquishments to shelters in the first place and successful adoption outcomes for those in shelters.

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# **APPENDICES**

## Appendix A

Four stages of attachment development proposed by Bowlby (1969/1982)

Stages	Description
Stage 1 Orientation and Signals	The infant reaches, attempts to grasp or cries to elicit the attention of the caregiver. There is high interaction with caregiver, although the infant is not yet capable of distinguishing between individuals. At about two months of age, the infant will start to grasp (other than in reflex movements), and orient its vision towards an object. During this stage the caregiver maintains proximity and is sensitive to the child's attachment behaviours such as crying, the caregiver/child pattern of interacting stabilises. This phase will terminate at about 12 weeks of age.
Stage 2 Chained behaviour sequences	In the second stage, at between 3 and 6 months, simple behaviours become more complex, with chained sequences of behaviour, such as crying when the caregiver leaves, greeting behaviours, exploration of its environment smiling in response to caregivers. The infant starts to differentiate between caregivers in its attachment behaviours and controls the attachment system, actively seeking out the attachment figure. It is during this stage that sensitivity of the caregiver is important. If the caregiver is less sensitive or inconsistent in responding to the child's attachment behaviours, the child will turn behaviours inward to terminate its distress (such as limited exploration) (Marvin & Britner, 1999).
Stage 3 Development of separation between parent and self	In the third stage, occurring between six/nine months of age up until the first year, the child actively seeks proximity to the attachment figure moving towards the caregiver, as well as crawling and exploring its environment (Bowlby, 1969/1982). With higher cognitive development, the infant has an image of the set goal it wishes to attain, such as crawling to an object or its mother. It also has an internal image of the attachment figure (Bell, 1970; Marvin & Britner, 1999). The infant has developed separate working models of its caregivers and itself which have been derived from patterns of interacting with caregiver, although the infant has yet to differentiate between the caregiver's goals and its own (Bowlby, 1969/1982). Behaviours are activated by specific stimuli and events (Bell, 1970; Marvin & Britner, 1999). During this stage, the child's communication skills are developing. The child is also developing wariness of unknown individuals and to novelty. When confronted with the unknown, they will seek proximity with the caregiver (Ainsworth et al., 1978).
Stage 4 Toddler and pre-school years	In the fourth stage between 2 and 3 years of age, the child is able to understand other individual's feelings and behaviours. A more complex plan in achieving set goals develops as communication skills increase. For example, the child begins to think about its behaviour and can inhibit its behaviour while it grasps the internal

	<p>working model of situation. This cessation in behaviour allows enough time for the child to introduce the caregiver's goal into the child's behaviour plan. Therefore the infant and caregiver are starting to develop a shared set goal Further development in the pre-school years (3-4 years old) sees the child learning to inhibit its behaviour and to enact goal-correcting behaviours in response to the caregiver. The more the child inhibits behaviour and actively inserts a caregiver's goal into its own action plan, the more their interactions become predictable (Bowlby, 1969).</p>
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## APPENDIX B

### THE ADULT ATTACHMENT INTERVIEW

Main, Goldwyn & Hesse, 2002

#### *QUESTIONS*

1. I'm going to be interviewing you about your childhood experiences and how they may affect your adult life. So, I'd like to ask you about your really relationship with your family and we'll focus mainly on your childhood but later on your adolescence and then to what's going on now. The interview often takes about an hour. Could you start by helping me get orientated to your early family situation and where you lived and so on? If you could tell me where you were born, whether you moved around much, what your family did at various times for a living?
2. I'd like you to try to describe your relationship with your parents as a child. If you could start back from as far as you can remember.
3. Now I'd like to ask you to choose five adjectives or words that reflect your relationship with your mother starting from as far back as you can remember in early childhood-say 5-10 is fine.
4. Now I'd like to ask you to choose five adjectives or words that reflect your relationship with your father starting from as far back as you can remember in early childhood-say 5-10 is fine.
5. Now I wonder if you could tell me to which parent did you feel the closest and why?
6. When you were upset as a child what did you do? When you were upset emotionally when you were little, what would you do?
7. What was the first time you remember being separated from your parents?
8. Did you ever feel rejected as a young child? Of course, looking back on it now, you may realise it wasn't really rejection, but what I'm trying to ask about here is whether you remember ever having FELT rejected in childhood?  
How old were you when you first felt this way, and what did you do?  
Why do you think your parent did those things – do you think he/she realized that he or she was rejecting you?  
Did you ever feel pushed away or ignored?  
Were you ever frightened or worried as a child?
9. Were your parents ever threatening with you in any way – maybe for discipline, or even jokingly?  
Some people have told us for example that their parents would threaten to leave them or send them away from home?

Some people have told us that their parents would use the silent treatment – did this ever happen with your parents?

10. Some people of memories of threats or of some kind of behaviour that was abusive – did anything like this ever happen to you or in your family?

How old were you at the time? Did it happen frequently?

Do you feel this experience affects you now as an adult?

Does it influence your approach to your own child?

Did you have any such experiences involving people outside your family?

11. In general, how do you think your overall experiences with your parents have affected your adult personality?

Are there any aspects to your early experiences that you feel were a set-back in your development?

Are there any other aspects of our early experiences that you think might have held your development back or had a negative effect on the way you turned out?

12. Why do you think your parents behaved as they did during your childhood?

13. Were there any other adults with whom you were close, like parents as a child? Or any other adults who were especially important to you, even though not parental?

14. Did you experience the loss of a parent or other close loved one while you were a young child - - for example, a sibling or a close family member?

Could you tell me about the circumstances, and how old you were at the time?

How did you respond at the time?

Was this death sudden or was it expected?

Can you recall your feeling at that time?

Have your feelings regarding this death changed much over time?

Did you attend the funeral and what was this like for you?

What would you say was the effect on your (other parent) and on your household and how did this change over the years?

Would you say this loss had had an effect on your adult personality?

How do you think it affects your approach to your own child?

15. Did you lose any other important persons during your childhood?

Have you lost other close persons in adult years?

16. Other than any difficult experiences you've already described, have you had any other experiences which you would regard as potentially traumatic? I mean any experience which was overwhelming and immediately terrifying?

17. Now I'd like to ask you a few more questions about your relationship with your parents. Were there any changes in your relationship with your parents (or the remaining parent) after childhood? I mean changes occurring roughly between your childhood and your adulthood?

18. I would now like to move to a different sort of question. It's not about your relationship with your parents, instead it's about an aspect of our current relationship with your child, or partner or even your dog. How do you respond now in terms of feelings when you separate from your child or children?



Do you ever worry about them?

(if childless)- I'd like you to imagine that you have a one year old child, and I wonder how you think you might respond, in terms of feelings if you had to separate from this child? Do you think you would ever feel worried about this child?

19. If you had 3 wishes for your child twenty years from now, what would they be? I'm thinking partly of the kind of future you would like to see for your child. I'll give you a minute or two to think about this one.

(if childless) imagine you had a child...for a minute.

20. Is there any particular thing which you feel you learned above all from your own childhood experiences? I'm thinking here of something you feel you might have gained from the kind of childhood you had?

We've been focussing a lot on the past in this interview, but I'd like to end up by looking quite a way into the future. We've just talked about what you think you may have learned from your own childhood experiences. I'd like to end by asking you what you would hope that your child (or your imagined child) might have learned from his/her experiences of being parented by you?

## APPENDIX C

### ADULT ATTACHMENT INTERVIEW AND STRANGE SITUATION TEST CORRESPONDING CATEGORIES

*Four major adult classifications from the AAI and corresponding infant classifications from the Strange Situation with descriptions (George & Solomon, 1999; Main, Goldwyn & Hesse 2002, pp. 7-9)*

Infant Category	Description	Mother Category	Description	
Secure (B)		Secure/Autonomous (F)		George et al 1999.
B1	Positive interaction across distance replaces proximity-seeking. Little or no distress but delight when parent returns	F1	Some setting aside or lack of attachment to attachment, rather than focussing on poor parenting	Mothers realistic about threats, positive in assessment of relationship with child, lack defensive processing in caregiving, able to clearly separate their own needs from the child's.
B2	Avoids on first reunion, seeks proximity on second	F2	Some avoidance of attachment, some lack of memory or idealisation but overall valuing of attachment	
B3	Very secure with no resistance or avoidance on reunion	F3,	Very or prototypically secure. High coherence, no idealisation, no preoccupation even when experiences are negative.	
		F5	Somewhat resentful, with mild preoccupation although moderately coherent. Anger is contained or accompanied by humour.	
B4	Exaggerated concern with maintaining proximity, stay close to parent	F4	Slightly preoccupied, either sentimentally involved with largely supportive parents, or difficult or traumatic experiences.	
Avoidant (A)		Dismissing (Ds)		
A1	Highly Avoidant, no distress shown when parent departs and no reaction upon reunion.	Ds1,	Dismissing of attachment, idealising of parent with no supporting statements, Self and experiences portrayed as normal, often memory block occurs.	Mothers reveal representations of rejection in their own childhood, adopt distancing caregiving strategies (i.e. many extracurricular activities for child). Mothers assess themselves and children as unworthy, devalue child's need for security, and are generally negative and defensive about their interactions.
A2	Moderately avoidant, some distress when alone but not distressed with stranger, and may show some anger when approached by parent	Ds2 Ds3	Uninvolved and cool devaluing of at least one attachment relationship and emphasis on own strength. Restricted feeling, with direct evidence of rejection, neglect or role reversing. Expressions of hurt are absent although resentment is expressed. Some idealisation. Self as normal.	
A1 or A2		Ds4 (rare)	Fearful regarding future loss (death) of child, without cause.	
Resistant/Ambiv. (C)		Preoccupied (E)		
C1	Angry, seeks proximity upon reunion but vacillates between reunion and rejection	E2	Passive, ill defined experiences of childhood. Speech is confusing, vague or child-like. Indications of anger but primarily confusing, rambling discourse.	Mothers reveal preoccupying anger in discussing relationships. They are inconsistent or uncertain about their caregiving, describing a need to keep children close while at the same time seeming insensitive to the child's cues - an inability to organise their caregiving decision making processes.
C2	Passive. Highly distressed on separation, weak crying rather than active reunion behaviours, slight or absent exploration	E1	Angry, one or both parents portrayed as responsible for current problems. Long passages describing parental behaviour.	
C1 or C2		E3 (rare)	Overwhelmed or fearfully preoccupied, with fearful or traumatic past events (flooded with traumatic memories).	
Disorganised/Disorientated	Conflict behaviours, approaching and freezing or moving away from parent to wall as though fearful. D is also scored with the best fitting A,B or C category	Unresolved/disorganised (U/d)	Lapses in monitoring or reasoning when discussing loss or trauma. U/D is also scored with the best fitting Ds. E or F category.	Mothers' lack of control, inadequacy and helplessness. They view caregiving role as secondary to own needs. Children lack self-control and mother unable to control them

## APPENDIX D

*Summary table comparing of techniques employed in Strange Situation Tests using dogs.*

Study	Aim	Strange situation Stages	Analysis and Results	Comments
(Fallani et al., 2006)	Assess affectional bond between groups of dogs: guide dogs (n=25), puppy walker dogs, dog (n=34) trainers (n=26) and pet dogs(n=24). Labradors only	1. Owner and dog explore room 2. Stranger enters 3. Owner leaves room, stranger plays with dog 4. Owner returns and stranger exits 5. Owner exists. Dog is alone 6. Stranger returns 7. Owner returns, stranger leaves	Behavioural analysis using point sampling. Factor analysis of behaviours: three dimensions of dogs behaviour: proximity seeking, playfulness and fearfulness. Pet dogs displayed more fear than assistance dogs.	1. Order effects: two of the 7 situations were repetitive leaving to potential confounding order effects. 2.No preliminary questionnaire to identify differences between individuals (rearing practices, socialisation). 3. Factor analysis into groups "playfulness" and "proximity seeking" based on either a relaxed or anxious response does not accurately assess motivation behind the behaviours. i.e. "staring at the puppet/toy" was taken to mean "fear" which may not be an accurate description of the ethological interpretation of staring (i.e. "staring could be giving eye to a prey species during the hunt"). 4. Female stranger.
(Fallani et al., 2007)	Labradors and Golden Retrievers. Assessment of behavioural and physiological reactions to different groups of dogs in the strange situation: pet dogs and guide dogs strange situation N = 57 pairs	1. Owner and dog explore room 2. Stranger enters 3. Owner leaves room, stranger plays with dog 4. Owner returns and stranger exits 5. Owner exists. Dog is alone 6. Stranger returns 7. Owner returns, stranger leaves	Behaviourally controlled reaction although increased cardiac activity. Guide dogs revealed higher heart rates but less behavioural reaction to stress in the strange situation.	1. Order effects as above. 2. Female stranger
(Prato-Previde et al., 2003)	Dog-human relationship is an attachment.  N = 38 pairs	1. Owner and dog In test room alone 2. Owner dog and stranger 3.Stranger and dog 4. Owner and dog 5.Dog alone 6. Stranger returns 7. Owner returns and stranger leaves. Owner leaves scarf on floor. Owner leaves dog alone	Dog/owner relationship showed behavioural evidence of an affectional bond, but not an attachment.	1.Order-effect as above 2. No preliminary assessment of behaviour 3. Female stranger

Study	Aim	Strange situation Stages	Analysis and Results	Comments
(Topal et al., 1998)	To demonstrate adult dogs' attachment behaviours to human owners using ethological evaluation of the Strange Situation. N = 51 pairs	1. Owner and dog enter experimental room and researcher leaves 2. Owner and dog 3. Stranger enters, owner leaves 4. Stranger and dog. 5. Owner returns, stranger leaves. 6. Dog alone 7. Stranger returns. 8. Owner returns and stranger leaves	Dogs played more and explored more in presence of owners. Individual differences between groups noted: insecure and secure groups with varying levels of attachment ratings.	1. Order effects 2. Limited behavioural description of secure base behaviour 3. Female stranger 4. Preference of owner over stranger
(Topal et al., 2005)	Comparison of attachment behaviour toward human caregivers between puppies( n = 11)and hand-reared wolves (n=13)	1. Owner and dog/wolf 2. Owner, stranger and dog/wolf 3. Stranger and dog/wolf 4. Owner returns 5. Dog/wolf alone in room 6. Stranger and dog/wolf 7. Owner returns, stranger leaves	Proximity seeking (person specific) and contact seeking upon reunion between puppies and owners but not wolves and owners.	1. Order effects 2. Comparing between groups although early environments (i.e. wolves raised in compound) and dogs raised with owners would confound results. 3. Females stranger
(Palmer et al., 2007)	Determine secure base effects in counterbalanced SST using pet dogs. N = 38	Group 1: 1. Owner and dog 2. Owner dog and stranger 3. Stranger and dog 4. Dog 5. Owner and dog 6. Stranger and dog  Group 2 1. Stranger and dog 2. Owner dog and stranger 3. Owner and dog 4. Dog 5. Stranger and dog 6. Owner and dog	Well socialised dogs were less wary of stranger , although this did not extend to play with the stranger. Dogs orientated to the door until the owner returned, concluding that dogs showed displayed attachment behaviours: less independent play and, exploration behaviours and calm/relaxed behaviours in the absence of owners.	Counterbalancing of two components: 1. addresses order effects (order of presentation of stranger) 2. Addresses exploratory behaviour by revealing a new room during the experiment to encourage more exploration and reduce habituation. 3. Questionnaire well defined early environment 4. However, female stranger
(Marinelli, Adamelli, Normando, & Bono, 2007)	Determine associations between owner characteristics and dog characteristics and the Quality of Life of pet dogs N = 104	1. Owner and dog 2. Owner, stranger and dog 3. Stranger and dog 4. Owner returns 5. Dog alone in room 6. Stranger and dog 7. Owner returns, stranger leaves	High QoL positively correlated with high emotional bonds of the owner.	1. No control for order effects. 2. Scale used to measure attachment/bonding were not critically assessed for validity.



## APPENDIX E

*Advertisement for study participants  
Southampton Echo, May 2007*

visit [dailyecho.co.uk](http://dailyecho.co.uk) 7

### Are dogs man's best friend?

DOG lovers are being asked to take part in a university study into the bond between canines and their owners.

The University of Southampton is investigating the relationship between a man and his dog to discover whether nature or nurture has a greater part to play in a pet's behaviour.

Researcher Jill White, who is writing her PhD thesis on the subject, said: "We know that dogs are very much part of their human family, with owners often considering them surrogate children. We really want to know to what degree dogs are thought of as children in terms of the owner's relationship with the dog and if this is related to the dog's behaviour.

"We're predicting that in some cases the relationship owners have with dogs is a better indicator of dog behaviour than breed, which has always thought to be the case."

Participants must fill out a short questionnaire online and take part in a filmed one-hour laboratory session with their pet at the University's Animal Behaviour Clinic, Chamberlain Avenue from June 6 to 16 (evening and weekend appointments available) and again in September and November 2008.

Dogs must be over 18 months old, have no history of aggression towards people, and the owner must be the primary caregiver for the dog.

All participants will receive gift bags from JamesWellbeloved Pet Foods.

■ To take part contact Jill by e-mailing her at [jill.white@soton.ac.uk](mailto:jill.white@soton.ac.uk).



## APPENDIX F

### *SCRIPT FOR STRANGE SITUATION PROCEDURE*

(this occurs after signing the Statement of Consent)

Please turn off your mobile phone.

Let me describe the procedure for this part of the study.

#### Orders A and C

In the first instance you will enter the experimental room, take off the dog's lead and sit in the chair labelled "owner". When you let your dog off the lead, please put it on the table next to you, out of the dog's reach. You will interact normally with your dog, for example, if it solicits your attention, you would respond as you would normally. If it asks to play, you will again respond as you would normally. I would ask you NOT to initiate behaviour however. Your behaviour will be in response to your dog's request.

A stranger will enter the room after 3 minutes. I will use the intercom to signal for the stranger to start playing with the dog by saying "1". When I say "2" on the intercom, you will leave the room and come out here with me again, without saying anything to the dog other than "stay". I will tell you when to enter the room again.

When you enter the room again, you will follow the previous instructions: do not initiate behaviour but respond to your dog as you would normally.

When you hear the number "5" will again exit the room and sit here with me. I will tell you when to enter the room again.

I will enter the room when the experiment is over.

Now I need to give you this cloth scarf to put around your neck in order for your scent to permeate. You will leave it on the floor when you leave the room for the second time. As you will be here with me before you enter the second time, I will remind you to leave the cloth.

#### Order B and D

In the first instance you will enter the experimental room with your dog, take off the dog's lead and simply exit the room, returning here with me. When you let your dog off the lead, please bring it back out here with you. The "stranger will then enter the room. After 3 minutes, I will tell you when to re-enter the room. When you re-enter the room, greet your dog AS YOU WOULD NORMALLY when you enter a room, after being separated from the dog for a short period (i.e. to go to a local shop only). You will sit in the chair labelled "owner". You will interact normally with your dog, for example, if it solicits your attention, you would respond as you would normally. If it asks to play, you will again respond as you would normally. I would ask you NOT to initiate behaviour however. Your behaviour will be in response to your dog's request.

A stranger will enter the room after 3 minutes. I will use the intercom to signal for the

stranger to start playing with the dog by saying “1”. When I say “4” on the intercom, you will leave the room and come out here with me again, without saying anything to the dog other than “stay”. I will tell you when to enter the room again.

When you enter the room again, you will follow the previous instructions: do not initiate behaviour but respond to you as you would normally.

When you hear the number “6” will again exit the room and sit here with me. I will tell you when to enter the room again.

I will enter the room when the experiment is over.

Now I need to give you this cloth scarf to put around your neck in order for your scent to permeate. You will leave it on the floor when you leave the room for the second time. As you will be here with me before you enter the second time, I will remind you to leave the cloth.



## APPENDIX G

### *Consent Form for Research Participants*

#### **Information sheet**

I am Jill White a PhD researcher at the University of Southampton, School of Psychology. I am requesting your participation in a study investigating dog owner's relationships with their dogs. This study is comprised of three individual tasks, in which all participants complete: an on-line survey (20 minutes in length) completed prior to the other tasks in the owner's home or place of work; a 30 minute filming session with you and your dog; and a 30 minute interview of the dog owner in which they will be asked to talk about their experience of dog ownership. Personal information will not be released to or viewed by anyone other than researchers involved in this project. Results of this study will not include your name or any other identifying characteristics.

Your participation is voluntary and you may withdraw your participation at any time. If you have any questions please ask them now, or contact me Jill White at

[jill.white@soton.ac.uk](mailto:jill.white@soton.ac.uk)

Signature

Date

Jill White

---

#### **Statement of Consent**

I \_\_\_\_\_ have read the above informed consent form.

*[participants name]*

I understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. I understand that data collected as part of this research project will be treated confidentially, and that published results of this research project will maintain my confidentiality. In signing this consent letter, I am not waiving my legal claims, rights, or remedies. A copy of this consent letter will be offered to me.

#### **(Circle Yes or No)**

I give consent to participate in the above study. Yes No

Yes No

I give consent to be videotaped and audiotaped Yes No

I understand that these videotapes and audiotapes will be destroyed after analysis

Yes No

Signature

Date

Name *[participants name]*

I understand that if I have questions about my rights as a participant in this research, or if I feel that I have been placed at risk, I can contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ.  
Phone: (023) 8059 3995.

## APPENDIX G

### Debriefing Statement

The aim of this research was to identify an association between your dog's behaviour and the type of care style you employ as a dog owner. It is expected that dog owner caregiving style will fall into three or four categories which will correlate with similar behaviours their dogs displayed when filmed. Your data will help our understanding of the human/companion animal bond, specifically in regards to identifying caregiving that promotes a strong bond between owner and dog, and conversely caregiving that leads to a higher incidence of dog behaviour problems. Once again results of this study will not include your name or any other identifying characteristics. The research study did not use deception of any kind. You may have a copy of this summary if you wish as well as a copy of the research findings once the project is completed.

If you have any further questions please contact me Jill White at [jill.white@soton.ac.uk](mailto:jill.white@soton.ac.uk).

Thank you for your participation in this research.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name \_\_\_\_\_

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ.  
Phone: (023) 8059 3995.

## **APPENDIX H**

### **DOG OWNERS SURVEY**

**(available on-line at [www.psychosurvey.soton.ac.uk](http://www.psychosurvey.soton.ac.uk))**

#### **Information Sheet – Informed Consent Form**

#### **‘People, Family life and Pets’**

##### **Research Outline**

I am Jill White, a research student at the School of Psychology, University of Southampton. I am requesting your participation in a study that aims to explore pet owners’ family relationships and their feelings about their dog’s behaviour (i.e. how you felt about your dog if it behaves badly). This will involve your response to the following questionnaire, which will take approximately 30 minutes to complete. Personal information will not be requested therefore the results of this study will not include your name or any other identifying characteristics. This means that you will be anonymous and unrecognisable to other people.

##### **Use of findings**

The study is being conducted as part of the work towards a PhD in Psychology in the School of Psychology, University of Southampton, which is looking at the human-pet bond. The results of the study will be written up as part of a doctoral thesis. The findings of the study may also be presented at conferences and may be submitted for publication in academic journals. You will not be identifiable in any reports or publications that may result from the study.

This study has received approval by the Ethics Committee of the University of Southampton (approval reference: PG/04/56).

##### **Further questions and information**

If you have any questions or would like further information about this research, please feel free to contact me, Jill White at [jill.white@soton.ac.uk](mailto:jill.white@soton.ac.uk).

This research is supervised by Dr. Anne McBride (Senior Lecturer, Animal Behaviour) and Dr. Ed Redhead (Behaviour Analysis) at the School of Psychology, University of Southampton. This research is supported by a grant from the Economic and Social Research Council (ESRC).

**By checking this box, you give your approval to proceed with the survey.**



**Please turn to the next page.**

## SCORED QUESTIONNAIRE

### **Section A- General Information (Please tick the appropriate response)**

1. Country of Residence: \_\_\_\_\_

2. Your gender      Female      Male

3. Your age

4. What is your marital status?

1. Single (not currently in a relationship)
2. Cohabiting
3. Married/Civil Partnership
4. Separated (not currently in a relationship)
5. Divorced (not currently in a relationship)
6. Widowed (not currently in a relationship)

5. What sort of area do you live in:

Rural    1                      Village    2                      Town    3                      City    4

6. How many people are in your household and how old are they? (Please include yourself)\_\_\_\_\_ (total in household)

	Number	
	Female	Male
5.Adults (over 65 years old)		
7.Adults (18 yrs- 64)		
8.Young adults (13-17)		
9.Children (6-12)		
10.Children (younger than 6)		

6a: Are you a parent? If you have indicated if your children were

1. your biological children
2. adopted
3. step children (partner's children)

7. What is your highest level of education attained? Grade school

1. Some O levels (some high school)

2. Some A or AS levels (High School diploma)
3. NVQ (technical or community college) diploma
4. Some university
5. University degree
6. Post-graduate degree

8. What is your occupation? (please check one or more of the following):

1. I do not work
2. Full time student
3. Study part time/work part time
4. Manual unskilled labour
5. Manual skilled labour
6. Teaching profession
7. Scientific or technical
8. Sales or marketing
9. Administration
10. Managerial
11. Company Director
12. Company owner/manager
13. Retired
14. Other

9. Number of hours you are in employment per week

- |                    |                             |             |
|--------------------|-----------------------------|-------------|
| Over 40 hours      | 30-39 hours                 | 20-29 hours |
| Less than 10 hours | I do/ not work outside home |             |

10. Are you a:

1. Veterinarian
2. Veterinary nurse/technician
3. Animal Scientist
4. Animal welfare/rescue worker
5. Dog Trainer
6. Dog behaviourist
7. None of the above

11. Do you work from home? (please circle)

- |     |   |    |   |           |   |
|-----|---|----|---|-----------|---|
| Yes | 1 | No | 2 | Sometimes | 3 |
|-----|---|----|---|-----------|---|

12. If yes, how many hours per week is spent working from home? \_\_\_\_\_ hours

13. Your income bracket (per annum) (please tick):

1. £ under £10,000 (up to \$20k)
2. £10,000-£20,000 (\$20 to \$40k)
3. £20,000-30,000 (\$40 to \$60k)
4. £30,000- £40,000 (\$60-\$80k)
5. over £40,000 (over \$80k per annum)

14. Please indicate the currency of the above question regarding annual income:

\_\_\_\_\_

## **Section 2: Your Relationships**

15. This section asks concern how you feel in romantic relationships. We are interested in how you generally experience relationships, not just in what is happening in your current romantic relationships. If you are not currently in a relationship, these statements will reflect your experience in general of romantic relationships. Respond to each statement by indicating how much you agree or disagree with it. Please check the box that most closely reflects your experience using the following scale:

Disagree Strongly      Neutral/Mixed      Agree Strongly.  
1      2      3      4      5      6      7

<b>In romantic relationships:</b>	<b>Disagree Strongly 1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>Agree Strongly 7</b>
1. I prefer not to show a partner how I feel deep down.	1	2	3	4	5	6	7
2. I worry about being abandoned.	1	2	3	4	5	6	7
3. I am very comfortable being close to romantic partners.	7	6	5	4	3	2	1
4. I worry a lot about my relationships.	1	2	3	4	5	6	7
5. Just when my partner starts to get close to me I find myself pulling away.	1	2	3	4	5	6	7
6. I worry that romantic partners won't care about me as much as I care about them.	1	2	3	4	5	6	7
7. I get uncomfortable when a romantic partner wants to be very close.	1	2	3	4	5	6	7
8. I worry a fair amount about losing my partner.	1	2	3	4	5	6	7
9. I don't feel comfortable opening up to romantic partners.	1	2	3	4	5	6	7
10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.	1	2	3	4	5	6	7
11. I want to get close to my partner, but I keep pulling back.	1	2	3	4	5	6	7
12. I often want to merge completely with romantic partners and this sometimes scares them away.	1	2	3	4	5	6	7
13. I am nervous when partners get too close to me.	1	2	3	4	5	6	7
14. I worry about being alone.	1	2	3	4	5	6	7
15. I feel comfortable sharing my private thoughts and feelings with my partner.	7	6	5	4	3	2	1
16. My desire to be very close sometimes scares people away.	1	2	3	4	5	6	7
17. I try to avoid getting too close to my partner.	1	2	3	4	5	6	7
18. I need a lot of reassurance that I am loved by my partner.	1	2	3	4	5	6	7
19. I find it relatively easy to get close to my partner.	7	6	5	4	3	2	1
20. Sometimes I feel that I force my partners to show more feelings, more commitment.	1	2	3	4	5	6	7
21. I find it difficult to allow myself to depend on romantic partners.	1	2	3	4	5	6	7
22. I do not often worry about being abandoned.	1	2	3	4	5	6	7
23. I prefer not to be too close to romantic partners.	1	2	3	4	5	6	7
24. If I can't get my partner to show interest in me, I get upset or angry.	1	2	3	4	5	6	7
25. I tell my partner everything.	7	6	5	4	3	2	1
26. I find that my partner (s) don't want to get as close as I would like.	1	2	3	4	5	6	7

27. I usually discuss my problems and concerns with my partner.	7	6	5	4	3	2	1
28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.	1	2	3	4	5	6	7
29. I feel comfortable depending on romantic partners.	7	6	5	4	3	2	1
30. I get frustrated when my partner is not around as much as I would like.	1	2	3	4	5	6	7
31. I don't mind asking romantic partners for comfort, advice or help.	7	6	5	4	3	2	1
32. I get frustrated if romantic partners are not available when I need them.	1	2	3	4	5	6	7
33. It helps to turn to my romantic partner in times of need.	7	6	5	4	3	2	1
34. When romantic partners disapprove of me, I feel really bad about myself.	1	2	3	4	5	6	7
35. I turn to my partner for many things, including comfort and reassurance.	7	6	5	4	3	2	1
36. I resent it when my partner spends time away from me.	1	2	3	4	5	6	7

Scoring instructions (from Brennan, Clark & Shaver, 1998, pp.71-72.)

- Reverse scores as per table above.
- Compute scores for Avoidance and Anxiety dimensions:  
Avoidance = mean.14 (1, 2, 5, 7, 9, 11,13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35)  
Anxiety – mean .14(2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36)
- compute Attachment style categories  
Secure = Avoidance x 3.2893296 + Anxiety x 5.4725318 – 11.5307833  
Fear = Avoidance x 7.2371075 + Anxiety x 8.1776446 – 32.3553266  
Preocc= Avoidance x 3.9246754 + Anxiety x 9.7102446 – 28.4573220  
Dismiss= Avoidance x 7.3654621 + Anxiety x 4.9392039 – 22.2281088
- If (sec > max (fear,pre,dis)) Attach = 1  
If (fear > max (sec, pre, dis)) Attach = 2  
If (pre > max (sec, fear, dis)) Attach = 3  
If (dis> max (sec, fear, pre )) Attach = 4
- Value labels:  
Attach 1=Secure, Attach 2 = Fearful, Attach 3 = Preoccupied, Attach 4 = Dismissive



### 16. Approach to Caregiving in Romantic Relationships

This section asks concern how you approach caregiving in your romantic relationships. We are interested in how you generally provide care and support in relationships, not just in what is happening in your current romantic relationships. If you are not currently in a relationship, these statements will reflect your experience in general of romantic relationships. Respond to each statement by indicating how much you agree or disagree with it. Please check the box that most closely reflects your experience using the following scale:

Disagree Strongly   Neutral/Mixed   Agree Strongly.

1      2      3      4      5      6

### Scoring:

P/D: Proximity versus Distance

S/I: Sensitivity versus Insensitivity

C/C: Cooperation versus Control

Comp: Compulsive Caregiving

Scale Items:	Scale	1	2	3	4	5	6
1. When my partner seems to want or need a hug, I'm glad to provide it	P/D	1	2	3	4	5	6
2. When helping my partner solve a problem, I am more cooperative than controlling	C/C	1	2	3	4	5	6
3. I frequently get too wrapped up in my partner's problems and needs.	Comp	1	2	3	4	5	6
4. I tend to be too domineering when trying to help my partner.	C/C	1	2	3	4	5	6
5. I'm not very good at "tuning in" to my partner's needs and feelings.	S/I	1	2	3	4	5	6
6. I don't like it when my partner is needy and clings to me.	P/D	1	2	3	4	5	6
7. I can always tell when my partner needs comforting, even when she doesn't ask for it.	S/I	1	2	3	4	5	6
8. When I help my partner with something, I tend to want to do things my way.	C/C	1	2	3	4	5	6
9. I am always supportive of my partner's own efforts to solve his/her problems	C/C	1	2	3	4	5	6
10. When my partner is crying or emotionally upset, I sometimes feel like withdrawing.	P/D	1	2	3	4	5	6
11. I am very attentive to my partner's nonverbal signals for help and support.	S/I	1	2	3	4	5	6
12. When my partner is troubled or upset I move closer to provide support or comfort.	P/D	1	2	3	4	5	6
13. When my partner tells me about a problem, I sometimes go too far in criticising his/her own attempts to deal with it.	C/C	1	2	3	4	5	6
14. I tend to get over-involved in my partner's problems and difficulties.	Comp	1	2	3	4	5	6
15. I sometimes push my partner away when s/he reaches out for a needed hug or kiss.	P/D	1	2	3	4	5	6
16. I can easily keep myself from becoming overly concerned about or overly protective of my partner.	Comp	1	2	3	4	5	6
17. I sometimes miss the subtle signs that show how my partner is feeling.	S/I	1	2	3	4	5	6
18. When necessary, I can say no to my partner's	Comp	1	2	3	4	5	6

requests for help without feeling guilty.							
19. I can help my partner work out his/her problems without taking control.	C/C	1	2	3	4	5	6
20. When my partner cries or is distressed, my first impulse is to hold or touch him/her	P/D	1	2	3	4	5	6
21. I often end up telling my partner what to do when s/he is trying to make a decision.	C/C	1	2	3	4	5	6
22. I'm very good at recognising my partner's needs and feelings, even when they're different from my own.	S/I	1	2	3	4	5	6
23. I tend to take on my partner's problems and then feel burdened by them.	Comp	1	2	3	4	5	6
24. I sometimes draw away from my partner's attempts to get a reassuring hug from me.	P/D	1	2	3	4	5	6
25. I'm good at knowing when my partner needs my help or support and when s/he would rather handle things alone.	S/I	1	2	3	4	5	6
26. I help my partner without becoming over-involved in his/her problems.	Comp	1	2	3	4	5	6
27. When it's important, I take care of my own needs before I try to take care of my partners.	Comp	1	2	3	4	5	6
28. I always respect my partner's ability to make his/her own decisions and solve his/her own problems	C/C	1	2	3	4	5	6
29. I feel comfortable holding my partner when s/he needs physical signs of support and reassurance.	P/D	1	2	3	4	5	6
30. Too often I don't realise when my partner is upset or worried about something.	S/I	1	2	3	4	5	6
31. I create problems by taking on my partner's troubles as if they were my own.	Comp	1	2	3	4	5	6
32. I sometimes miss or misread my partner's signals for help and understanding.	S/I	1	2	3	4	5	6

### **Section 3: Pet Ownership**

17. Are you CURRENTLY a Pet Owner: yes \_\_\_1\_\_\_ no \_\_\_2\_\_\_

If you have indicated No above (you do not currently own a pet), please turn to the last page of this questionnaire. Thank you.

18. If you are currently a pet owner, please indicate what type of pet you currently own:

<b><u>Check if owned</u></b>	<b><u>number</u></b>
18.a Dogs	___
18.b Cats	___
18.c Rabbits	___
18.d Horses	___
18.e Birds	___
18.e. Other	___

If you are a **CURRENT DOG OWNER**, please continue with the rest of this questionnaire. All other pets owners (non-dog owners), please turn to the **last page** of this questionnaire. Thank you.

19. Number of dogs owned: \_\_\_\_\_

20. Please describe the first dog your currently own:

Name: \_\_\_\_\_

Age: (years): \_\_\_\_\_

Breed (including cross-breeds): \_\_\_\_\_

Gender (M/F): \_\_\_\_\_

Neutered or spayed (Y/N) \_\_\_\_\_

21. Please describe your second dog (leave blank if not applicable)

Name: \_\_\_\_\_

Age: (years): \_\_\_\_\_

Breed (including cross-breeds): \_\_\_\_\_

Gender (M/F): \_\_\_\_\_

Neutered or spayed (Y/N) \_\_\_\_\_

22. Please describe your third dog (leave blank if not applicable)

Name: \_\_\_\_\_

Age: (years): \_\_\_\_\_

Breed (including cross-breeds): \_\_\_\_\_

Gender (M/F): \_\_\_\_\_

Neutered or spayed (Y/N) \_\_\_\_\_

23. Please describe your fourth dog (leave blank if not applicable):

Name: \_\_\_\_\_

Age: (years): \_\_\_\_\_

Breed (including cross-breeds): \_\_\_\_\_

Gender (M/F): \_\_\_\_\_

Neutered or spayed (Y/N) \_\_\_\_\_

#### **SECTION 4 Your Dog's Characteristics**

**The rest of this questionnaire only relates to the 1<sup>st</sup> dog in your list above.**

**24 Dog's Name:** \_\_\_\_\_

25. How old was this dog when you obtained it: \_\_\_\_\_ years \_\_\_\_\_ months

26. How many owners did this dog have before you obtained it:

1. None, I bred it
2. I obtained it from the breeder
3. One previous owner (not the breeder)
4. Two previous owners
5. More than three previous owners

6. Unknown

27. Why did you get this dog? (Please tick all that apply)

1. As a pet for your children

2. As your personal pet
3. Breeding
4. For Showing
5. Agility
6. Obedience
7. Welfare reasons
8. Working requirements:
9. Other(please describe): \_\_\_\_\_

28. Where did you obtain this dog?

1. Official breeder
2. private breeder
3. pet shop
4. Friends or relatives
5. rescue
6. rehomed by unknown individuals (i.e. advert in paper)
7. other

29. Your main residence:

1. farm
2. house
3. bungalow
4. Flat/maisonette/apartment/condominium
5. mobile home ☐

30. Does this dog have access to a garden?

Yes 1

No 2

31. Please indicate the amount of time this dog spends alone during the day:

Hours per day: \_\_\_\_\_

33. Did this dog have any traumatic early experiences (under the age of 1 year)?

	Yes	No
1. More than two homes	1	0
2. Death/abandonment by previous owner	1	0
3. Divorce of owners	1	0

4. Children of owners leaving home	1	0
5. Moving communities/towns/countries	1	0
6. Accident requiring stay at veterinary clinic	1	0
7. Attack from another dog requiring veterinary care	1	0
8. Boarding in a commercial kennel	1	0

for more than 2 weeks

34. Please provide details if you have checked "yes" to any of the above:

35. Did your dog have any other traumatic experiences not mentioned above? (please describe):

36. Please indicate if you have taken your dog to the following training classes (check all that apply).

1. puppy school
2. follow-on training after puppy school
3. general obedience
4. specialised obedience (i.e. police dog training)
5. agility or fly-ball
- 6 other: please describe: \_\_\_\_\_

## **Section 5 Your dog's behaviour**

### **37. Dog Caregiving Scale**

The following questions asks you about the way that you care for your pet, and your attitudes about dog ownerships in relationship to the FIRST DOG ON YOUR LIST. (i.e. the dog participating in the rest of the study). Please answer on a scale of 1 (not at all like me) to 5 (exactly like me) the degree to which the statement matches your opinion.

Scale of 1-5

1. "not at all like me"
2. "a bit like me"
3. "not like me nor unlike me"
4. "very much like me"
- 5 "exactly like me"

**Scoring categories: Lax, O/R(Over-reactive), Der (Derogative), F/F ( Firm but Fair), Aff (Affectionate)**

Scale Items:	Scale	1	2	3	4	5
I will take my dog to the vet even if I think the injury is minor. <sup>1</sup>	O/R	1	2	3	4	5
If my dog has rolled in something, I will lock it away until I can bathe it. <sup>1</sup>	Der	1	2	3	4	5
If my dog soils in the house, I often point it out to so he/she learns it is wrong. <sup>2</sup>	Der	1	2	3	4	5
Sometimes I abdicate responsibility for my dog to my partner/parent/friend etc. <sup>1</sup>	Der	1	2	3	4	5
I think owning a dog is too much work.	Der	1	2	3	4	5
I am annoyed by my dogs barking. <sup>1</sup>	Der	1	2	3	4	5
I am anxious when walking my dog. <sup>1</sup>	O/R	1	2	3	4	5
I sometimes think I worry too much about my dog. <sup>1</sup>	O/R	1	2	3	4	5
When my dog disappears on walks, I panic. <sup>1</sup>	O/R	1	2	3	4	5
I get so frustrated and angry at my dogs behaviour. <sup>1</sup>	O/R	1	2	3	4	5
I raise my voice and yell at my dog when he/she's been bad. <sup>1</sup>	O/R	1	2	3	4	5
When I'm stressed or upset, I know I am quick to shout at my dog. <sup>1</sup>	O/R	1	2	3	4	5
I slap or use physical punishment when my dog misbehaves. <sup>1</sup>	Der	1	2	3	4	5
I sometimes overreact to my dog's behaviour and punish it more than I mean to. <sup>1</sup>	O/R	1	2	3	4	5
When my dog is bad, I want to give it away. <sup>1</sup>	Der	1	2	3	4	5
I make sure my dog knows it done the wrong thing. <sup>2</sup>	Der	1	2	3	4	5
I push my dog away when it comes to me for attention.	Der	1	2	3	4	5
I grab or handle my dog roughly.	O/R	1	2	3	4	5
I worry about this dog when I am not with him/her. <sup>1</sup>	O/R	1	2	3	4	5
I am afraid of my dog.	Der	1	2	3	4	5
My dog is a disappointment to me. <sup>1</sup>	Der	1	2	3	4	5
My dog's priorities often come before others in the household, including myself. <sup>1</sup>	Lax	1	2	3	4	5
I know I will be a wreck when my dog dies.	O/R	1	2	3	4	5
I lose my temper when my dog doesn't do something I ask it to do. <sup>1</sup>	O/R	1	2	3	4	5
I wish I didn't have the dog.	Der	1	2	3	4	5
I don't think my dog would benefit from training classes.	Lax	1	2	3	4	5
I don't buy special toys for my dog.	Der	1	2	3	4	5
I think of my dog as "top dog" in my home.	Lax	1	2	3	4	5
I let my dog sit on the sofa with me.	Lax	1	2	3	4	5
I have let my dog make the home "his/hers".	Lax	1	2	3	4	5
I think my dog has a mind of its own.	Lax	1	2	3	4	5
I can't stop my dog from doing something I don't like. <sup>1</sup>	Lax	1	2	3	4	5
When I tell my dog not to do something and he/she does it anyway, I generally don't stop him/her. <sup>1</sup>	Lax	1	2	3	4	5
If my dog misbehaves and then looks guilty, I generally ignore the behaviour . <sup>1</sup>	Lax	1	2	3	4	5
When my dog does something I don't like, I often just let it go. <sup>1</sup>	Lax	1	2	3	4	5
When we're not at home, I let my dog get away with a lot more. <sup>1</sup>	Lax	1	2	3	4	5
If saying "no" doesn't work, I offer my dog something nice so he/she stops acting up. <sup>1</sup>	Lax	1	2	3	4	5
If my dog whines for my attention, I will give in.	Lax	1	2	3	4	5
I let my dog sleep on my bed.	Lax	1	2	3	4	5
My dog has the free run of the house (follows me around the house).	Lax	1	2	3	4	5
I let my dog steal food from my plate/fork.	Lax	1	2	3	4	5
I know my dog often freely wanders the neighbourhood	Lax	1	2	3	4	5

I don't always know where my dog is.	Der	1	2	3	4	5
I know my dog looks to me for guidance. <sup>2</sup>	Aff	1	2	3	4	5
I know my dog knows its place in the pecking order at home.	F/F	1	2	3	4	5
I know my dog always knows where I am when he/she is out exploring.	Aff	1	2	3	4	5
I know my dog comes to me for reassurance when it is frightened or hurt.	Aff	1	2	3	4	5
I know my dog will cry out for me/actively look for me if it can't find me.	Aff	1	2	3	4	5
I have confidence in my dog's quick response to my commands.	F/F	1	2	3	4	5
I understand my dog.	Aff	1	2	3	4	5
I make sure my dog sleeps in its own bed.	F/F	1	2	3	4	5
When my dog misbehaves, I firmly tell it to stop. <sup>2</sup>	F/F	1	2	3	4	5
I set limits on what my dog can do and where it can go within the home. <sup>2</sup>	F/F	1	2	3	4	5
I take/have taken this dog to training classes.	Aff	1	2	3	4	5
I take/have taken this dog to agility/flyball/similar classes.	Aff	1	2	3	4	5
I greet this dog as soon as I get home.	Aff	1	2	3	4	5
I spend time training this dog.	Aff	1	2	3	4	5
I will spend my leisure time with my dog.	Aff	1	2	3	4	5
I exercise with my dog (i.e. jogging, walking).	Aff	1	2	3	4	5
I take this dog to visit friends and family.	Aff	1	2	3	4	5
I would never hit or slap my dog.	F/F	1	2	3	4	5
I try to stay calm when my dog misbehaves. <sup>2</sup>	F/F	1	2	3	4	5
I am firm with my dog by not giving in to him/her when he/she begs for attention. <sup>2</sup>	F/F	1	2	3	4	5
I use a threatening voice when my dog has been behaving badly.	F/F	1	2	3	4	5
If my dog does something I don't like I try to retrain it to more acceptable behaviour. <sup>2</sup>	F/F	1	2	3	4	5
I enjoy a cuddle with my dog.	Aff	1	2	3	4	5
My dog and I have a strong bond.	Aff	1	2	3	4	5
I organise someone to walk the dog or let it outside if I am working late.	Aff	1	2	3	4	5
Sometimes I need to restrict my dog's access to places in the home.	F/F	1	2	3	4	5

Notes:

1. Adapted from Arnold et al. (1993) Parenting Style Scale
2. Adapted from Baumrind (1971) Parental Authority Scale

### **Debriefing Statement: 'People, Family life and Pets'**

The aim of this research was to explore your relationships and how they may interact with your relationship to your dog. Your data will help our understanding of human caregiving on a dog's behaviour, which will enable behaviourists to more effectively treat dogs exhibiting problem behaviours. Once again results of this study will not include your name or any other identifying characteristics. This questionnaire did not use deception of any kind. You may have a copy of this summary if you wish once the project is completed.

If you have any further questions or would like a summary of the research please contact the researcher, Jill White at email [jill.white@soton.ac.uk](mailto:jill.white@soton.ac.uk)

This study has received approval by the Ethics Committee of the University of Southampton (approval reference: PG/04/56).

Thank you for your participation in this research.

If you have questions about your rights as a participant in this research, or if you feel that you have been placed at risk, you may contact the Chair of the Ethics Committee, Department of Psychology, University of Southampton, Southampton, SO17 1BJ.  
Phone: 011 44 (0) 23 8059 3995.



## APPENDIX I

### QUESTIONS AND SCORING RATIONALE FOR THE PET OWNERS' INTERVIEW

Question/Statement	Description:	Assessing:	Scoring
1. If you had a dog when you were growing up, or when you were first an adult, did that dog cause conflicts within your household/within your relationships?	Assessing warmth/conflict and degree of harmony within household when growing up, relationships with parents OR relationship with partner at the time of owning this prior dog	Low scores: present coherent picture of family/dog or past relationships/dog. Family would be united in difficult time. Participant provides believable details and coherent stories, in a warm and humorous manner Medium scores will indicate average levels of warmth and support from family/earlier partner. However, no examples are given of past positive or negative warmth/love High scores will present evidence of/lack of warmth and affection from previous relationships. Details reveal conflicts with parents/prior relationships, with evidence of critical, self-centred or distant behaviours among family group	1. Very warm/supportive, with evidence to support it. Prior relationships do not have to be uniformly positive but the negative events are described coherently using relevant succinct examples. There is strong evidence of early secure relationships. 3. Somewhat warm/supportive. Participant may have had some problems but overall relationships have been warm, supportive and accepting with speech consistent and relevant. 5. Neither warm or cold – details or examples are missing. May have had cold, unsupportive relationships in the past but later relationships have become warm and supportive (score 4-5) 7. Lacking in warmth. Parents or earlier relationships were mildly supportive but were primarily inconsistent. Participant is not able to provide coherent examples and wanders off topic. 9. Very lacking in warmth and support in early and prior relationships. Inability or refusal to discuss and avoidance in discussing. Divorced parents during this time score 1-3; participants divorced themselves during this time, score 1-3.
How were you able to deal with the death of this previous dog?	Assessing unresolved loss of previous pet which may be a result of unresolved human loss in the participant's personal life.	Low scores are indicative of no disorganised effects of dealing with loss. For example, the ability to talk about the death in a coherent fashion. High scores will indicate negative long-lasting effects of loss of pet. However, included in this category is experience of loss in general. If an owner discusses other (human or companion animal) loss, this would indicate unresolved bereavement and should be scored 8-9. High scores: Look for: <ul style="list-style-type: none"> <li>indications of disbelief (unresolved loss) with highly detailed descriptions of the past dog</li> <li>sudden changes of topic when past dog is mentioned</li> <li>discussion of the past dog inappropriately</li> <li>confusing accounts of the previous dog</li> <li>excessive guilt</li> <li>extreme responses at the time of this dog's death (drugs, etc)</li> </ul>	1. No direct previous losses (i.e. pet was not their's) 3. No disorganised effects-dog's death can be discussed in a coherent way, and volunteers details relating to the dog's death. 5. Unsettled and sad (perhaps crying) when discussing events, but not disorganised-they can talk about this previous dog in a coherent manner 7. Some negative effects and disorganisation in discourse-somewhat unresolved loss. Avoidance in discussing this event or change of topic. 9. Great disorganisation in discourse-unresolved loss revealed in irrelevant comments, or issues relating to unresolved human loss.

Question/Statement	Description:	Assessing:	Scoring
How happy are you with your current dog? Does your relationship with your dog bring out negative emotions or memories? Does it bring out positive emotions or memories?	Current dog ownership: assessing owners bond with the dog to determine satisfaction in current relationship. Assessment based on analysing the adjectives used.	Assessment is based on a of description of the relationship as well as adjectives used. Low scores are indicative of a secure, strong attachment of the owners to the dog and the use of positive adjectives. Caution must be exercised to determine is uniformly high scores idealise the relationship instead of objectively evaluating it. High scores will be indicative of dissatisfaction surrounding the relationship, with the use of predominately negative adjectives.	1.. Very satisfied: owner is delighted with dog, and the dog is perceived as holding a special place in the owners heart. The adjectives used are uniformly positive and positive examples of the relationship are recounted. 3. Mostly satisfied: primarily positive accounts of the relationship but there might be one or two problem areas, although owner emphasises that the relationship is still positive. Even if problems are serious, if owner can coherently and directly describe them, they should be scored 2-3. 5. Somewhat satisfied: Bpth negative and positive comments about the owners relationship with the dog are discussed with the overall assessment of it that with training/BM, the relationship could be improved. This score may be used if the owner has not thought about the relationship in this way and cannot provide significantly positive or negative comments 7.. Moderately dissatisfied: the dogs behaviours is described as primarily negative and has difficulty in assessing the dog as special to the owner, but is able to openly and coherently discuss problems in the bond. 9 .Strong dissatisfaction: owner reveals displeasure or disapproval of dog, mentions few positive comments and primarily problem areas and comments. There is a feeling that the owner is considering re-homing the dog.
How involved are you with your dog on a daily basis? Can you give me an example of your daily routine. Give examples .	Involving Behaviours indicative of quality time spent with dog. Can include walking, leisure activities, training, etc.	Involving behaviours indicate the owners attempt to provide stimulation and activities for the dog. However, scores in the 8-9 range will indicate a hyper-involvement which may be indicative of anxiety in the relationship, or an over-involvement in dog activities which could be indicative of social isolation. Low scores would indicate abdication or avoidance of responsibilities. Scores in the 3-6 range would indicate secure involvement relationships.	1. No involving behaviours; owner provides minimal activities for dog, while still being primary caregiver 3. Minimal involving behaviours-may have taken dog to training early on but abandoned it. 5. Somewhat involved in the care of the dog and is realistic about their level of care and their ability to provide it. 7 Involving behaviours: very involved in organising activities for the dog but still has a non-dog related social network 9 Very involving behaviour: dog has activities planned daily, dog sitters which owner is out, and all social contacts are dog-related.
How do you discipline your dog?	Controlling Behaviours indicative of a highly controlling/authoritarian-type style, or lax/ineffective control	Low scores will be indicative of an authoritarian inflexible dog care style where owner must be in control at all times. This may include hitting the dog or extremes form of punishment. Middle scores are more indicative of flexibility in dog care: dog is responsive to commands most of the time, but owner is also caring and not over-reactive to disobedience. Physical punishment is never used. High scores indicate lack of interest or ability to train the dog, with a number of behaviour problems mentioned along with the owners impotency in dealing with them.	1. Has total control over dog: dog is not allowed to deviate from owner's commands, indicative of an authoritarian dog control style 3 Has some control over dog: dog is allowed some autonomy, but is overall well controlled 5. Moderate control: owner has control in about 50% of situations. 7. .Rarely successful in controlling dog: owner operates a lax dog control system, but occasionally the dog will respond 9. Totally unsuccessful in controlling dog: owner has no control over their dog's behaviour.

Question/Statement	Description:	Assessing:	Scoring
Are there situations where your dog will seek you out for comfort and reassurance?	Assessing owner's ability to be their dog's safe haven: to react to dog's attachment behaviours when dog is stressed.	Assessment refers to behaviour of the dog in a stressful situation seeking out a safe haven. Low scores: dog will seek out owner readily with the owner being responsive to their dog's signals. Middle scores: dogs are less likely to actively seek out owner for nurturing but when they do, owner is able to provide it. High scores: the dog never seeks out comfort or support from owners with owner not acknowledging any need for help or may be uncomfortable providing this type of care to their dog	1. Dog actively seeks out owner: dog is very comfortable seeing care from owner, which includes both stressful events and more common occurrences. 3. Dog Seeks and accepts care from owner: owner responds to dog's signals for care and can give examples. type of care sought related to more ordinary concerns. 5. Dog moderately seeks support from owner: dog may seek out owner but is not easily pacified (i.e. not ordinary stressful events). If no examples are given, score 5 7. Unlikely to seek out owner: occasionally approaches owner when needed support, but more likely for physical problems(i.e. sore paw) rather than emotional (i.e. fear related). 9. Dog does not seek a safe haven from owner: evidence of dog rejecting owner, not coming to them for support.
Are there situations where you will seek out your dog for comfort and reassurance?	Assessing owner dependency – i.e. a childlike orientation towards their dog , with little interests of their own. Could be a result of lack of a larger social network or competitive in establishing other social networks.	Low scores: self-reliant and self directed. Middle scores: owner will at time provide support and at times seek support. High scores: owner unable to function without high levels of interacting with their dog. The dog is their primary social contact, and acts as a secure base/safe haven for owner. Their entire life rotates around their dog. No other interests in life and there is evidence that the owner's relationship with the dog could be damaging to the owner.	1. Not at all dependent: autonomous owner, not reliant on dog, could be lax or avoidant dog care. 3. Mostly non dependent: owner is generally self-reliant and has interests that do not relate to their dog. 5. Somewhat dependent: owner has some separate interests but emphasise activities with dog, or efforts to get their dog to be more responsive. The relationship may be new, or new training begun. 7. Dependent: owner's interests revolve around their dog, with the dog appearing to control/dominate. 9. Extremely dependent: owner is unable to function without dog and has let their dog and activities with their dog take over their life
How involved are you in the provision of care for your dog, in terms of both physical requirements (food, warmth) and emotional requirements (stimulation). Provide details.	Caregiving: owner's involvement in the actual care/feeding/emotional support (provision of secure base, fear reduction, stimulation).	Low scores: could be indicative of hyper-vigilance. Middle scores 5-7 indicative of a balance in caregiving Low scores: indicative of a lax dog care style	1. Provides consistent, stimulating care, including the provision of a secure base and can provide more than one example. 3. Provides skilful caregiving but not consistently and at least one example is provided. 5. Provides moderate care, i.e. feeding/water but nothing more owner can respond in a crisis, but it generally unresponsive and uninterested. Score 5 if no examples are given 7. Infrequent or inadequate caregiving: owner may be reluctant or resent the dog and will ignore the dog when they feel their dog's needs are unimportant. 9. Minimal dog care: rejecting, unresponsive and generally uninteresting in caring for their dog.

Question/Statement	Description:	Assessing:	Scoring
Do you every get angry at your dog?	Current state of mind: reflective of the owner's anger at the dog or self-directed anger.	Low scores indicative of self-directed anger, inability to control anger, indicative of rejection or anxiety Middle scores: do get angry in response to events but do not lose control High scores: never get angry- but this could also indicate ambivalence	1. Very positive (great warmth, affection, overall very valuable relationship. Never angry at dog, can rationally describe events. 3. Somewhat positive (warm, content), have become anger in response to events and willing to give example 5. Neither negative nor positive 7..Somewhat negative 9. very negative (cold/hostile/angry)
What are your best experiences of owning this dog? what are your worst experiences of owning this dog?	Assessing owner attitude towards their dog and their role in caregiving: specifically owners behaviours associated with both positive and negative dog behaviour. This category is scored based on transcripts from entire interview and not specific questions.	Owner care style as reported through owner behaviour and examples. Low scores: indicative of lax dog care: owners are not highly involving in the provision of care, and are slow to react to the dog's needs. High Scores: indicative of hyper-vigilant dog care. Middle to high scores: safe haven provision, firm but fair approach to dog discipline.	1. Extremely Lax dog care: no examples given, few shared activities, no dog training, dog is not set limits/guidelines for behaviour. Dog's basic needs are met, but no additional stimulation provided but owner will not respond to attention seeking. 3. Moderately Lax dog care: some shared activities, limited dog training, dog has some limits but these are inconsistently reinforced. Dog's basic needs are met and limited additional stimulation provided but owner rarely responds to attention seeking. 5. Averagely reactive dog care: shared activities are consistent but not frequent (i.e. monthly). dog has received training. Owner does expect dog to respond to some commands, although this is not strictly reinforced. Dog is considered part of family, but is still a "dog". 7. Consistent, reactive dog care: frequently shared activities. Dog is well trained using positive reinforcement. Dog is taken to visit friends/family and is considered a family member/child. Owner will occasionally respond to attention seeking 9. Over-reactive dog care: dog is constantly with owner, or if not possible, surrogate caregiver is appointed. Dog is strongly considered to be a "child". Owner is hyper-vigilant to dog's behaviour and will use both positive reinforcement and punishment. Owner consistently responds to attention seeking.

Question/Statement	Description:	Assessing:	Scoring
Would you say that this is your ideal dog? What five adjectives would best describe this dog?	Assessing owner idealisation of relationship: the image the participants has of the dog: 2. the image of themselves as part of this relationship and 3. the relationship between them defined as normal, good or perfect.	High scores (5 or above) may be indicative of Dismissing classification. Preoccupied may also have scores of 4-5. Assessment is based on the distortion of the relationship – i.e. dog may be described as perfect but then less than perfect examples are given. Owners who describe their dogs as "normal", "typical" or explain their behaviour in this way is suggestive of idealisation.	1. No idealisation: description of the relationship is convincing and consistent and is supported by both positive and negative examples. Directness about problems suggests normalisation. 3. Slight idealisation: minor discrepancy between positive image of dog and actual dog behaviour examples, or owners will begin positively and then provide negative examples. 5. Moderate idealisation: vague generalising, superficial, image-orientated examples, or discrepancies between adjectives and examples given. 7. Considerable idealisation: Researcher's impression of relationship is markedly different from adjectives or descriptions provided. Presents positive descriptions of the dog-"he's perfect" without examples or memories to support it, and describes the dog as typical or just like a dog. 9. Extreme idealisation: sharp contrast between the researchers assessment of the dog and the participants descriptions. Dog is presented consistently in a positive light. Any negative ideas are quickly dismissed. Dog is described as perfect when it has evidence of serious behaviour problems.
What is your greatest concern about your dog at the moment? What makes you most worried about your dog?	Assessing owner anxiety, tapping into owner's fear's for dog, 's future loss of dog.	High scores; excessive preoccupation for dogs health and well being with it is non warranted (i.e. dog is fit and young). Based on the owner's fear of losing the dog, and not to the continuation of the relationship. If the dog is already ill, score low because there is already a realistic concern. If the owner is conscious and can explain the fear as legitimate, score 1-3 . A low score can be given if the owner admits to being fearful but does not act upon it (can rationally explain it).	1. No fears or concerns about dog 3. Fear of loss connected to real issues: because of current health issues which are coherently described 5. Somewhat fearful and concerned but past experiences may have led to these fears and owner does not realise this 7. Mild concern over dog which affects owner behaviour; owner does not identify course of worry but owner will react to minor absences or ailments. However, these occur inconsistently 9. Great concern over dog with the source of the fear the loss of the dog. Owner has frequently acted on the fear (i.e. frequent phone calls to vet)

Question/Statement	Description:	Assessing:	Scoring
Passive Speech	Assessing owners clarity, focus or specificity . indicative of complete preoccupation with the relationship.	<p>High scores: confused, preoccupied and overwhelmed when they speak becoming conference, wandering off toting, use of vague phrases, and generally do not communicate. They cannot put their thoughts and emotions into words at all. Characterised by:</p> <ul style="list-style-type: none"> <li>• use of meaningless words or general replacement words (“this or that”, “bla bla bla” to avoid mentioning negative things</li> <li>• Fails to complete sentences</li> <li>• Digresses from answer and completely wanders off topic without realising it</li> <li>• Yeses very brief words (“Yes”, “Not really”)</li> <li>• Uses a childlike tone</li> <li>• Addresses the dog and not the interviewer</li> </ul> <p>NOTE: lack of fluidity, hesitations, restarting sentences is not passive if the participant eventual gets to the point. If owner mentions some things and then follows with “and that type of thing”, speech is not passive. If owner wanders off topic and then gets back on topic, then this is more evidence of dismissive owners than passive speech.</p>	<p>1. No evidence for passivity of thinking/discourse: clear thinking although light use meaningless words infrequently  3. Slight passivity: some examples of clearly passive speak but more frequently slight passivity  5. Moderate passivity throughout interview  7. Marked passivity-several indices of passivity are included in speak over lengthy passages  9. Fully passive thinking/discourse: interview becomes extremely difficult to follow and the meaning of the words spoken are lost.</p> <p>NOTE: highly passive can be indicative of both highly preoccupied or highly dismissive. To score <u>dismissive</u>: look for vagueness and lack of specificity but not confusion: these owners will attempt to be in charge of the interview. Whereas <u>preoccupied</u> owners will have no control over interview, and are generally lost and confused in their conversation.</p>
Coherence of Transcript	<p>Quality: truthfulness, consistency, lack of factual, or logical contradictions  Quantity: succinct, with few run-on sentences or the opposite, short, incomplete answers  Relation: relevance of the response to the interview question.  Manner: clarity and orderly, lack of shifting into other voices or focus, lapses into jargon, entangled hard to follow sentences or unfinished trailing-off sentences :  Scores for Anger, passivity, idealisation, death of previous dog and fear of loss are incorporated into the overall coherence score.</p>	Note: if any maxims occur, but owner tries to explain why it is a complicated issue, score low.	<p>1. Highly coherent: steady and coherent flow of ideas with overall intent, memories and feelings are clear. Owner is at ease with the topic and seems to think or reveal fresh ideas when talking.  3. Coherent: owner seems truthful, arguments do not contradict, speech concise and complete, and reader will agree with owner on the owners experiences and their effects. However, if the transcript is not totally coherent (i.e. conversation is not flowing, or interpretation is often required, this could indicate some distancing.  5. Neither coherent nor incoherent: acceptable coherence although owner not highly articulate but transcript is understandable. Owner is coherent through most of the interview but can be incoherent on occasion.  7. Incoherent: owner does not have a clear picture of relationship with dog. Although largely incoherent, the interviewer can still follow the transcripts, with reader not agreeing with the owner about their interpretation of their relationship. ,  9. highly incoherent: owner cannot make previous experiences or feelings clear. Arguments are vague, or excessively detailed with major contradictions in different areas.</p>

## APPENDIX J

*Comparison of dog clusters, owner AAI, ECR and Adult caregiving ratings, owner talk, touch levels and FR behaviours from the Strange*

*Situation and both owner and dog behaviours in Task Solving*

Dyad	Dog attachment style	AAI Rating	ECR rating	Owner FR behaviour	Prox	Sens	Coop	Comp	Talk	Touch	Task Solving (owner)	Task Solving (Dog)
Dyad 1 June Duke	Secure prototype	Preoccupied (anger) (E2)	Fearful	Nil	High	High	Mod	Mod	mod	mod	Sensitive, non-invasive support	highly focussed, long duration
Dyad 2 Robert Pepper	<b>Avoidant</b> (some secure behaviours)	Unresolved/ <b>Dismissive</b> (emotionless (U/d, Ds1)	Preoccu.	Threatening	Low	Low	Low	Low	High	low	Invasive, high control	Orientated to play, while avoiding owner
Dyad 3 Beth Barney	<b>Secure</b> (with some passive)	<b>Secure</b> , some dismissing of attachment (F1)	Fearful	Nil	Mod	Mod	Mod	Mod	Mod	Mod	Supportive, low invasive behaviours	Moderate. intensity, sought proximity with owner
Dyad 4 Pamela Rusty	Passive prototype	Dismissive (Ds3)	Secure	Nil	low	Mod	mod	low	low	high	Highly invasive	low play, no proximity, high owner avoidance
Dyad 5 Carolyn Benji	<b>Avoidant</b> (anxious)	<b>Dismissive</b> (Ds1)	Dismissive	Threatening	low	Mod	mod	mod	very high	Nil	non-invasive, no praise, just orders	Moderate intensity which decreased steadily, nil proximity. seeking
Dyad 6 Janet Buddy	Passive (secure)	Secure (F4) (some conflict, resentment)	Fearful	Nil	high	Mod	high	low	low	high	Low to mod support, controlling 1 occasion	initially focussed, with high proximity seeking
Dyad 7 Judy Tiggy	Secure (with avoidance)	Unresolved/ Dismissing (Ds2)	Secure	Dissociative	n/a	n/a	n/a	n/a	mod	mod	highly invasive, orders but no praise	low intensity, no proximity seeking
Dyad 8 Frank Missy	Anxious prototype	Secure prototype (F3)	Preocc.	Nil	mod	High	high	low	low	low	low invasive, low praise, low ordering	highly task orientated