A Social-Cognitive Approach to Understanding the Person-Pet Relationship

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DECLARATION

All research presented in this thesis was undertaken by the author. This thesis is presented in accordance with the specifications outlined in the Guide to Examinations for Higher Degrees by Research produced by the University of Warwick graduate School.

Dr. L Alton wrote the computer program used to display the stimuli in studies 5 and 9 and presented in chapters 5 and 8 respectively. A program written by Mr. N Stewart, was used to create the dissimilarity matrices from data files storing participants' responses.

SUMMARY

In many western societies, including Britain, the practice of owning pet animals is widespread. The reasons people keep pets have been the focus of recent academic interest and many studies have been published. It is argued that the relationship that pets form with their owners is important, and similar to those formed between people. The belief that pets are members of social groups such as 'family' and 'friend' is pervasive and supported in academic literature exploring the relationship between people and pets. However, this finding is less well supported outside the person-pet field.

This thesis aims to resolve this dichotomy by using a social-cognitive methodology to investigate the structure of these concepts. A series of experimental studies are presented, each of which carries forward the social-cognitive theme, first exploring the notion that person-pet relationships can be modelled as a family relationship and then as a friendship.

This research found no support the notion that the majority of pet owners consider their pets as family or friends. The finding that pet owners are not a homogeneous group and have different cognitions concerning the role of pets may go some way to explain the differences which exist in the literature.

DEDICATION

To Harriet

CHAPTER ONE | INTRODUCTION

1.1 Pet keeping

In Britain, one in every two households own some sort of pet animal (Pullinger & Summerfield, 1997). The most common pets are fish, cats out number dogs, although, more households own dogs. The majority of pets are kept by households with children (Petfoods, 1996), although this is differentiated across household categories, with single parent households least likely to own pets (Kidd & Kidd, 1989). The high prevalence of pet keeping is reflected in many western societies despite the many potential costs and lifestyle changes involved in pet keeping, including demands on time and finance, potential health risks, and emotional distress when a pet is ill or dies.

The reason so many people keep pets has been the focus of academic interest in recent years. It is argued that relationships with pets are important and that pets perform relationship functions analogous to those performed by people. Much research has been directed towards investigating pets serving relationship roles, by exploring categories of relationships such as 'family member' (Catanzaro, 1984; Jones, 1983; Soares & Whalen, 1985), 'friend' (Peretti, 1990; Serpell, 1989; Stewart, Thrush, Paulus, & Hafner, 1985), or 'companion' (Hirschman, 1994). Others have looked at functions of relationships such as attachment (Endenburg, 1995; Sable, 1995; Serpell, 1996), and social support (Friedmann & Thomas, 1995; McNicholas & Collis, 1998b).

The belief that pets are members of relational categories such as 'family' and 'friend' is pervasive in academic literature and in popular culture. The notion that pets *are* members of the family, is embraced by advertisers, (for example, the 'Petsmart' slogan is "pets are family") and journalists (Evans, 1981). This view is supported by many researchers investigating the relationship between people and pets, and some studies report that over 90 per cent of pet owners consider their pets members of the 'family' (Catanzaro, 1984; Jones, 1983; Katcher & Rosenberg, 1979; Soares & Whalen, 1985; Voith, 1985). The extension of concepts such as 'family' and 'friend' to include pets legitimatises attempts to model person-pet relationships using concepts from person-person relationships based on the assumption that relationships between owners and their pets have much in common with relationships between one person and another.

However, the notion that pets are members of the category 'family' and 'friend' is not universally acknowledged and receives mixed support from academics outside the person-pet field. Research exploring the concept of 'family' generally demonstrates that the structure of the family is a nuclear grouping, consisting of parents and their children (Gilby & Pederson, 1982; Hodkin, 1983; So & Hodkin, 1987) with generally only a minority of respondents including pets. However, in the context of studies that implicitly or explicitly endorse the inclusion of pets this rate rises dramatically.

One of the main difficulties in evaluating whether pets are members of these categories is that both concepts are extremely difficult to define. Although, family theorists have considered the family unit, a formal definition of 'family' has proved elusive; many definitions have been suggested but as noted by Surra

(1991b) there is "no answer yet". The problem of a definition is mirrored for the concept of 'friend'.

The problem of defining concepts is rarely acknowledged in the literature exploring 'pets as family' or 'pets as friends'. The failure of some of these studies to define terms leaves researchers free to develop accounts that are unconstrained and therefore the interpretation of some studies suggesting pets are family members or friends is problematic.

In order to evaluate whether pets are considered as members of the categories 'family' and 'friend', and whether such categories are useful for describing the relationship between people and pets, more research needs to be conducted. One approach would be to examine the level of relational provision derived from people and pets for characteristics indicative of these concepts, and to evaluate whether the contribution from pets was comparable to that from people.

Unfortunately, as there is no agreed definition for these concepts a resolution to this question using this approach would seem unlikely. Whether a pet was a member of a category might depend upon which criteria were adopted, other criteria may yield different answers. The absence of a definition for these concepts adds complexity to evaluating whether these frameworks are useful in describing the person-pet relationship. As no agreed definition has been forthcoming this may suggest that a definition in terms of necessary and sufficient criteria to represent these categories may not be possible, because there may be no set of characteristics which are common to all category members. This is true for

a number of entities, both social and non-social, for example, games (Wittgenstein, 1953).

A second approach would be to explore how people think about pets, by examining peoples' representations of these social relationships. Methodologies borrowed from cognitive psychology, especially prototype theory, have been utilised to provide insights into a number of difficult to define social concepts including, emotion and subcategories of emotion such as love and anger. (Fehr & Russell, 1984; Fehr & Russell, 1991). Prototype theory is not reliant on singly necessary and jointly sufficient features to define a category. Instead, category membership is dependent upon similarity to the prototype of the category, which is a set of characteristics that are typical of the category but not necessary and sufficient to define it. Members of the category will differ in the degree to which they resemble the prototype and can be ordered in terms of their similarity to the prototype. Members that are most similar are rated as better examples of the category and have most features in common with the prototype. The application of prototype theory to friendship has been advocated by Davis and Todd (1985).

It is important to understand how people conceive the boundaries of what constitutes 'family' and 'friend' in order to understand the relationship function served by pets within these social groups. The application of prototype theory to the study of family and friendship would delimit these concepts and explore the extent to which family and friendship are useful frameworks for exploring the relationship between people and pets.

1.2 Thesis outline

A review of the literature that formed the basis for this investigation is presented in chapters 2, 3, and 4. Chapter 2 reviews studies that seek to explain the relationship between people and pets using methodologies for analysing human-human relationships. Chapter 3 evaluates studies exploring the concepts of 'family' and 'friend' and the extension of pet members. Chapter 4 reviews literature exploring knowledge structures and describes how methodologies adopted from cognitive psychology have provided insights into social phenomena and how such methodologies could be extended to explore the person-pet relationship. The four empirical chapters 5, 6, 7, and 8 present experimental work completed by the author and where designed to evaluate the extent to which 'family' and 'friend' are useful frameworks for exploring the person-pet relationship. Chapter 9 summarises the findings of the research programme, discusses these findings in relation to previous research and the implications for further research.

CHAPTER TWO | FRAMEWORKS FOR DESCRIBING PERSON-PET RELATIONSHIPS

2.1 Introduction

Research exploring the person-pet relationship has focused on two explanations to account for pet ownership. Firstly, some researchers have considered the utilitarian function of pets (Hirschman, 1994; Society, 1988). For example, pets may be kept as an avocation by owners who breed their animals and compete with them at breed shows (Hirschman, 1994). Pets may also serve as ornaments, providing aesthetic qualities comparable to inanimate household objects such as paintings, porcelain or houseplants (Society, 1988). For example, exotic fish may be visually pleasing and birds may be both visually and aurally pleasing. Rare, or expensive animals may be acquired in order to indicate the owners' status in the same way a person may a own an expensive car or boat (Beck & Meyers, 1996).

Belk (1988) argues that people regard possessions as part of 'self'. This conceptualisation contributes to the sense of self in that what we possess is what we are. Possessions may serve to extend self by the association of attributes, which may be positive or negative, to the individual. Belk (1988; Belk, 1996) suggests that pets may function as an extension of self in that attributes of the pet are projected onto the owner.

However, more commonly, research into person-pet relationships has focused on the interpersonal relationship between pets and their owners using methodologies borrowed from person-person relationship research. The change in terminology from pet to companion animal (Shapiro, 1997) reflects this shift in emphasis towards explaining pet ownership in relational terms. Although, their role of relational provider and their role in fulfilling more utilitarian functions may not be mutually exclusive; a pet acquired for a utilitarian purpose may also act as a relational provider and vice-versa.

The notion that the nature of the relationship between people and pets may be usefully explored using relationship methodologies from person-person research is plausible. As noted by Collis and McNicholas (1998b) it seems unlikely that evolutionary pressures have evolved specific mechanisms to account for the relationship between people and pets. They argue a more likely explanation is that mechanisms accounting for person-person relationships have been generalised to accommodate person-pet relationships.

Research investigating interpersonal relationships is diverse, encompassing a number of disciplines including sociology, socio-biology, social psychology, developmental psychology, and clinical psychology. Researchers utilise a number of methodologies including typological approaches such as attachment (Bowlby, 1969) and functional approaches such as social support (House, 1981) and relational provision (Weiss, 1974). However, it is argued that in order to fully understand interpersonal relationships an integrated approach is required (Hinde, 1996), although, to date there is no over aching 'grand theory' to explain the nature of interpersonal relationships (Berscheid, 1994). It follows then

that given 'cognitive software' is generalised to accommodate person-pet relationships (Collis & McNicholas, 1998b) research approaches exploring person-pet relationships will also be eclectic. Although, for some people relationships may bring distress (Hinde, 1997) research has demonstrated benefits from relationships for people; for example, mental and physical well-being (Cobb, 1976). It is argued that relationships with pets are important and that pets provide relationship functions analogous to those provided by people. Therefore it is important to carefully evaluate the extent to which these frameworks are relevant to person-pet relationships. This chapter explores evidence for the notion that the person-pet relationship is usefully conceptualised using methodologies from person-person research.

2.1.1 Pets and Attachment

Attachment is now widely regarded as an important concept in understanding relationships (Weiss, 1998). Attachment was proposed by Bowlby (1969) to describe the emotional bond between a caregiver and child; the caregiver, known as the 'attachment figure', is usually, although not necessarily, the mother. Bowlby (1969) proposed attachment theory to account for the behaviours of children when separated for long periods from their caregivers.

Bowlby (1969) was dissatisfied with theories of social development that prevailed in the 1950s and 1960s, namely psychoanalysis, with an emphasis on sexuality (Erickson, 1968) and Social Learning Theory, focussing on secondary drives (Dollard & Miller, 1950). In his theorising Bowlby (1969) was influenced by a number of related perspectives including psychoanalytic theory, computer

science, systems theory and ethology. Bowlby (1969) hypothesised the existence of two important mechanisms, an 'attachment behavioural system', and 'inner working models' (IWMs) (Bretherton, 1985).

The attachment system is an innate motivational control system that functions to maintain a feeling of felt security and therefore keeps the child in close proximity to their primary care giver. Discrepancy between the current state and the goal state (felt security) results in activation of the system; producing responses such as crying and following which are directed to the caregiver (Bretherton, 1985). The responses work to establish proximity or contact with the attachment figure. The system is hypothesised to continuously monitor the current state, ensuring that external sources of insecurity are dealt with by the caregiver, and feelings of security restored as soon as is appropriate. This bestows the evolutionary advantages of protection from danger during the relatively long period while the human infant is helpless, while also permitting the infant to explore and maximise their acquisition of knowledge and understanding of the environment (Ainsworth, Blehar, Waters, & Wall, 1978).

IWMs, represent the self, others, and the world. The models develop as a consequence of numerous interactions with others and the environment and become incorporated into the personality, see Figure 1. The models are dynamic, becoming organised and elaborate with the assimilation of new experiences, although, over time they become relatively stable (Bowlby, 1980). They function as a method of evaluation, interpreting events and influencing behaviour, especially events and behaviour relating to interactions with others (Main, Caplan, & Cassidy, 1985).

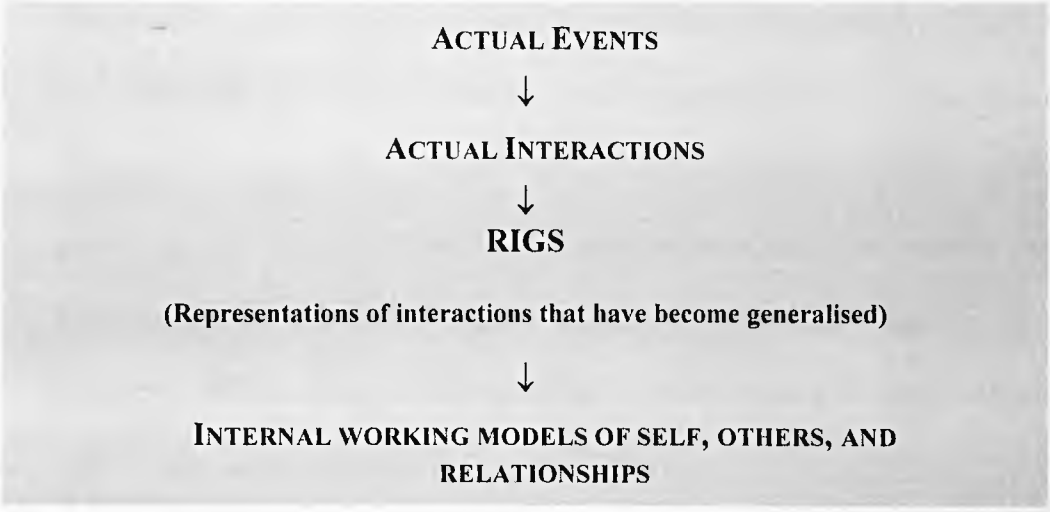

Figure 1 Model of hypothesised organisation of mental experience concerning relationships. (Steele & Steele, 1984).

Initial relational experience occurs within the context of the caregiver-child relationship. An important aspect in the formation of cognitive representations is the degree to which the child feels confident about the responsiveness of the caregiver. A second but related aspect is the extent to which the child feels it deserves its needs to be met. These two aspects are intimately linked; it is the response of the caregiver, which produces a sense of worth. For example, if the caregiver is responsive to the child's needs then the child develops a model of the parent as trusting and a model of the self as worthy. Alternatively, if the caregiver is not responsive or responds inconsistently, sometimes positively and sometimes negatively, the child develops a model of the caregiver as rejecting or untrustworthy and a model of the self as unworthy (Bretherton, 1985). Bowlby (1973) hypothesised that elaborated models of the self and the caregiver may function beyond 'conscious awareness'. Also, there may be more than one model of the self and others available. Alternative models may develop as the result of

an attempt to reconcile two discrepant models. Bowlby (1973) suggests the alternative models function defensively, protecting self-constancy.

Bowlby (1973) proposed that attachments have significance through the life-span. He claimed that the relationship between the caregiver and the child is a prototype for interaction in future relationships and the success of later relationships is influenced by the quality of the child's attachment to the caregiver. The mechanism that accounts for the influence of prior interaction on current interaction is an IWM.

Ainsworth, Blehar, Waters, and Wall (1978) developed a procedure for categorising attachment. The procedure known as the 'Strange Situation' enabled the classification of the relationship between caregiver and child into three types: *secure*, *insecure avoidant*, and *insecure ambivalent* (Ainsworth et al., 1978). Later a fourth type, *disorganised*, was included (Main & Solomon, 1990).

The categories were derived by examining the behaviour of children during eight three-minute episodes during which felt security was manipulated. The episodes were so designed that the child experienced different situations of certainty and uncertainty, either with the caregiver, with the caregiver and a stranger, or with a stranger or alone. The child's behaviour when reunited with the mother formed the bases of the categories. Children who appeared to ignore their caregiver and continued with their activity were classified as insecure-avoidant. Children who greeted and were comforted by their caregiver and then continued with their activity were classified as secure. Children who clung to their caregiver, could not be pacified and were reluctant to continue with their activity were classified as insecure-ambivalent.

Ainsworth and Bell (1969) examined the interactions of caregivers and children in their home environment. They observed episodes of care giving, such as feeding, during the first three months. They found the caregiver's responsiveness to the child's needs was predictive of the child's behaviour in the following month. For example, children whose caregivers were more responsive to their needs during the first three months cried less in the fourth month. Caregivers' early responsiveness was correlated to attachment types; avoidant types were associated with caregivers' unresponsiveness.

The classification system devised by Ainsworth Blehar, Waters, and Wall (1978) enabled the testing of Bowlby's (1973) notion that early relationships affect relationships beyond early childhood. The classification of types of attachment appears to have long term stability in stable families (Main & Cassidy, 1988). Researchers have used the system to examine social behaviour in children. For example, Waters, Wippman, and Sroufe (1979) found children classified as securely attached were more 'socially competent and empathic' at age three and a half years than their insecure age matched counterparts.

However, the 'true' effect of attachment on adult relationships has yet to be fully assessed as most children assessed using the 'Strange Situation' procedure are only now just reaching early adulthood. However, research based on interviews and questionnaires (Hazan & Shaver, 1987) designed to determine attachment type in adults has found support for Bowlby's model that early attachments serve as prototypes for later relationships. Hazan and Shaver (1987) conceptualised close relationships in adulthood, primarily romantic relationships, as attachments. However, the nature of attachment relationships is differentiated

between childhood and adulthood. In childhood, attachment is characterised as asymmetrical, the child receives security from the attachment figure, but does not itself provide security (Ainsworth, 1989). In adult attachment relationships the nature of the attachment is believed to be more symmetrical. Both individuals expect to provide and receive care and security (Hazan & Zeitman, 1984). Kirpatrict and Davis (1994) found the relationships of individuals labelled as secure (using Hazan & Shaver attachment questionnaire) were more stable and lasted longer than those labelled as insecure. Individuals classified as securely attached tended to have positive close relationships and positive models of the self. Individuals classified as insecure-avoidant tended to avoid close relationships, were pessimistic about their outcome, and found it difficult to rely on others. Individuals classified as insecure-ambivalent tended to feel they contributed more to relationships. However, some researchers have suggested that, because attachment type was not determined prior to commencement of the relationship, it may merely reflect the current relationship (Bartholomew, 1994).

Ainsworth (1989) did not think that all adult relationships should be described as attachments. She divided adult relationships into two categories comprising, *affectional bonds* and *other relationships*. Affectional bonds refer to relationships such as those between parent-child and sexual or close friend relationships. These relationships are characterised by enduring ties, pleasure on unification and grief with the loss of the relationship. It is a subset of these relationships, which may be classified as an attachment if there is a desire for proximity with the other to provide feelings of comfort and security and distress at loss. Relationships categorised as 'other relationships', such as those with social

friends, neighbours and colleagues, tend not to be enduring and should not be classified as attachments.

The attachment model as proposed by Bowlby (1969) and augmented by Ainsworth (1989), has been utilised to explore person-pet relationships, by applying constructs such as felt security, proximity maintenance, the presence of an internalised cognitive representation and grief at the loss of the other (Melson, Peet, & Sparks, 1991). Other studies have used the term attachment informally, typically referring to an affectional bond between the person and pet (Chumley, Gorski, Axton, Granger, & New, 1993; Endenberg, 1993). Yet others studies have failed to define any operational terms (Zasloff & Kidd, 1994).

Recently, researchers have questioned the appropriateness of applying attachment theory to person-pet relationships. Collis and McNicholas (1998a) argued that fundamental principles of attachment theory have been misapplied. For example, felt security is a defining construct in attachment theory (Bowlby, 1969). Voith (1985) suggests dogs and cat owners derive a sense of security from their pets, she proposes that security is based on the notion of pets as 'burglar alarms' or deterrents. However, Collis and McNicholas (1998a) argue that felt security in the presence of a large animal is distinguishable from that provided by an attachment figure. The former is a specific function performed by the animal, for example, the presence of a large dog may act as a deterrent when out walking alone and this appraisal will enhance a sense of security for this particular event. However, this is theoretically distinct from the felt security in the presence of the attachment figure, which is a generalised motivational response and is not role specific. The felt security from an attachment figure is inherent in the type of

relationship, and not dependent on a rational appraisal of what the attachment figure could do to protect one.

The second important construct in attachment theory is the development of an inner working model (IWM) (Bowlby, 1973). Melson, Peet and Sparkes (1991) examined the attachment of children to pets using a dimensional approach. The dimensions included behavioural, affective and cognitive measures. Cognitive attachment was assessed by the number of 'thought units' by categorising the answers from seven open-ended questions about the child's own pet and dogs and cats. Melson et al., (1991) argued that the results, based on children's ideas of pets, suggest a mental representation of the child-pet relationship analogous to that of the child/caregiver attachment relationship. They concluded that such a model may influence future relationships with both animals and people. The fact that children have relationship-like cognitive representations of pets is interesting in that it fits a relationship model in general, but it does not specifically indicate an attachment relationship (Collis, McNicholas, & Morley, 1993). All relationships are presumed to be cognitively represented and have the potential to influence future interaction. They cannot be considered an attachment relationship unless the relationship is based on felt security (Ainsworth, 1989). Melson et al., (1991) offer no evidence that the cognitive representation of the person-pet relationship is founded on felt security. Merely having a representation of a relationship is not equivalent to having an attachment relationship.

The caregiver-child relationship is characterised by asymmetry, for example, infants and young children gain security from the attachment figure, but do not provide security, thus benefits accrue to the cognitively less advanced

(Bowlby, 1969). The person-pet relationship is also characterised by asymmetry, however, the direction of attachment in the person-pet relationship is from pet owners to their pets, and therefore the benefits accrue to the cognitively more advanced (Collis et al., 1993). A study by Topál (1998) uses Ainsworth (1969) 'strange situation' paradigm to observe the behaviour of dogs with their owners. They concluded that the behaviour of dogs was analogous to that of the child in mother-infant interactions. This supports the case for animals being attached to their owners, rather than the stance taken in much of the literature, that people are attached (in the Bowlbain sense of attachment) to their pets. Therefore if attachment theory is to be useful in exploring the person-pet relationship, it is likely to be from the perspective of the animal in the child's role.

Grief has also been proposed as a construct indicating the presence of an attachment (Rajaram, Garrity, Stallones, & Marx, 1993). Reactions to pet loss are taken as a measure of the strenth of attachment to a pet (Archer, 1997). The grief response to pet loss has been compared to that of human loss. In human bereavement people often experience shock, numbness, disbelief, anger, distress, searching depression and despair (Parkes, 1986). Fogle (1981) argues the grief experienced by pet owners is comparable to the death a friend. In order to investigate grief responses of pet owners Archer & Winchester (1994) developed the 'Pet Loss Questionnaire'. They found similarities in the grief responses to pet loss and human loss for the owners of dogs and cats. For example, the majority of participants initially experienced numbness and/or disbelief; were preoccupied with thoughts of their pet; and sought reminders of their pet. In addition a minority of pet owners experienced anger, anxiety and depression and the urge to

search for their pet. Although Archer & Winchester (1994) found similarities in the grief response to the loss of pets and the loss of humans, they found less negative affect, a charcteristic in hunman berevement, in pet owners. Similar results were obtained by McNicholas, Collis, and Morley (1995), who found pet loss less intense and enduring, compared to human loss.

However, Ainsworth (1989) conceptualises grief as characteristic of affectional bonds in general rather than as a defining feature of attachment bonds in particular.

Despite the criticisms of the use of the attachment model as a framework to investigate the person-pet relationship, it is still dominant in the literature. Most researchers interpret the model as the broader 'affectional bond' described by (Ainsworth, 1989) This would encompass the role of pet owners as a caregiver (Zasloff & Kidd, 1994).

2.1.1.1 Measures of pet attachment

Extrapolating from the theoretical principles underpinning attachment theory, a number of researchers have attempted to develop scales to measure attachment analogous to those developed to investigate attachment patterns in human relationships. However, Collis and McNicholas (1998a) argue that measures designed to investigate pet attachment have failed to produce items that map onto attachment constructs, except for scales measuring proximity seeking behaviour. For example 'The Companion Animal Bonding Scale' (CABS) (Poresky, Hendrix, Mosier, & Samuelson, 1988) includes items such as *"How often does your companion animal sleep in your room?"* The Lexington

Attachment to Pets Scale (LAPS) (Johnson, F, & Stallones, 1992) which is a composite of three other scales: the Companion Animal Bonding Scale (CABS) (Poresky et al., 1988), Pet Attitude Inventory (Wilson, 1987) and The Pet Attitude Scale (Templer, Salter, Dickey, Baldwin, & Velber, 1981) has items such as *"I play with my pet quite often"*. Finally, the Pet Attachment Instrument (Chumley et al., 1993) includes items such as *"My pet is constantly by my side"*. Proximity seeking is characteristic of other types of relationships, not just attachments. Its significance in attachment theory is that proximity seeking is the means by which protection can be ensured for infants and young children who may lack any specific understanding of sources of danger (just generalised feelings of insecurity) and are unlikely to be able to deal with sources of danger.

The pet attachment scales have been used by other researchers investigating attachment issues (Albert & Bulcroft, 1988; Triebenbacher, Wilson, & Fuller, 1998). Triebenbacher, Wilson, and Fuller (1998) propose that the mechanisms in human attachment theory such as unconditional love and providing a secure base may operate in relationships with pets and suggests this may positively affect childrens' self-esteem. In a survey involving 364 children, in school grades 4 - 12, Triebenbacher, Wilson, and Fuller (1998) used CABS and the New York Self-Esteem Scale/Rosenberg Self-Esteem Scale (Rosenberg, 1979) to measure pet attachment. She found children were significantly more attached to dogs and cats than to other types of pet, and that attachment to pets enhanced self-esteem. She also observed a higher degree of attachment in girls than in boys. However, reliance on scales that do not adequately measure attachment confounds these findings (Collis et al., 1993).

Collis's (1993) argument is that Bowlby's (1969) model of attachment is problematic if one tries to use it to describe human attachment to pets. In Bowlby's (1969) model the cognitively inferior child is dependent on the adult caregiver, therefore the child is attached to the adult and not vice versa. Application of Bowlby's (1969) model would fit person-pet relationships better if one considered the pet's attachment to their owner as investigated by (Topál et al., 1998). An alternative would be to use the broader construct of affectional bonds as discussed by (Ainsworth, 1989; Ainsworth, 1991).

There is a need for researchers to provide operational definitions when applying relationship models, such as attachment, to person-pet relationships in order to fully evaluate the relative contributions of such models. However, as suggested by Collis and McNicholas (1998a) attachment theory may not be the most useful model in understanding person-pet relationships.

2.1.2 Social Support

Social support is a multidimensional construct, which in broad terms describes actual or perceived assistance or supportive provision. The number of dimensions of supportive provision differs between theorists, although most include: e*motional/esteem support,* which refers to the provision of empathy, care, love and trust (sometimes distinguished from esteem support), and it provides validation that an individual is regarded as competent, worthy, and valued:

- *instrumental support* refers to material assistance to solve practical problems.
- *informational support* refers to the provision of advice or guidance.

- *social companionship* enhances feelings of social integration and belonging and part of a network.
- *appraisal support* provides feedback an evaluative provision (Cobb, 1976).

It is suggested that social support is a factor in moderating stress or illness. Low levels of social support have been found to be associated with atherosclerosis (Blumenthal et al., 1987), essential hypertension (Carroll, 1992) and cardiovascular mortality (Orth-Gomér & Johnson, 1987). In contrast high levels of social support have been reported to ameliorate cardiac symptomatology following myocardial infarction (Fontana, 1989), and to protect against anxiety (House, 1981).

The link between social support and health was suggested in data obtained from longitudinal epidemiological studies examining factors associated with mortality (Berkman, 1985). Although, social support was not directly examined Berkman (1985) found those described as *'weakly socially connected'*, as measured by marital status, contact with family members, and membership of social groups, had twice the risk of mortality than of those described as *'socially connected'*. Differences between groups were also found for specific disease types including coronary heart disease (ischemia angina pectoris, myocardial infarction), cerbrovascular accident and cancer. This finding persisted when health promoting behaviours such as exercise were controlled for. Sarason, Sarason, and Gurung (1997) suggest that the risk may have been overestimated. However, Orth-Gomér and Johnson (1987) found a similar relation, between mortality and social integration. Sarason, Sarason, and Gurung (1997) suggest social integration studies demonstrate a 'main effect' rather than a 'buffering effect', that is, on

going support irrespective of current stress. The effect of social integration and mortality has been examined in clinical populations. Ruberman, Weinblatt, Goldberg, Chaudhary (1984) interviewed over two-thousand males recovering from myocardial infarction they found life stresses such as divorce, separation, accident etc., and low social integration predicated mortality.

The evidence for a relationship between social support and morbidity are not as clear-cut, however, the strongest evidence for such a relationship is for cardiovascular disease and social support (Sarason, Sarason, Potter, & Antoni, 1985). In a review of the literature exploring evidence for a link between coronary heart disease and social support, Stroebe (1996) found consistent evidence for an relationship between social support and recovery from cardiovascular disease and coronary surgery. However, the data obtained was correlational, and therefore may reflect not that low social integration causes disease, but that disease causes low social integration (Berscheid, 1994).

Social support is now considered an interactive process between the individual, their social network, and other factors such as perception of support (Cutrona & Russell, 1990; Vaux, 1988). Gottlieb (1985) emphasises the importance of the interaction between the recipient and the provider and suggests that it is the individual's perception of what is supportive that is important. Thus, the critical factor is not whether the behaviours are intended to be supportive or not, but on the interpretation of the behaviours by the recipient, which has the effect of diminishing the degree of stress experienced. Cutrona and Russell (1990) paired participants and asked one of the pair to recall a stressful experience and the other to provide supportive behaviour. Although, helpers rated their

behaviours as supportive and independent observers confirmed this, Cutrona and Russell (1990) found participants did not find the helpers supportive, indicating that perceived support may exert a beneficial effect when an individual feels they have resources to cope with a stressful situation. Conversely, a perceived lack of control is associated with negative health consequences as in learned helplessness (Seligman, 1975). The perception of having access to support is also important. Riggio and Zimmerman (1991) found that individuals classified as socially skilled perceived more availability of both informational and emotional support than those classified as less socially skilled.

Pierce, Sarason, and Sarason (1990) suggested expectation of support is related to perception of support and is cognitively represented in the IWM of social support. Based on a number of studies, Sarason, Shearin, Pierce, Sarason (1987) propose that perceived social support is a personality characteristic that arises from the attachment relationship. They argue secure relationships bring about increased perceived support, which they argue should be termed as a *'sense of acceptance'*. This construct of support is based on a development from an early attachment relationship, where attachment is considered as the Bowlbian security seeking system. If one where to consider a broader construct involving care giving by the adult, this account would not fit, as Pierce (1990) view of support is that it derives from the early experience of individuals as infants. Other constructs of support, which operationalize support as a set of relational provisions, may be more useful.

The social support construct is important because it is argued that the reported benefits associated with pet ownership may derive from the supportive

nature of the person-pet relationship (Collis et al., 1993). Person-person support has been associated with amelioration of physical and psychological responses to stressful life events (Cohen & Wills, 1985; Stroebe & Stroebe, 1995). Thus, pets may function in a similar role on some dimensions of support, such as emotional, esteem, or network support. Although, some studies report disadvantages associated with pet-ownership (Edney, Jennens, & Jones, 1993a; Plaut, Zimmerman, & Goldstien, 1996; Tan, 1997) most recent research has claimed support for the popular view that *'pets are good for you'*. The reported advantages generally focus on three broad areas, physical well-being, psychological well being and social benefits. Studies reporting physiological benefits cite a lower risk factor for cardiovascular disease, lower blood pressure (see also Anderson, Reid, & Jennings, 1992; Baun, Bergstrom, Langston, & Thoma, 1984; Friedmann, Katcher, Lynch, & Thomas, 1980), lower heart rates, (Wilson, 1987) decrease depression (Bolin, 1987) and fewer minor health problems (Serpell, 1991).

Psychological benefits include reduced stress (Katcher, Segal, & Beck, 1984) increased relaxation effects (Baun et al., 1984), improved morale and decreased loneliness (Goldmeier, 1986; Lago, Delaney, Miller, & Grill, 1989; Robb & Stegman, 1983), lower anxiety levels (Wilson, 1991) and enhanced self-esteem (Triebenbacher et al., 1998). Social benefits include increased social networks (Eddy, Hart, & Boltz, 1988; Messent, 1983).

It has been argued that in order that support is effective it needs to be perceived by the recipient as supportive (Blazer, 1982), match the needs of the recipient (Cohen & MacKay, 1984; Cutrona & Russell, 1990), and needs to be consistent and persistent (Collis & McNicholas, 1998a). The fact that the provider

is a pet may be a positive factor in explaining the relation between benefits and pet-ownership (Collis & McNicholas, 1998a). As it is the owners' perception of support which is important, if the relationship between the person and pet is perceived as supportive then the benefit is received. Also, perceived support is likely to be consistent and persistent, because it is less prone to fatigue (McNicholas et al., 1995). Although, the matching of needs may not be fully attributable to pets, because as already noted pets are unable to contribute to all dimensions of support, mismatches are less likely to occur because good social skills are not required to elicit interaction with pets (Collis & McNicholas, 1998a).

Two intervention studies have provided support for the hypothesis that pets may act as social facilitators. It is argued that pets, in providing a focus for interaction, may increase their owner's social network and thus improve well-being. Mugford (1975) found improvements in social and psychological functioning in those receiving caged birds compared to those receiving house plants. Respondents reported improved physical health, as measured by reduced reporting of minor illness and emotional well-being (as measured by the 'General Health Questionnaire') compared to baseline measures. Health benefits in other studies may have been attributable to increased physical activity associated with dog walking. For example, Messent (1983) found dog walkers elicited more social interaction compared to walkers without dogs. In order to measure the effect of social facilitation McNicholas and Collis (1998a) used a dog trained not to seek attention from passers by. They also manipulated the walkers and dog's appearance, either smart or scruffy. They found the presence of the dog acted as a social facilitator, even in the scruffy condition. However, Collis and McNicholas

(1998a) examined the social networks of dog owners, cat owners, and non-owners and found no significant differences in size.

Recovery from major illness has also been claimed to be associated with pet ownership. In a follow-up study of 92 patients, one year post myocardial infarction, Friedmann, Katcher, Lynch, and Thomas (1980) found increased survival rates for pet owners. This effect was independent of disease severity and increased exercise associated with dog ownership. However, Wright and Moore (1982) have criticised these findings, suggesting Friedmann et al., (1980) over emphasised the pet ownership variable, because it accounted for the least amount of variance in the analysis of all the factors considered. Friedmann and Thomas (1995) claimed to replicated these findings in a later study of 424 participants. However, the levels of significance reported were lower than would be conventionally expected for significance (p=0.085 rather than p=0.05 or p<0.05).

Anderson, Reid, and Jennings (1992) also reported cardiovascular health benefits associated with pet ownership. Anderson et al., (1992) found increased longevity for pet owners in a sample of 5741 participants attending a health screening programme. Anderson found pet owners were more likely to have lower systolic blood pressure, and plasma trigylerrides. However, Anderson et al., (1992) found that pet owners self reported measures of exercise were higher than non-pet owners. Exercise is suggested as health promoting and therefore the cardiovascular health benefits associated with pet ownership may be due to pet owners taking more exercise or because active people may be more likely to acquire a pet.

More compelling evidence that pets provide relational functions come from studies utilising other relational models. The models reviewed so far fail to put the person-pet relationship in the context of the individuals other human relationships. Studies which address this have used a 'social provisions model' (Weiss, 1974).

2.1.3 Social Provisions

Weiss's (1974) theory of relational provision comprises two elements. The first details the provisions that relationships provide. There are six relational provisions: attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance, which are important for well-being. Attachment refers to relationships that provide emotional closeness and security.

The Weissian account of adult attachment relationships differs from that of Bowlby (1969) and Ainsworth (1989) in that he does not explicitly require 'felt security' as an element. Social integration refers to a network of relationships. This network provides companionship, enables individuals to pool information and ideas. Reassurance of worth is derived from relationships in which an individual's competence and skill is valued. Reliable alliance refers to relationships that are lasting and dependable. Because of the enduring nature of these relationships family members generally provide reliable alliance. Guidance refers to emotional, practical and instrumental support. Opportunity for nurturance refers to relationships whereby an individual performs some caring function for another, and a sense of being needed develops for the provider.

The second element of Weiss's theory argues that in order to maintain well-being individuals need all six relational provisions to be met. It is unlikely a single relationship could provide all the necessary provision. Relationships tend to provide specific provision, for example, attachment will most often be provided by primary relationships such as family members and friends. Therefore individuals require a variety of relationships to maintain *'Adequate life organisation'* (Weiss, 1974). Failure to maintain an adequate life organisation may prompt an individual to either extend their social network to include other relationships or alter the function of existing relationships.

Although the relational provision model was developed to explore person-person relationships a number of theorists have utilised the model to explore person-pet relationships.

Enders-Slegers (2000) investigated the availability of social support for the elderly. She argued that as a person ages, they may become isolated due to the death of a partner or peers and/or reduced mobility. The reduction in relational provision may affect an elderly person's physical and psychological well-being. Based on 'Weissian' principles Enders-Slegers (2000) hypothesised that elderly people who own dogs and/or cats would have enhanced quality of life because the reduction in relational provision (attachment, social integration, reassurance of worth, reliable alliance, guidance, and opportunity for nurturance) due to a reduced social network would be maintained by the relational provision provided by their pets. Enders-Slegers (2000) interviewed 60 pet owners and 36 non-pet owners, 14 had never owned a pet. The interview schedule comprised a number of questions covering, demographics, relational provision, loneliness, life

satisfaction, plans for the future, finances, safety, contacts and mobility, and emotional support. The section exploring relational provision derived from pets comprised three questions: "what does your companion animal mean to you?", "what interactions do you have with companion animal(s)?" and "what arrangements do you have for the care of your pet in case you are ill or die?". The content of each of the three questions was analysed in categories denoted as '*meanings*', '*interactions*' and 'arrangements' respectively, to identify elements of Weiss's social provisions.

Enders-Slegers (2000) found that 'attachment, emotional closeness' was the most important social provision provided by pets, for 79/82 participants for meanings, for 58/58 for interactions, and for 6/40 for arrangements, reported as attachment behaviours. Attachment behaviours to the pets were indicated by reports of physical contact, such as stroking, contact, and talking. Attachment behaviours by the pet were classified as the pet seeking the owner. Emotional closeness to pets was indicated by reports of love, affection, and closeness to the pet. Opportunity for nurturance was the second most commonly reported provision from pets for 46/82 participants for meanings, for 17/58 for interactions, and for 39/40 for arrangements. Reassurance of worth was also reported by 29/82 participants for meanings, for 15/58 for interactions, and for 4/40 for arrangements. Enders-Slegers (2000) concluded that person-pet relationships have commonalties with person-person relationships and methodologies borrowed from person-person research can be utilised to explore relationships between people and pets.

However, it appears that non-pet owners may have contributed data to the 'meanings' dimension, as indicated by an n-value of 82. It is unclear whether non-pets owners also contributed data on the other two dimensions 'interactions' and 'arrangements'. Although the n-value for both interactions and arrangements is below 60, (the number of pet owners participating in the study) it is not clear that non-pet owners have not contributed data to these two dimensions. If non-pet owners have contributed data to the three dimensions then the results should be interpreted with caution. It seems implausible that non-pet owning participants would be able to provide valid answers to questions that clearly required that you were currently a pet owner, therefore the n >60 need to be clarified. Also, Enders-Slegers (2000) seems to equate importance with frequency. She reports that attachment-emotional closeness and opportunity for nurturance were the most important social provisions on the basis that they were the most frequently cited social provision, however no definition of importance has been made explicit. It is possible that these provisions are most frequently cited, but still of relatively low importance compared with the other provisions that they report. A further limitation of the study is that Enders-Slegers (2000) hypothesised that elderly dog and cat owners would have enhanced quality of life because pets would provide social provision; however, based on Weissian principles individuals would only experience an enhanced quality of life from relational provision provided by pets if they were lacking relational provision from other sources. People who have an adequate life organisation with all six provisions met from existing relationships would not benefit from any additional relationships, either human or animal. To identify people who would benefit from additional relationships according to

Weiss one would just need to establish whether their general needs for provision are already being met. Yet participants general level of relational provision has not been assessed.

2.1.3.1 Furman and Buhrmester's Network of Relationship Inventory

Other researchers using Weiss's model have measured relational provision using Furman and Buhrmester's (1985) Network of Relationship Inventory (NRI). The instrument is theoretically underpinned by Weiss's (1974) needs based approach and measures relational provision on a number of dimensions including: companionship, instrumental aid, intimacy, nurturance, affection, admiration, reliable alliance, satisfaction, relative power, conflict, antagonism and punishment. Participants quantify relational provision by rating three questions for each subscale, for their ten most important relationships. The NRI explores both positive and negative aspects of interpersonal relationships and also includes measures of overall satisfaction with the relationship. In addition, each relationship dyad for every member of the participants' network is measured thus, providing relationship specific measures.

Applying this model Bonas (1999) asked individuals to rate, each relational provision for each household member (both family members and pets) using a five-point-scale from 1 (***not at all)***, to 5 (***very much***). For the person-pet dyads Principal Components Analysis (PCA) was applied and revealed two components, support and conflict. The support component comprised: companionship, instrumental aid, intimacy, nurturance, affection, admiration and reliable alliance. The conflict and antagonism component comprised, conflict and

antagonism (to the other) and antagonism (from the other). Bonas (1999) found four components for person-person dyads denoted as support, conflict, relative power and intimacy. The support component comprised the same subscales as for person-pet dyads, with the exception of intimacy. For the person-person dyads, intimacy came out as a separate component. She compared person-person relationships with person-pet relationships and found relative power is a feature of human relationships. She also found the two items, which loaded most strongly onto relative power, were two nurturance items. She argues that power and nurturance are features of parent-child relationships. Relative power is not a feature of person-pet relationships and the notion that pets fulfil roles similar to children is not supported in this research. A second difference was that compared to human relationships, relationships with pets, intimacy formed part of the general support component. In human relationships intimacy was a separate dimension. Bonas (1999) notes that intimacy is concerned with confiding and that humans may look to relationships outside the family to satisfy this need. Bonas (1999) found, although, overall person-person relationships provided more support than person-pet relationships for some types of provision, namely, reliable alliance, companionship, and nurturance the mean level of provision was greatest in person-dog relationships. Bonas (1999) found differentiation amongst animal species, with dogs rated as higher providers than cats and cats rated as higher providers than other pets. For other provisions the level was comparable to that provided by people. Bonas (1999) found no support for the notion that pets compensate for lack of human relational provision. Her study provides some evidence for the notion that the person-pet relationship may usefully be

conceptualised as a social relationship. Bonas (1999) concludes that person-pet relationships have common features with person-person interpersonal relationships. In this study Bonas (1999) asked all participants in the household to complete the NRI. However she concluded that participants may gain important provision from significant others that were not in the household, for example friends.

In a second study using the NRI to explore peoples' relationships with pets Bonas (1999) focused on peoples' close relationships including those outside the participants' immediate household. Close relationships were elicited by asking participants to complete a social network diagram by writing the names of those with whom they "*feel so close that it is hard to imagine life without them*" in the centre circle. In the middle circle respondents were asked to write the names of those "*you may not feel quite that close to, but are still important to you*". In the outer circle respondents were asked to write the names of those "*who are close enough and important enough in your life that they should be placed in your personal network*". The diagram yielded both human and animal instances, 61% of pet owners included their pets. In addition participants completed a health questionnaire. The symptom checklist was used as a measure of general health and well-being and comprised 60 items, 30 representing measures of physical health and 30 representing measures of psychological health (McNicholas et al., 1995). The data provided comparisons for 1,975 relationship dyads (respondent and spouse or partner, respondent and child, respondent and parent/s, respondent and sibling/s, respondent and other family member(s), respondent and friend/s, respondent and pet/s, respondent and miscellaneous other). She found some

evidence consistent with the model that support from person-pet relationships may buffer individuals from effects of highly stressful life events, and result in fewer psychological symptoms than found in participants who did not have pets.

Harker (1997) also used Furman and Buhrmester (1985) NRI to explore both elements of Weiss's theory of relational provision, firstly to examine whether pets convey relational provision and secondly to explore whether pets augment social networks. (Harker, 1997) investigated both adults and children (4-5 years, 8-9 years & 14-15 years). She asked participants to compile a list of their ten most important relationships and participants completed the NRI for these ten relationships. Harker (1997) found that in all age groups, participants who included pets in their list of important relationships reported comparable overall levels of supportive provision compared to those who had not included pets. She also found that pets were reported to provide proportionally greater relational provision for nurturance and relative power subscales than human relationships. Compared to human relationships pets were described as contributing significantly less negative relational provision. However, as noted by Harker (1997) relational provision from pets is idiosyncratic, not all pet owners listed pets as important relationships: of the adults 58% listed a pet or pets; of the children, 91% of 4-5 years olds, 95% of 8-9 years olds, and 60% of 14-15 years olds listed a pet or pets and thus these results cannot be generalised to all pet owners. Harker (1997) concluded that for some individuals pets may provide certain aspects of relational provision at levels comparable to and in some cases greater than human provision.

2.2 Conclusions

The studies reviewed in this chapter explore the boundaries of pets as relationship providers by applying models utilised in person-person relationships. However, the evidence has demonstrated that researchers are often unconstrained by the methodological approaches they have adopted and thus their interpretation of their findings is sometimes fundamentally flawed. The attachment model has been shown to be less useful in explaining the relationship between people and pets (McNicholas et al., 1995). Although, other models such as social support and relational provision have provided some evidence that pets provide relational provision.

There are clearly differences between person-person and person-pet relationships including types of interaction and levels of provision. However, there are also similarities and participants in these studies have been able to respond to human relationship type questions about their pets. Whatever the pets are actually able to provide, people perceive them as a source of relational provisions. Taken together these studies suggest that people include pets in a category of human relationships.

CHAPTER THREE | THE CONCEPT OF 'FAMILY' AND 'FRIEND'

3.1 Introduction

The notion that pets are conceived of as a family member or a friend is commonly cited in literature exploring person-pet relationships (Cain, 1985; Peretti, 1990; Voith, 1985), in popular culture, and the press (Norris, 1997). This extension of relational categories further legitimises attempts to model person-pet relationships using concepts from person-person relationships, based on the assumption that relationships between people and their pets have much in common with relationships between people. As previously discussed in chapter 2, some researchers have concluded that pets may provide people with relational provisions such as affection, opportunity for nurturing, companionship and support (Bonas, McNicholas, & Collis, 2000; Enders-Slegers, 2000; Harker, 1997). As such provisions for people are often met within social groups such as the family and within friendships (Hinde, 1996; Witenberg Fisher, 1996), it seems a plausible hypothesis to propose that pets are perceived as members of these social groups. However, the support for this proposal is mixed. While it is widely supported in the literature exploring person-pet relationships the findings are not reflected or reflected to a lesser extent in literature exploring human relationships only (Argyle & Henderson, 1985; Davis & Todd, 1985; Gilby & Pederson, 1982;

Hodkin, 1983). This chapter will review a number of literature sources in an attempt to explore this dichotomy and evaluate the evidence that pets are members of these relational groups.

3.2 The concept of 'family'

Most people grow up in a 'family-like' structure and go on to form a family structure of their own, separate from their family of origin (Hinde, 1996). The functions of 'family' vary across cultures and time, although the socialisation of children within a culture is a primary function common to all societies (Parsons & Bales, 1955). Witenberg Fisher (1996) states that the function of the family is also to provide affection, emotional support and a sense of belonging. Familial relationships are involuntary and generally lifelong. Mutual obligation, rituals and social rules together with evidence of exchange of goods and services are seen as important principles in describing behaviour between family members (Stein, 1992).

Individualist approaches have revealed insights into family dynamics, by exploring relational dyads within the sub-disciplines of psychology, for example, the role of the family in differences in sibling relationships (Dunn, 1996) and adolescent sexual behaviour (Witenberg Fisher, 1996). Family has also been researched from an evolutionary perspective. Evolutionary psychologists explore how genetic predisposition influences social behaviour, based on the assumption that current social behaviour is influenced by previously adaptive behaviour and thus manifest today because of its survival and reproductive advantages. Emlen (1997) studied animal family systems from an evolutionary perspective. Based on

this research he proposed 'evolutionary principles' which he argues accounts for the formation, structure, stability and dynamics of biological families. Emlen (1997) proposes that genetic relatedness differentially effect family dynamics. Families with high genetic relatedness demonstrate more co-operative behaviours and families with low genetic relatedness demonstrate more conflict. Although, each sub-discipline has added to our understanding of family dynamics no explicit family theory has been posited (Crosbir-Burnett & Lewis, 1993).

The configuration of the family in Britain has changed over the last 30 years; witnessed by a decline in the nuclear family and an increase in the number of cohabiting couples (both heterosexual and homosexual), together with a rise in the proportion of childless couples, one parent families and those living alone (Pullinger & Summerfield, 1997). This change in the configuration of family is reflected in many western societies (Copeland & White, 1991) and has led a number of theorists to ask "what is family" (So & Hodkin, 1987; Surra, 1991b; Trost, 1990). A selection of the many attempts to define 'family' are presented in Table 1 and Table 2. Table 1 consists of 'expert' definitions provided by theorists and Table 2 consists of 'lay' definitions. The lay definitions were taken from responses to a questionnaire study (N=290) exploring the nature of modern families and were elicited by the question "what is family" (Fisher, Collis, & McNicholas, 1998).

Table 1 Definition of family - Expert

Definitions Of Family
"Set of relationships determined by biology, adoption, marriage, and in some societies, social designation and existing even in the absence of contact or effective involvement and, in some cases, even after death of certain members. This implies that the boundaries of a family, according to this definition, is subjective" (Boyd-Franklin, 1989).
"After the birth of a child a couple become a family" Witenberg Fisher (1996).
"A group of people connected by a close relationship. For legal purposes a family is usually limited to relationships by, blood, marriage, or adoption, although sometimes (e.g., for social security purposes) statute expressly includes other people, such as common-law wives. The courts have interpreted the word 'family' to include unmarried couples as husband and wife in permanent and stable relationships" (Martin, 1994).
"the unity formed by those who are nearly connected by blood or affinity " (Sinclair J, 1994).
"Families are of different structures and forms, even though the traditional definition is limited to the domestic unit or households made up of persons related by blood, marriage or adoption. The household shares cooking facilities and provides sleeping arrangements. It is the unit that legitimately procreates and socialises children. Families have extended as well as nuclear dimensions. For all the problems and difficulties families have had, the family household is the most effective institution human kin has evolved to care for and socialise the young. It is not a unitary monolithic concept, but a plural one with many varieties, both exotic places and within our own society. New variations have always been formed adaptively as social and environmental conditions have changed, giving rise to the rich variety of kinship systems described by anthropologists" (Rappoport, 1997).
"A system of interacting personalities bound by biology, rules, and ritual" (Boss, 1988).
"Either a married or cohabiting couple, with or without their never married children, who have no children of their own, or a lone parent with such children. This definition is essentially that of a nuclear family as it excludes relations other than parents and children. Step-children and adopted children belong to the same family as their step-parents or family that adopted them. Foster children, however, are not part of their foster parents' family as they are not related to their foster parents" (Pullinger & Summerfield, 1997).
"The only real family is the mother and the baby. Everyone else is peripheral" (Rayner, 1994).
"...offspring continue to interact, into adulthood, with their parents" (Emlen, 1997)
"...he nevertheless did not feel entitled to find that a couple in a long standing stable and exclusive homosexual cohabitation fell within the definition of family. The law in England regarding succession to statutory tenancies was formerly rooted in the concept of the family as an entity bound together by ties of kinship, including adoptive status, or marriage. The only relaxation, first by court decision and then by statue had been a willingness to treat heterosexual cohabitants as if they were husband and wife" Lord Justice Waite.

Table 2 Definitions of family - Lay

Definitions Of Family
"A grouping of humans with a tie of vows exchanged to each other swearing loyalty, devotion and mutual support or a tie created by birth. The first is a matter of choice but the second not but is a tie which introduces a sense of responsibility and loyalty to those included."
"A traditional family would generally consist of a mother, father and children with an extended family including grannies, granddads aunts etc. A family now however can be one parent two same sex parents, half brothers, half sisters, aunts acting as parents – endless possibilities!"
"Families are based on hereditary structure but a 'family' usually means a child or children and their parents. Other relatives fit in around this unit but the child/parent part is the most distinct 'family'. Families rely on one another for love and support and the children especially for care and protection. Families may do things together but this is now less common – the family is now just a base for each person's own individuality."
"A group of people who live together in peace – not always related."
"My idea of family would be best described as keeping up a genuine interest in each individual you would consider to be a member of your family. A group of people you form emotional attachments with. I would say a member of a family would always experience a bond with others members of the family. Also people who are blood relatives."
"People and pets who live with you (in the same residence) and are related you (in the case of pets, they do not have to be!)."
"A family is two people of the opposite sex who produce babies and live together."
"A family is a number of people that are joined either by marriage or blood related. Brothers, sisters, uncles, aunts, grandparent's etc. are all members of your family. Close friends can also be developed into your family background."

From the table of expert definitions it can be seen that some theorists define family by way of blood ties (consanguinity), for example, the definitions by Witenberg Fisher (1996) and Rayner (1994) (Table 1), both suggest that the birth of a child creates and defines a familial relationship. However, given the rise in new family constellations, a definition based solely on these criteria would exclude a number of important relationships, for example reconstituted families. Given this metric, pets would also not be considered family. Although, the emphasis on consanguinity is evident in other definitions (Boyd-Franklin, 1989; Kaiser, 1996; Martin, 1994; Pullinger & Summerfield, 1997) (Table 1), other features such as conjugality and cohabitation are also seen as important factors. These definitions provide a broader base and would encompass other family constellations such as reconstituted families, although they would still exclude pets. Interestingly, homosexual cohabitation is not sufficient to define a family (Lord Justice Waite). Definitions incorporating affinity such as that given in the Collins English dictionary (Sinclair J, 1994) would enable pets to be considered family members, however, by adopting such a loose definition of family, there is a danger of the term losing all of its explanatory value. The definitions provided by 'experts', incorporating notions of consanguinity, conjugality, cohabitation and affinity are reflected in the 'lay' definitions presented in Table 1.

It appears that an agreed definition of 'family' that encompasses all valid members of family is not available, and although many definitions have been suggested, as reported by Surra (1991b) there is "no answer yet". As a scholar in the field of family research Trost (1990) laments the difficulty in defining the concept of 'family', arguing that it hinders communication within the discipline.

The search for a definition of the term 'family' has led a number of researchers to explore the extension (category members) and intension (necessary features) of the category (Hodkin, 1983; Hodkin, Vacheresse, & Buffet, 1996; So & Hodkin, 1987).

3.3 Studies exploring the concept of 'family'

An early study which shed some light on the concept of family was undertaken by Battig & Montague (1969). Although the objective of their research was to collect category norms for verbal categories rather than to explore peoples' knowledge of social relationships, it provides an early insight into the configuration of 'family'. In the study, participants were asked to list people or objects belonging to the category 'relative'. The responses are reproduced in Table 3. Instances with frequencies greater than ten tended to be those that could be described as nuclear and extended family. Instances with frequencies of less than ten could also be described as nuclear and extended family but they also included other relationship terms such as step and half relationships, instances not necessarily defined by consanguinity, conjugality, and cohabitation such as god parents and objects such as home. Pet was not identified as a member of the category 'relative' in this study. It is not surprising that pets are not included in the category norms as the term 'relative' suggests a consanguinal or conjugal relationship.

Table 3 Responses for the category 'relative'

RELATIVE			
(FREQUENCY >10)		(FREQUENCY <10)	
Aunt	In-laws	Dad	Great-grandparents
Brother	Mother	Mom	Third cousin
Brother-in-law	Mother-in-law	Child(ren)	Stepparent
Cousin	Nephew	Grandson	Stepdaughter
Daughter	Niece	Granddaughter	Sibling
Father	Second cousin	Stepfather	Great-great-granpop
Father-in-law	Sister	Parents	Grandmother
Grandfather	Sister-in-law	Stepsister	Great-great
Grandmom	Son	Stepson	Grandnephew
Grandmother	Uncle	Stepmother	Granddad
Grandparents	Wife	Stepbrother	Godson
Grandpop		Half sister	Goddaughter
Great-aunt		Half brother	Godchild
Great-grandfather		Godparents	Duchess
Great-grandmother		Godmother	Duke
Great-uncle		First cousin	Home
Husband		Son-in-law	Removed

A number of researchers have used a similar paradigm to explore peoples' representation of the concept 'family' (Buffet & Hodkin, 1995; Gilby & Pederson, 1982; Hodkin, 1983; Hodkin et al., 1996; So & Hodkin, 1987; Trost, 1990; Trost, 1995). Researchers exploring the concept of 'family' have focused on two separate, although, interdependent constructs; intension and extension. Intension refers to the set of attributes required to be a member of a particular concept and extension refers to instances of the category (Anglin, 1977).

Piaget (1928) was the first to examine the intension of 'family' through his

work with children. He asked boys (7-13 years) to define 'family'. Piaget's research identified three stages of representation; in the first stage younger boys based their definition on co-residence, so all those who lived in their household were considered family; in the second stage the boys limited their definitions to individuals who were biologically related and lived in the same household. In the final stage, older boys considered all relatives to whom they were biologically related irrespective of whether or not they were present in their household.

In order to explore the conceptualisation of 'family' Trost (1990) asked participants to "list all those that counted as family members". Trost (1990) did not present the exact figures for these findings but claimed that 'about' two-thirds of participants listed spouse/partner, child(ren); half of the participants included parent(s), one-third included a sibling(s); and less than 10% included: grandchildren, children's spouses, in-laws, step relatives, nephews and nieces, ex-spouse, pet(s) and friend(s).

In a Canadian study exploring the concept of 'family', Hodkin (1983) asked participants to complete a free-response listing task, which sought to identify "who is in your family"; then to "construct a typical family" using pre-prepared symbols (line drawings) of males and females representing all age categories from infancy to senescence, and pets represented by a dog and a cat; and finally to compete a rating task, in which participants were asked to rate (using a seven point scale) characteristics generated from a previous study which they considered unimportant/important in the definition of 'family'. (Hodkin, 1983) reported that in the listing task the majority of participants, (65%), listed only members of their nuclear family and although, none of the participants listed

non-kin relationships such as friends and romantic partners, 29% listed pets.

However, the majority of participants who were asked to construct a 'typical family' using the line drawings did include members other than the nuclear family, and the number of pets included more than doubled to 65%. In the rating task, emotional items were rated higher than consanguinal items, although consanguinal items were rated as 'somewhat important'. The finding that emotional items were rated as more important in defining family provides a basis for the inclusion of pets within the concept. Unfortunately, the purpose of this study was to examine trends in the nature of the family and therefore specific pet ownership variables were not recorded so it is unclear exactly how many pet owning participants included pets as family members.

Using the same methodology as Hodkin (1983) So and Hodkin (1987) also explored the concept of 'family' in three generations of Chinese-Canadians (9-13 years, 30-50 years, and 65 plus). So and Hodkin (1987) predicted that the extension of the concept of 'family' would be differentiated between the generations. In the listing task they found that 48% of participants listed only nuclear members. As predicted the extension of 'family' was differentiated between generations, with the elderly listing significantly more extended members than either the adult or child groups. Only 3% of participants included pets in their list of family members.

In the construct a 'typical family' task, the inclusion of only nuclear family members decreased to 25% and the majority (58%) of respondents included extended family groups. As predicted, the elderly group included significantly more extended members than either of the other two groups and the

inclusion of pets as family members increased to 35%. In the rating task, emotional items were again rated as more important in defining family than consanguinal items. So and Hodkin (1987) expected to find differences between the elderly and the other two groups in terms of who they nominated as family members and in the two tasks, they concluded that this difference was a function of their exposure to Canadian culture.

These studies highlight the importance of methodology for the data collected. Both studies found similar effects, in that participants nominated different categories for family membership depending on the task. When participants were asked to list those who were in their family they tended to list only nuclear members. When asked to construct a 'typical family' from instances provided they tended to include members from an extended family group and the number of pets included increased.

There are a number of possible explanations for this difference. One possibility is that their responses in the listing task may have been constrained by the emphasis placed by many western societies on the nuclear family prototype (married couple and their biological children). Although this family model has fallen into decline in recent years, and many variants now exist, it is still the dominant configuration in the western world and portrayed as the ideal. It is also likely that many participants were not pet owners themselves, and so would not have the opportunity to include them in their own family.

In the task to 'construct a family', participants were able to choose instances from a list of many other possibilities and thus participants were 'explicitly sanctioned' to include other members. However, an alternative

explanation could be that they may have construed that they should in fact use the available instances provided in the task, because "why else would the experimenter have provided them". Research has shown that in an effort to be a 'good participant' people may give answers in accordance with what they believe is the researcher's hypothesis (Orne, 1962).

One of the most important conclusions that can be drawn from these studies is that the experimental methodology adopted is important, and very likely to affect the data collected and hence the inferences that may be drawn. In order to address this issue, Hodkin, Vacheresse, and Buffet (1996) directly compared two methodologies, a free listing task and a checklist task. Participants completed both tasks, although the order of presentation was counterbalanced. In the free listing task, participants were asked, *"who is in your family?"* in the checklist task participants were given a list of person categories and asked to *"check off the people below who YOU consider members of your family"*. The categories included nuclear and extended family members, pets and friends. The researchers hypothesised that participants would include category members other than nuclear in a checklist rather than a free-list task.

They found that participants nominated members based on the order that the tasks were completed. When the listing task was presented before the check list task, 40% of participants included only nuclear members, however when the order of task presentation was reversed, more participants included extended members in the listing task. For pets, if the listing task was presented first, 13% of participants included pets, compared with 71% if participants received the checklist task first. Similar results were reported for friend and romantic partner

nominations.

Hodkin, Vacheresse, and Buffet (1996) argue that both free listing and check-list tasks demonstrate validity, in that both tasks tap different aspects of the concept. They suggest that the most valid procedure may be the free-response task when it is followed by the checklist task and suggest "the subject is in a position to express his/her own perceived family without bias to name nuclear members, but also without bias to include those who are not personally felt to be family" (Hodkin et al., 1996p 53). However, the checklist task biases the participant's responses irrespective of whether it is presented first or following the free response task. This effect is clearly demonstrated by examining the comments reported by Hodkin et al., made by participants at the end of the task.

> *"On the free-response I put people who I considered were in my family... when I got the checklist I opted to include people because they were there...(the checklist)...gave me an idea of what was perceived as family"* (Hodkin et al., 1996p 53).
>
> *"You've got pets included, you've got friends included...so it gave me an idea of what it was you were looking for"* (Hodkin et al., 1996p 53).
>
> *"Had I received ...the open-ended one first I would have been like everyone else...tend to stay with the nuclear family rather than open it up"* (Hodkin et al., 1996p 53).

The qualitative responses clearly demonstrate that the participant answered in accordance with what they believed were Hodkin et al., (1996) hypotheses (Orne, 1962).

These findings suggest that the methodology used to examine concepts of 'family' affects the data collected, and that in free listing tasks the majority of participants include only nuclear members with the minority including extended and non-kin relationships such as pets, friends and romantic partners. If participants are given instances to select from, either in the form of a checklist task or a 'construct a family' task, then the configuration changes and more participants include extended family and pets.

These findings suggest that the methodology is not reliable, either within or between tasks. In listing tasks, previously reviewed the nomination rate for pets as family members varied between 3% and 29%. In 'prompt' tasks the nomination rate for pets as family members varied between 35% and 75%. It is important to establish both a reliable methodology and a reliable figure for the inclusion of pets within the family if we are to assess whether the 'family' concept is a suitable framework to describe the person-pet relationship.

However, it is unclear exactly how many pet-owning participants included pets as family members. The purposes of these studies were to explore the concept of 'family' and not the inclusion of pets in the 'family' concept. Studies that set out to specifically address this issue have found that the majority of pet owners consider their pets family members (Cain, 1985; Voith, 1985). This is discussed further in the following section.

3.4 Pets as family members

Studies exploring the relationship between people and pets have noted that pets are included as family by pet owners. Fogle (1983) argues that the change in

family configuration, with a decline in traditional families and the dispersion of extended family members has led to pets fulfilling family member-like functions. There is some support for this claim in Britain, where, as in other western societies, the importance of the traditional family, conceptualised as a married couple with their dependent children has declined over the last 30 years (Pullinger & Summerfield, 1997). In addition, others have identified that although, most people in western societies are in weekly contact with their family, and three-quarters of elderly people over 65 have weekly contact with their relatives (Pullinger & Summerfield, 1997), there has been a decline in physical contact with family and friends (McGlone, Park, & Roberts, 1999). It has been suggested that pets in western society may fill this gap (Fogle, 1983).

Some support for the claim that pets are represented as members of the family comes from the observation that pet owners often make naming errors between household members and their pets (AAHA, 1996). This study of pet owners found that 38% of participants sometimes referred to their spouse by their pet's name, 11% called their child by their pet's name and 25% called their pet by their spouses or child name. The survey also reported that naming errors were more common amongst pet owning women than amongst pet-owning men.

Naming errors have been used as one source of evidence in support of the claim that people in all cultures, categorise relationships in terms of combinations of four basic relational elements, comprising: 'communal sharing', 'equality matching', 'authority ranking' and 'market pricing' (Fiske, 1991). Communal sharing refers to the distribution of resources on a communal basis, without reference to cost or the obligation to repay. Relationships between family

members are characterised by communal sharing. Equality matching relationships are based on the equal distribution of reciprocity resources. Equality matching relationships are found between non-intimate friends. Authority ranking relationships are hierarchically organised and characterised by asymmetry; such relationships are typical of those in government organisations such as the armed forces. Market pricing relationships are based on proportionality, thus resources are distributed with reference to costs and benefits. Such relationships are characteristic of those in a business environment. It is argued that all social relationships may be represented by 'discrete social frames' (Fiske, 1991) and that the models representing elementary mental frames account for social activities such as motivation, planing, production, comprehension, and co-ordination. These function as a cognitive schema for evaluating social actions based on combinations of the four basic relational models.

The main source of support for this relational model theory comes from naming errors, the phenomena that occurs when people mistakenly substitute one objects name for another (Fiske, 1993). It is assumed that this substitution indicates that the intended and substituted objects are in some way equivalent. Fiske's study collected retrospective and prospective social naming errors by asking participants to keep a diary and record both the error and the type of relationship they had with those the participants had confused. He found that people often misnamed those whom they had the same form of relationship with in terms of the four basic relational elements. However, errors between relational categories were much rarer.

The finding that pet owners confuse pets with other household members suggests that some pet owners categorise their relationships with their pets in a similar way to those with other people because they share the same relational resource relationship. Given that pet naming errors occur with other family members, this suggests that the relational type is the same and pets are mentally conceptualised in the same manner as other family members.

A number of studies have directly assessed whether pet owners consider their pets family members, these studies have generally found a high percentage of pet owners who consider their pets to be members of the family (Table 4). These studies have reported behaviours towards pets that are similar to those of family members. For example, studies have shown care giving behaviour towards pets (Beck & Katcher, 1996; Hirschmann, 1994), other studies have found that pet owners talk to their pets in a modified form of motherese known as doggeral (Hirsh-Pasek & Treiman, 1982).

Table 4 Studies citing pets as members of the family

STUDY	PERCENTAGE
(Albert & Bulcroft, 1988)	87
(Anderson, 1985)	81.58
(Beck & Katcher, 1996)	>70
(Cain, 1983)	87
(Cain, 1985)	68
(Catanzaro, 1984)	98
(Friedmann, Katcher, Eaton, & Berger, 1984)	88 Current
	81 Former
(Hirschman, 1994)	80
(Jones, 1983)	96
(Katcher & Rosenberg, 1979)	93
(Katcher, Friedmann, Goodman, & Goodman, 1983)	48
(Soares & Whalen, 1985)	99
(Voith, 1985)	99

One study, which directly assessed whether pet dogs were located in the family sphere, was undertaken by Barker and Barker (1988). They used the 'Family Life Space Diagram' methodology, instructing participants to locate on the diagram, themselves, their family members, and their dog. Barker and Barker (1988) report that prior to instructing participants to locate their dog on the diagram 'some' participants had already done so. They found that dog owners located their dogs in close proximity to other family members such as spouse, child, or parent. It would have been interesting to note how many participants had spontaneously located their dog on the diagram prior to the instruction to do so.

Barker and Barker (1988) criticised 'The Psychology Today Survey' which found that pets were ranked lower in importance than immediate family members and they suggest that the findings may be due to social desirability bias

which would function to prevent participants ranking pets higher in importance than family members. However, Barker and Barker (1988) themselves may have fallen victim to a similar bias in that subjects may have felt obliged to locate their dog in a similar relation to other members when requested to include their dog on the diagram.

Hirschman (1994) explored the association between consumers and their pets, using twenty-five phenomenological interviews. Hirschman (1994) found three categories of relationship between consumers and their pets, denoted, 'pets as family members', 'pets as friends' and 'pets as self'. In the study, 80% of respondents 'spontaneously' describe their pet as a 'member of the family'. However, respondents were informed about the nature of the study and further, the interviewer admits to having known the participants personally, and this may have affected the respondents' behaviour.

Within Hirschmann's (1994) study the two roles most commonly ascribed to pets, were 'sibling' and 'surrogate child'. As surrogates, pets may provide an opportunity for nurturant behaviours in those intending to have children, those, whose children had left home, or childless couples. Respondents acknowledged different expectations and aspirations for their human and pet 'children'. Human children are expected to attain independence whereas pets are expected to always be dependent. Hirschman (1994) found that pets were often included in family rituals such as Christmas and birthday celebrations and owners often carried photographs of their pet with them. Hirschman (1994) also suggests that 'most commonly' people perceive their pets as a friend, citing unconditional love and loyalty as important attributes.

Hirschman (1994) argues that pets belong, simultaneously to two categories, 'family' and 'friend', and she supports this claim with results that show that 80% of respondents nominate their pet as a family member, and that participants most commonly perceive their pets as friends. However, although some attributes of 'family' and 'friend' may overlap (Davis & Todd, 1985), it is generally argued that friends and family members have distinct attributes, for example, the relationship between family members is involuntary compared to the voluntary nature of friendships (Argyle & Henderson, 1985).

Cain (1983) also claims to have found that a high percentage of pet owners consider their pets family members. Using Systems Theory to investigate the role of the pet in the family, she designed a sixty-one-item questionnaire. She found 87% of respondents described their pets as 'members of the family', and that 36% of those thought of their pet as a person. Cain (1983) found that pets were considered to be fulfilling important relational roles when respondents were sad, lonely, or depressed, and that the relationship became especially significant during illness or following family bereavement. Other significant events identified were times of crisis such as job losses, separation, and divorce, absence of spouse or children, during childhood and adolescence or when children had left home. Some respondents stated that pets were important in all periods while other pet owners said that their pets were not important.

Cain (1983) proposed that pets act as 'barometers' reflecting their owners moods. She found in times of high tension some pets sought family members whilst others withdrew from family members. She also found that pets were often involved in 'triaganulation' processes, involving, affection, anger, distracting and

distancing. She found that negative comments were often redirected towards pets rather than directly to the other person, and thus pets were used as a vehicle to safely express emotion (i.e. 'kick the cat syndrome').

In a second study Cain (1985) surveyed military personnel with pets. The study had four aims: "to survey a cross section of American families, to survey mobile military families, to survey the pet's role in the quality of life of service families and to survey the pet's role in community health". Again she found the majority of participants (68%) claimed their pet was a family member and that comparable number (39%) had 'people status'. Cain proposes that seven functions are provided by pets as family members: "something to care for; something to keep us busy; something to touch; something to watch; something that makes us feel safe; something that provides a stimulus to exercise; and something that guarantees us companionship".

In both studies Cain (1983; 1985) finds support for the notion that pet owners consider their pets family members, and claim a sizeable minority of participants said their pets had people status.

Soares and Whelan (1985), studied the role of dogs in families, in order to investigate the responses of dogs to family dynamics and to understand the factors that determine the degree of satisfaction perceived by families with their dogs. They found 99% of their sample considered their dogs to be members of the family and report that the most frequent role attributed to the dog was that of friend. Although this provides more support for the notion of pets as family members the study combines two concepts, that of 'family member' and of 'friend'.

A study by Beck and Katcher (1996) reports that over 70% of respondents claimed their pet was a family member. They argue that the role of the pet in the family is that of a child, because of the nurturing behaviour directed towards pets and the owner's acceptance of the animal's excrement. Albert and Bulcroft (1988), hypothesised that pets are viewed as family members in the urban American household. They asked participants to rate on a one-to-five scale the extent to which their favourite pet is a member of the family, where five is 'very much' and one is 'not at all'. They found high ratings in support of their hypothesis with 87% of owners rating their pet as either a five (48.8%) or a four (38.1 %). They therefore concluded that the majority of urban owners viewed their pets as family members.

Jones (1983) investigated the association between people and their horses in order to explore differences between horses and other types of pets. In a questionnaire study, she found more than 80% of children considered their horses to be members of the family. She concluded that co-residence may not be a core defining attribute of family membership.

Berryman, Howells, and Lloyd-Evans (1985) compared person-person and pet-person relationships using the repertory grid technique for eight relationships types: same sex parent, spouse or current boy/girlfriend, same sex friend, child under 10 years old, their own child under 10 years old, disliked person, current pet, and previous pet. They found that compared to '*current pet*' the most similar relationship type was '*previous pet*', followed by '*own child*'. They also found that participants supported their selections by citing 'dependency', 'fun/play', and 'relaxation based on absence of demands' as features of the relationship.

Berryman et al., (1985) found that relationships with pets were only rated as intermediately important to the majority of owners.

3.5 Pets As Friends

Many of the studies reviewed in the previous section suggest that nomination of pets as a 'friend' is almost as frequent as nomination of pets as a 'family member'. The theoretical underpinnings for the explanation of this bear consideration. The concept friend has been variously defined and different theorists emphasise different features in their definitions. Duck (1994) proposes that talking, shared memories, trust, commitment, and concern for the others well-being, are all characteristic of friendship. Alternatively, Kahn and Antonucci (1980) suggest three provisions characterise friendship: 'assistance' (information and practical assistance), 'affect', (emotional support and enjoyable association) and 'affirmation' (validation of self-worth). Planalp and Garvin-Doxas (1994) lean towards Duck's definition, highlighting self-disclosure as an important feature of friendship. Hinde (1997) proposes that friendship is characterised by feelings of 'comfort, freedom and naturalness of emotion' which is dependent upon reciprocity. Whilst Argyle and Furnham (1982) suggest friendship is defined by the activities that friends participate in, for example, they found that friends typically engaged in eating, drinking, talking, and joint leisure activities. Argyle and Henderson (1985) (Table 5) go on to formally propose that there are a number of rules that characterise friendship and that transgressing the rules can have an adverse effects on the friendship.

Table 5 Rules for Friendship (Argyle & Henderson, 1985)

RULES OF FRIENDSHIP
Volunteer help in time of need
Respect the friend's privacy
Keep confidences
Trust and confide in each other
Stand up for the friend in his/her absence
Don't criticise each other in public
Show emotional support
Look him/her in the eye during conversation
Strive to make him/her happy while in each other's company
Don't be jealous or critical of his/her other relationships
Be tolerant of each other's friends
Share news of success
Ask for personal advice
Don't nag
Engage in joking or teasing with the friend
Seek to repay debts, favours, and compliments
Disclose personal feelings or problems to the friend

From the previous various definitions, it is apparent that there are no universal acknowledged defining features of friendship. A number of studies have explored the extent to which pets are perceived as friends.

Dunn (1999) asked participants to complete modified Quality of Relationship Inventories (Pierce, Sarason, Sarason, Solky-Butzel, & Nagle, 1997). This questionnaire was originally designed to assess factors of support, conflicts and depth in specified human-human relationships. In Dunn's study, participants completed comparable questionnaires for their dog and close friend. Dunn found significant numbers of participants nominated pets as being able to provide friend like support, i.e. being able to count on the dog for advice with problems (25%),

being able to count on the dog for practical help with problems (30%), help if a family member died (80%), and to listen to them when angry at someone else (63%).

Hinde (1997) argues that human friendships vary in the features that characterise the relationship. However, some features, such as a shared language is considered fundamental in forming relationships such as friendships (Duck, 1994; Hinde, 1996). Although, studies have reported that pet owners communicate non-verbally, based on "mutual understanding" (Hirschman, 1994; Peretti, 1990) and talk to their pet as though it were a person, the fact that pets are unable to communicate verbally is a limitation. Talking is an essential element in processes such as self-disclosure, shared memories, joking and teasing, important in the formation of relationships such as friendships. On the other hand, for some pet owners the fact that pets are not capable of verbal communication is unimportant and even advantageous (Serpell, 1996).

For some features of friendship such as support and validation of self worth, researchers have found that pets are perceived to provide provisions comparable to those from human relationships (Bonas, 1999; Enders-Slegers, 2000). In addition pets would be good at keeping confidences, not criticising in public and not nagging! Hirschman (1994) argues that pets may be better friends than people, because pets do not manifest traits such as envy, jealously, elitism, or materialism and they provide unconditional love and loyalty.

Peretti (1990) explored the elderly-animal friendship bond to explore whether the person-pet relationship could be usefully explained within a friendship framework. Peretti (1990) interviewed participants to determine the

number and nature of friendships in their friendship network, focusing on the attitudes of the owners towards their dogs. Participants were informed that the study concerned friendship and their attitude and feeling toward their dog as a friend. The interviewers used specific probe questions to focus participants on salient variables of their pet friendship. He found that five variables could be used to describe the person-pet friendship: companionship, emotional bond, usefulness, loyalty, and no negotiation. Support for the companionship variable was derived from the response of a majority of participants who said their pet was their only friend. Other participants also stated that companionship in their person-pet friendship was as strong as that in their human friendships. Companionship was cited as the most important variable for women and men. Peretti (1990) found participants claimed their dog gave them something to do: feed, water, groom, pet, walk, to fulfil; providing them with an outlet for the need to nurture. Participants also talked to and confided in their dogs and claimed that their pets helped them to solve problems, by enabling them to talk through their problems and possible solutions with their dog. Participants claimed that they treated their dogs as well as they did their human friends and valued their relationships equally. In particular, they claimed that they believed they knew how their dogs were feeling and what they were thinking. Peretti concluded that there was an elderly-animal friendship bond.

Serpell, (1989) also argues that the concept of friendship is a useful framework to describe the person-pet relationship. He claims that pet owners most commonly categorise relationships with dogs as friendships. However, Serpell, (1989) argues that the friendship relationship between people and pets is

asymmetric and applies only from the person's perspective. He claims because of the subordinate behaviour of pets in the presence of humans that friendship is not an applicable construct from the perspective of the pet. He argues that because people derive relational provision, for example, support and validation of self worth comparable to human provision from their pets then the friendship construct is only applicable from the human perspective. However, some theorists stress the importance of interdependence in defining friendships (Hays, 1988), therefore, the term friendship as outlined by Serpell, (1989) would not be appropriate to describe one-sided relationships.

Friendship has been variously defined. Some of the characteristics proposed would be appropriate to describe the person-pet relationship as a friendship. However, the difficulty in defining friendship itself makes the assessment of whether pets are friends imprecise. Some features suggestive as definitional of friendship, such as, confiding and reassurance of self worth are manifest in the person-pet friendship, however, other features such as practical assistance would seem absent.

3.5.1 Methodological issues

In most studies, it is often taken as given that participants' overt responses accurately reflect their internal representations, suggesting that individuals are able to accurately report the content of these internal representations (Turner & Martin, 1984). This assumption theoretically underpins the methodology used by those employing survey techniques (Turner & Martin, 1984). However, the responses individuals give to survey questions may not always represent what

they think. In many of the studies revisited it has been highlighted that in an effort to be a 'good participant' people may give the answers in accordance with what they believe is the researcher's hypothesis (Orne, 1962). Even when the aim of the survey in not explicit, participants will sometimes use cues in an effort to provide the requested information. For example, the respondent may consider the response format, the order of the questions, the wording of the questions, and take this into account when answering the question. All of this information may provide a cue to the researcher's intent and will therefore impact on the results. This is especially relevant in those studies where the participant may already have an overt clue to the nature of the study, through either previous personal contact with the researcher, e.g. Hirschman (1994), where effects of cueing by a previous pet related task were demonstrated, e.g. Hodkin et al (1996), or where the nature of the study was known from the outset, e.g. Cain (1983).

In other studies, participants have been explicitly invited to consider pets as potential family members, e.g. Barker & Barker (1988). Taken together these problems indicate that in order to obtain more valid data, steps should be taken to ensure as far as possible that respondents are unaware of the researchers hypotheses and inevitably that participants are not reused.

3.6 Conclusion

The extension of the concept 'family' and 'friend' to include pets accounts for attempts to model person-pet relationships using concepts from person-person relationships. This endeavour is based on the assumption that relationships between owners and their pets have much in common with relationships between

one person and another. In general, research exploring the relationship between people and pets finds between 70%-99% of pet owners describe their pets as important members of the family (Albert & Bulcroft, 1988; Cain, 1983; Hirschman, 1994; Voith, 1985) and in other studies 75% of participants claimed the pet is their friend (Peretti, 1990). The finding that the focus of the study determines the relational descriptor given to pets is important. When the focus of study is on pets as family members, the majority of participants concur that pets are family members (Cain, 1985), conversely when the focus of the study concerns pets as friends (Peretti, 1990), the majority of participants concur that pets are friends. In some studies, pets are claimed to be both family members and friends (Hirschman, 1994), and although some attributes of 'family' and 'friend' may overlap (Davis & Todd, 1985; LaGaipa, 1977) it is generally agreed that friends and family members have distinct features.

These studies demonstrate a large experimental effect suggesting that the methodology used to assess the extension of the concept 'family' is flawed. In studies exploring the concept of 'friend' researchers tend to focus exclusively on human relationships exploring friendship categories such as 'best friend', 'close friend' (same sex), 'close friend' (opposite sex). A further complexity is that the concept of 'family' and 'friend' are extremely difficult to define and there is no agreed definition for either concept. In order to assess whether the concept of 'family' and 'friend' are useful frameworks for describing the person-pet relationship it is important to determine an accurate measure of the number of pet owners who consider their pets members of these categories. To obtain an accurate measure it is important to use rigorous methodology.

Methodologies borrowed from cognitive psychology use rigorous methodology and have provided insights into the content and structure of a number of 'difficult to define' concepts (Fehr & Russell, 1991). This suggests that cognitive approaches might fruitfully be used to further the understanding of pets as members of the categories of 'family' and 'friend'. This potential advance will be elaborated on further in the next chapter.

CHAPTER FOUR | KNOWLEDGE STRUCTURES

4.1 Introduction

A major problem in evaluating whether the concept of 'family' or 'friend' are useful frameworks for describing the relationship between people and pets is that both concepts are extremely difficult to define. Researchers have considered the concept of 'family' (So & Hodkin, 1987; Trost, 1990) and 'friend' (Davis & Todd, 1985) and many definitions have been proffered. However, to date there is no agreed definition of 'family' (Surra, 1991b) or 'friend' (Davis & Todd, 1985). The difficulty in agreeing on a definition for both of these concepts suggests that it may not be possible to provide a set of defining features to describe these concepts that are singly necessary and jointly sufficient to represent the category.

The prototype approach borrowed from cognitive psychology suggests that a difficulty in definition does not prevent progress being made on gaining an understanding of a concept. The approach has provided insights into a number of difficult to define social concepts, including, emotion (Russell & Fehr, 1994), love, (Fehr, 1993; Fehr & Russell, 1991), anger (Fehr & Baldwin, 1996). This research suggests that some benefit might be gained from exploring peoples' concept of 'family' and 'friend' using cognitive methodologies, as this would provide a framework within which the content and structure of the salient concepts could be visualised. The use of prototype theory to examine friendship has been advocated by Davis and Todd (1985).

This chapter outlines theories of conceptual representation and examines how these methodologies have been applied to further our knowledge of social phenomena and how they may be utilised to increase our understanding of how pets are represented within social relationships.

4.2 Categories and Concepts

People strive to make sense of the world amid a vast amount of environmental information (Carroll & Payne, 1976; Heider, 1958). The construction of categories is a fundamental cognitive ability that enables people to simplify the environment by identifying and grouping stimuli rather than storing them as unique entities (Lakoff, 1987). The ability to use knowledge previously acquired about objects, people or events enables people to *"go beyond the information given"* (Bruner, Goodnow, & Austin, 1956). However, only a subset of the available knowledge is applied in subsequent thoughts, judgements and behaviours and based on the representations that have been built and not on the original stimulus (Wyer & Carlston, 1994).

The distinction between categories and concepts is often blurred because of their interdependence, and terms are sometimes used interchangeably (Komatsu, 1992). However, a 'concept' refers to a mental representation of a class of entities and contains all the knowledge possessed by an individual about the given entities. A 'category' refers to the set of entities grouped by the concept, for example, objects, people, actions, states and events and is designated by a name, e.g. 'family' (Anglin, 1977).

An important characteristic of cognition is that, although, entities may be individually different they are treated as equivalent in thought and language because they are in some respect similar. The importance of similarity as a powerful mechanism in the categorisation process has motivated many researchers to explore cognitive models based on the measurement of similarity. Two models, a theory account (Murphy & Medin, 1985) and a similarity account (Nosofsky, 1992) have been proposed as a mechanism underlying the assignment of instances to categories. The theory account is based on the notion that category assignment is based on theories, thus an entity is not categorised as a member merely on similarity to other members but on some relation between the two, thus the relation has some explanatory power.

Alternatively, a number of researchers have argued that instances are categorised as members of a given category depending on their similarity to pre-existing category members, and models based on this principle include, classical theory, prototype theory, and exemplar theory. In this case similarity is interpreted as a function of distance in multidimensional 'psychological space' (Shanks, 1995).

4.2.1 Psychological Space Theory

Knowledge structures underpin mental life because they enable people to comprehend the external world. But what is the nature of mental representational structures? Shepard (1958) proposed the notion of psychological space as a model for representational structures. Stimuli comprising entities, objects and events are represented as precise points within the space, such that similarity can be

measured as a monotonically decreasing function of distance in the space. Shepard (1958) argued that psychological spaces are analogous to physical spaces and as such, measurements within the space can be made using a distance metric. Distances (denoted by δ), within the space obey three axioms: minimality, symmetry and triangle inequality hold:

i) Minimality: $\delta_{ab} \geq \delta_{aa} = 0$

This axiom states that the similarity between stimuli a and itself must be greater or equal to the similarity between a and any other distinct stimuli.

ii) Symmetry: $\delta_{ab} = \delta_{ba}$

States that the similarity between stimuli a and b must be identical to that between b and a, i.e. similarity is invariant to how the stimuli are presented.

iii) Triangle inequality: $\delta_{ab} + \delta_{bc} \geq \delta_{ac}$

Places a constraint on the similarity measure between three objects.

Using the Minkowskian r-metric the distance (δ) between two points in psychological space may be computed as:

Equation 1. Minkowskian r-metric formula

$$\|x, y\|_r = \left(\sum_i |x_i - y_i|^r \right)^{1/r}$$

Shepard (1958) argues that r-values (denoting the order of the distance metric) of 1 and 2 give distance measures that are most appropriate for stimuli

classified respectively as separable and integral (Garner, 1974). Separable dimensions can be individually attended to and are distinct; for example, shape comprises of the separable dimensions, size and orientation. Integral dimensions are combined and cannot be attended to individually, for example, colour comprises the integral dimensions lightness and saturation. These r-values are more commonly known as 'city-block' and 'Euclidean' metrics in the literature. The city-block computes distances between points in an orthogonal grid similar to a city street map. A city block distance measure can be computed by setting r=1 in the Minkowskian power metric formula. The Euclidean metric computes the shortest distance between two instances and can be computed by setting r=2 in the Minkowskian power metric formula. The calculation (for 2-D) is based on Pythagoras's theorem, i.e. the shortest distance between two instances lies on the hypotenuse of a triangle and can be computed as the sum of the squared distances of the other two sides. The extension to Euclidean distance enables the calculation of distance in more than two-dimensions.

If psychological space is assumed to be a multidimensional geometric co-ordinate space it can be explored using a number of mathematical tools. The MDS algorithm (Kruskal, 1964; Sherman, 1996) has proved useful in exploring such spaces, as it allows a set of co-ordinates to be determined which enable the psychological space to be visualised.

4.2.2 Multidimensional Scaling

Multidimensional Scaling (MDS) has its origins in psychometrics and is one of a number of scaling techniques used to analyse distance-like data in order

to reveal the structure of conceptual domains. MDS enables data to be described, summarised and displayed to provide insights into the underlying dimensions people use to rate the similarity between stimuli. This enables a 'conceptual map' to be plotted showing the locations of individual stimuli in psychological space. The conceptual map is constructed from similarity data, which is gathered by asking participants to make judgements regarding similarity (similarity data) or dissimilarity (dissimilarity data) of pairs of stimuli on a linear scale.

To plot a conceptual map, it is advantageous to use dissimilarity data. In this case comparing an object with itself yields a zero rating (maximal similarity of an object is to itself) and thus pairs of stimuli that are similar are plotted in psychological space. MDS produces a geometrical configuration of stimuli points from similarity/dissimilarity data using a complex iterative algorithm. Data from a similarity task in which participants are asked to rate the degree of similarity between two stimuli is used to construct a matrix of the resulting data. The size of the matrix is determined by the number of stimuli judged. For example, if participants judge five stimuli then the resultant matrix would be 5-dimensional. The purpose of MDS is to determine a geometrical configuration for the data points that is consistent with the raw distance data. For a 5-dimensional matrix it should be possible to achieve an accurate geometrical configuration in five dimensions, using some iterative procedure, and an appropriate distance metric. To produce a solution with fewer dimensions, a distance metric, for example Euclidean, is applied and the iterative procedure produces a geometrical configuration of stimulus points that best approximates the original distance data (obviously there will be some degree of error because of the reduced dimensionality). The error term is used to drive the algorithm that searches for the

best solution. Thus, MDS can be used to visualise quite complex psychological spaces in co-ordinate spaces that have a lower dimensionality than that inherent in the raw distance data. This has advantages in simplifying complex data relationships.

One of the first studies to use MDS to explore interpersonal relationships was conducted by Wish, Deutsch, and Kaplan (1976). Wish et al., (1976). They asked participants to rate the similarity between role relations such as husband-wife, supervisor-employee, provided on 25 bipolar scales, and to classify relations into similarity groups. They found four dimensions which they interpreted as: equal versus unequal, co-operative and friendly versus competitive and hostile, socio-emotional and informal versus task oriented and formal, and superficial versus intense. Wish et al., (1976) concluded that their study reveals fundamental dimensions of interpersonal relationships. The application of MDS to relational data suggests that MDS may prove a useful approach to apply to person-pet relationships with the goal of verifying theoretical claims that the place of pets is in frameworks such as 'family' and 'friend'.

4.3 Categorisation

The premise of this thesis and the approach described in this section is that people represent the external environment in the form of concepts that are used to determine categories. However, alternative accounts of mental representation have been proposed (Moscovici, 1981) and these will be discussed in the following section.

The structure of categories has been debated, and a number of approaches have been proposed to account for the relationship between attributes and members. This review will outline three of the main approaches.

4.3.1 Theories of conceptual representation

4.3.1.1 Classical theory

The classical view is based on the assumption that concepts have a definitional structure, that is, categories are defined by singly necessary and jointly sufficient features to describe an entity as a category member i.e. a list of attributes connected by 'ANDs' (Lakoff, 1987). Because every instance possess every feature all category members are equally representative, and there are clear boundaries between categories (Rosch, 1975). This approach is sometimes known as the rule model and can be traced to Aristotle (Lakoff, 1987).

However, the classical view has a number of limitations. Although the model can adequately account for concepts such as geometric objects, it cannot account for concepts such as game which have no obvious defining features (Wittgenstein, 1953). In addition, the classical view maintains that all instances are equally good examples of the category, since all members share all features. However, research has shown that some category members are more typical of the concept than others, for example, people rate penguin as less typical of the concept bird than robin (Berlin, 1969; Labov, 1973; Rosch, 1973a). Also problematic, is the observation that for some entities it is unclear which category

they belong to, for example, when a cup becomes a bowl (Labov, 1973), although the assumption of classical theory is unambiguous category determination.

The anomalies highlighted in classical theory have lead theorists to consider alternative approaches which are not based upon definitional information.

4.3.1.2 Prototype theory

In light of the limitations of classical theory and based on the research of Rosch (Lakoff, 1987; 1973a; Wittgenstein, 1953) and others prototype theory was proposed as an alternative to classical theory. Prototype theory assumes that categories are based around a prototype which is defined as the central tendency of typical features of the category members; thus, the prototype acts as a referent to which actual items are compared (Rosch, 1973b). Category membership is not dependent upon the existence of defining features between category members but on the existence of co-occurring features. Therefore although members of the category tend to possess co-occurring features, they are not mandatory for membership of the category (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). The idea that categories cohere based on co-occurring features was founded in the philosophical writings of Wittgenstein (1953), who proposed that category members bear a 'family resemblance' to each other.

Category membership is determined by assessing how similar an instance is to other category members based on the number of features the instance possesses and weighted by their importance. A number of metrics for assessing similarity have been proposed (Estes, 1994; Tversky, 1977). Tversky's (1977)

'Contrast Principle' measures the psychological similarity between two entities by comparing shared and distinctive features and assigning different weights to these features. However, the computational procedure underlying peoples' judgements is not specified by this metric. Assigning different weights to the features of entities provides a mechanism to account for the finding that some category members are judged better examples and more representative of the category (Rosch et al., 1976).

Typical members are those that possess most or all privileged features of the category. Atypical or marginal members are those that possess none or only some of the privileged features of the category and may also possess some privileged features of another category. Typicality is a function of shared features, the more features an instance has in common with the prototype the more typical and representative it is of the category. For example, robins are judged to be better examples of the category bird than ostriches, because they share more common features, such as 'fly' and 'lays eggs', they possess more critical attributes for determining 'birdness' (Rosch, 1978). Typicality effects, (known also as prototypicality) have been demonstrated empirically and are robust. Participants find ranking category members in terms of their typicality 'natural' and typicality rankings have been found for many categories, including, fruit, vegetable, furniture, weapon (Rosch, 1975), bird, and mammal (Rips, Shoben, & Smith, 1973).

In addition, typicality effects have been demonstrated to predict results in other tasks, (Rosch, 1973a). For example, instances rated as typical examples of the category are verified faster in a Reaction Time (RT) task than instances rated as atypical examples of the category. In a typical RT task participants are asked to

respond 'true or false' or 'yes or no' to statements or words as quickly and accurately as possible. Rosch (1973b) presented participants with the target superordinate concept 'bird' followed by a subordinate concept, e.g. robin. Participants were instructed to respond as quickly possible whether the subordinate target was an instance of the category. Rosch (1973b) found typical members, such as, robin, were verified faster than less typical members such as ostrich; similar results have been found for fruit and furniture. Typicality also predicts the order in which participants list instances of a category in a listing task, instances rated as more typical will feature higher in the list than instances rated as atypical (Barsalou & Sewell, 1985). Typicality and the associated processing effects, such as facilitated RT or list order effects are considered important and essential elements in determining whether a concept is prototypically organised (has internal structure) Rosch and Mervis (1975). Because category members are graded in their resemblance to the prototype it is difficult to determine whether an instance belongs to a particular category (Neisser, 1967). Studies have shown that people tend to agree on typical instances but disagree on the categorisation of atypical instances.

In a classic study of categorisation of colour, Berlin (1969) found that people agreed on which focal colours were the best examples but disagreed for wavelengths near the boundaries. Similarly, Labov (1973) explored the boundaries between cup and bowl. He asked participants to categorise cups and bowls and found that clear examples were readily categorised however, as the distinction between cup and bowl was blurred, by making the cup broader participants were less likely to categorise an object as a cup. However, Labov (1973) found that context effected the boundary, if participants imagined the

objects containing food, this, altered the boundary making it more likely that the object would be categorised as a bowl. McCloskey and Glucksberg (1978) found similar effects for concepts such as kitchen utensil. Participants were shown object pairs and asked to indicate whether one object was an instance of the other. The pairs were either: typical, atypical, or non-instances. McCloskey and Glucksberg (1978) found participants were able to agree on typical and non-instances but disagreed on atypical instances. Boundary effects are also found when people use 'hedges' Lakoff (1987). Hedges are qualifying terms such as, 'technically', 'usually', 'virtually' and 'almost', the hedge acts to limit or extend the boundary to include or exclude certain instances (Lakoff, 1987). However, prototype theory assumes that concepts are context-independent (Medin, 1989).

A further limitation is that typicality for combined concepts can not be determined from their individual typicality ratings (Medin & Shoben, 1988). In addition, Armstrong, Gleitman, and Gleitman, (1983) argue that typicality effects do not reveal the structure of categories, because graded responses to category members can be obtained for classically defined categories.

An alternative account of category representation, which addresses some of these shortcomings is provided by exemplar theory (Medin & Schaffer, 1978).

4.3.1.3 Exemplar Theory

Exemplar models of cognitive representation, such as the 'context model' (Medin & Schaffer, 1978), 'generalised context model' (Nosofsky, 1986), 'exemplar-similarity model' (Estes, 1994), 'extended generalised context model' (Lamberts, 1995), and 'integration model' (Heit, 1997), all assume that

individuals store, with its category label, every instance encountered (Medin & Schaffer, 1978). Thus, categories are represented by one or more actual exemplars of a given category. Instances are categorised by reference to all previously stored instances based on their degree of overall similarity. The similarity function is multiplicative and this takes account of relational information (Hampton & Dubois, 1993). Thus, exemplars that are well matched on a number of features are considered more similar than exemplars well matched on only some features.

Exemplar theories account for many of the findings of prototype theory and for some findings that prototype theory is unable to account for. Exemplar models account for typicality effects by hypothesising that because typical instances are more frequent there are more stored exemplars. Similarly, exemplar models account for faster Reaction Times (RT) of some exemplars because of their greater frequency as stored exemplars, they will be located faster and classified quicker than less typical, less frequently stored exemplars. Exemplar models preserve more information than prototype accounts, because the whole instance is stored (Medin, 1989).

There are however a number of difficulties for the theory. First, it is unclear what the basis is for the grouping of instances (Murphy & Medin, 1985). In addition, research has shown that people do use abstracted knowledge that may be used to classify instances. It has been suggested that prototype and exemplar representations may not be competitors and that both types of representation may be used for categorisation (Barsalou, 1990).

4.3.1.4 Combined view

It is argued that prototype and exemplar models alone are unable to account for all the experimental findings and that people may use both prototype and exemplar information when categorising instances (Barsalou, 1990). That is, although a concept might have prototype structure, specific exemplars may also be stored. One possibility is that exemplar representation is used for categories with few members and prototype representation for larger categories. A second possibility is that initial representations may take the form of exemplars followed in time by summary representations (Smith & Medin, 1981). Evidence for the combined approach has been found in studies directly comparing prototype and exemplar accounts. Malt (1989) directly compared both views in a RT task, suggesting that RT for a target, which was similar to the preceding target would be faster if the individual was using an exemplar strategy than if they were using a prototype strategy. Malt (1989) found facilitated classification under some conditions but not all, suggesting that people may use both prototype and exemplar strategies. It is argued that prototype and exemplars may represent a continuum and that either strategy may be used to classify instances (Barsalou, 1990).

The literature reviewed in this section is not a comprehensive review of the categorisation literature, rather its purpose has been to broadly outline the theory, applications and limitations of the main approaches of conceptual representation. The review identified the social cognitive approach as being based on the assumption that the processing of social and non-social information have much in common and in this respect the discussion has been selective. A more

comprehensive account of the nature of representation can be found in Komatsu (1992).

4.4 Social categorisation

Jackendoff (1992) proposed the existence of cognitive modules specialised for interpreting social information. Specialised modules processing specific information have been proposed (Fodor, 1983), although, the exact nature of the modules remains contentious. Jackendoff (1992) hypothesis that the social module is innate and adaptive, deriving as a subdivision of the conceptual structure module and functioning to process social information, regarding the 'self in society'. He proposed that people are represented twice (physically and socially manifested) in conceptual space and that objects (physically manifested) are represented only once. Jackendoff (1992) makes an oblique reference to pets suggesting that pets may be intermediately represented by virtue of the possession of "some social status". Exactly what it means to possess 'some social status' is unclear. Jackendoff may have been referring to the fact that pets lack certain human attributes such as language, an important element in human relationships (Duck & Wright, 1993). However some theorists would argue that language is not unique to humans (Savage-Rumbaugh, Rumbaugh, & Boysen, 1978).

Social categories relate to people, not in their relation to other living species but in their relation to behaviour (Lindle, Altom, & Medin, 1984). Social categories have been shown to be more complex (Dahlgren, 1985) than non-social categories, because individuals can be categorised in multiple ways, for example a person can be categorised as a woman, a mother, a daughter, or an employee

(Cantor & Mischel, 1979). In addition people are perceived not merely as individuals but also as members of social groups (Hamilton & Sherman, 1989). It is debatable whether the process of categorising social and non-social stimuli is essentially the same. Three main positions have emerged from the debate: fundamentalist, building block view and the realist position.

The *'fundamentalist'* perspective argues that the processing of social information is essentially the same as the processing of non-social and the only difference between social and non-social processing is in the stimuli. (Hastie et al., 1980; Simon, 1976). The fundamentalist perspective is based on the assumption that an efficient cognitive system would have evolved for processing both social and non-social information (Cantor & Mischel, 1977). Alternatively, some theorists argue that the processing of social information is a more complex process than the processing of non-social information. They believe that the study of non-social categorisation provides a foundation for building our understanding of the more complex social processing and as such, their approach has become known as the *'building-block'* view (Ostrom, 1984). Finally, the *'realist'* position is that the foundations of cognitive processes are based only on the processing of social information. It is argued that infants are born into a social environment that makes demands upon them and stimuli that have the greatest effect on the infant's cognitive processes is social in nature. Fundamentalists argue that infants do not begin to process non-social stimulus until they have reached a later stage of development (Ostrom, 1984).

Whatever the correspondence, it is clear that researchers have drawn on cognitive methodologies to provide insights into a number of social phenomena.

4.4.1 Studies utilising social cognitive approaches

The following sections outline the application of cognitive methodology to a number of social categories.

4.4.1.1 Personality

Cantor and Mischel (1977) proposed that personality traits may serve as a prototype to which people can be compared. In order to test this they presented participants with fictional descriptions of a prototypical extrovert, a prototypical introvert, a non-extrovert, and a non-introvert. The extrovert and introvert descriptions contained trait words related to the two constructs. The non-extrovert and non-introvert descriptions contained words unrelated to the two constructs. Prior to presentation, participants were instructed to remember the descriptions of the character. Following presentation, participants were asked to rate the characters on six trait scales that included extroversion/introversion. Participants were also asked to indicate from a random list of words those present in the character descriptions. Cantor and Mischel (1977) found participants rated in line with the descriptions, extrovert descriptions were rated high on the extraversion scale and introvert descriptions were rated high on the introvert scale and that the non-extrovert and non-introvert were least likely to be rated high on the extrovert/introvert scale. They also found that participants given the extrovert and introvert descriptions were more likely than those given the non-extrovert and non-introvert descriptions to indicate that corresponding extraversion/introversion words, not presented, were present in the character description. Cantor and Mischel (1977) concluded that participants were using an extrovert/introvert prototype, which biased participants towards prototypical words.

Cantor (cited in Cantor & Mischel, 1979) predicted that three factors would influence peoples' prototypicality judgements in person perception: the number of category-consistent attributes possessed (consistency), the weight given to each attribute (dominance) and the number of attributes the category member possesses (breadth). To test this hypothesis she asked participants to provide detailed descriptions of people who were, 'good', 'moderate' and 'poor' examples of an extrovert using an 11-piont scale for how typical they were of the category 'extravert'. Cantor suggested that people compute a 'goodness of configuration' based on the number of attributes a given person has relative to the category type and that the greater the number of relevant features the more prototypical a person is judged to be. Thus it is the number of related attributes and not the prominence of one category-consistent attribute that is important. Although, category-consistent attributes do influence prototypicality. If an attribute has high weighting relative to the total attributes for the member then prototypicality is higher. Cantor concluded that people attend to both category-consistent and category-inconsistent attributes in person perception.

4.4.1.2 Emotion

The general approach afforded by prototype theory has been extensively utilised by Fehr and her colleagues to explore emotion and subtypes of emotion (Fehr, 1988; Fehr & Russell, 1984; Fehr, Russell, & Ward, 1982; Russell, 1991). They adopted a number of experimental techniques including listing subtypes, rating instances, and reaction time to verify instances, to advance their understanding of emotion, as a definition of emotion has proved elusive.

Fehr and colleagues (1984) used the prototype approach to explore whether emotion was prototypically organised. They asked participants to list exemplars for the category emotion and found four instances: happiness, anger, sadness and love were listed by the majority of participants. The ease with which participants are able to list exemplars is also a measure of prototypicality (Fehr & Russell, 1984). Fehr & Russell, (1984) found the frequency-of-listing score differentiated between participants, for example, one participant listed 187 whilst another listed only 1. No sharp boundary between these extremes was found, instead there was a gradient between those participants who listed a large number of instances and those who only listed a few.

In a second task, Fehr and Russell (1984) asked participants to rate how good an example of emotion 20 subtypes were. They used a median split of the prototypicality ratings to distinguish between central and peripheral members and found love, anger, sadness, and happiness were rated good examples of the category and respect, boredom, calmness, pride, and awe as poor examples. Fehr and Russell (1984) also considered whether participants would find the goodness-of-example a valid and natural task or whether responses would be idiosyncratic. In order to test this, a retest was conducted after five months. The test re-test demonstrated that typicality ratings were robust; a correlation of .97 was observed between the mean scores for both tasks. Fehr and Russell (1984) therefore concluded that prototypicality ratings predicted how readily subtypes of emotion were listed and that the concept emotion has an internal structure.

Further evidence that social concepts have an internal structure comes from the prototype analysis of love (Fehr & Russell, 1991). In a listing task Fehr and Russell (1991) asked participants to list subtypes of love. Participants listed

an average of 8.69 types. The frequency in which the subtypes were listed varied, for example, 'friendship', was listed by over 60 percent of participants compared to 'of books' which was only listed by two participants. They also asked participants to rate how typical 20 subtypes of love were and used a median split of the prototypicality ratings to distinguish between central and peripheral instances. They found that 'maternal', 'sisterly', and 'romantic' were central subtypes and 'passionate', 'spiritual' and 'puppy' were peripheral subtypes.

In a reaction time task, Fehr and Russell (1991) asked participants to respond true or false to statements of the type, "x is a type of y". The statements comprised of both central and peripheral subtypes. In addition some of the statements were true, for example, 'romantic love is a type of love' and some were false, for example, 'apple is a type of love'. They predicted that participants would verify a statement containing a central referent faster than a statement containing a peripheral referent. Fehr and Russell (1991) reported that participants were significantly faster to verify statements containing central referents compared to statements containing peripheral referents, for example, 'romantic love is a type of love' was verified faster than 'puppy love is a type of love'. However, there are some methodological issues that may have affected this observation.

In the statements presented to participants, no account was taken of word length, word frequency, or number of words. Indeed, the confounding effect that these factors would have on the interpretation of the data is not discussed. In the case of 'true' central referents, the average word length was shorter than for 'true' peripheral referents, 11.6 and 12.1 respectively. In addition, the 'true' peripheral referents contained a three-word string. Both longer words and the inclusion of

complex strings would tend to lead to longer time to verify statements. In Fehr and Russell's love study, both these factors went against the peripheral statements and thus it is unclear how much the difference in time taken to verify the statements is due to the peripheral nature of the statements and how much is due to these other factors.

4.4.1.3 Illness

The prototype approach has also been used to investigate illness belief. Bishop and Converse (1986) gave participants lists of physical symptoms grouped on the basis of their prototypicality rating (high, medium, low, random), to a particular disease. They found participants were more likely to indicate that high prototypicality symptom lists were indicative of disease than either medium or low prototypicality symptom lists. They also found greater recall for high prototypical symptom sets compared to either low or random prototypical symptom sets.

Using a similar paradigm, Bishop, Briedz, Cavazos, Grotzinger, and McMahon (1987) found that for high prototypical symptoms, people made more correct identifications of the target disease and were more confident about the identification than with low prototypical symptom sets. They also found that participants response times were faster for high prototypicality symptoms than for either medium, low, or random symptom sets. Participants made significantly more category-based associations to high prototypical data sets than to medium, low, or random sets. Bishop et al., (1987) also investigated peoples' perception of the seriousness of a disease and found that participants who rated a serious

symptom as indicative of disease were more confident about naming the disease. Bishop et al., (1986) concluded that illness beliefs are better represented as prototypes than in terms of classical features.

4.4.1.4 Role concepts

Cognitive approaches have also been utilised to explore role concepts. Role concepts are defined by function and contain knowledge about the roles of the self and others and the normative variability of behaviour for each role (Holyoak & Gorden, 1984). This knowledge constitutes the central content of role concepts, although, procedural knowledge concerning the creation of individualisation of roles are also represented (Holyoak & Gorden, 1984). These information structures enable individuals to function effectively within their specific culture. Holyoak and Gorden (1984) argue that role concepts are the most psychologically salient categories.

Dahlgren (1985) wished to explore whether role concepts have a prototype structure. In a series of studies she explored the role categories of worker, professional, employer, and politician.

Dahlgren (1985) asked participants to list as many instances as they could for each category: 'worker', 'employer', 'politician', and 'professional'. The subsequent instances were then rated by other participants for how typical they were of the category on a seven-point scale. (Dahlgren, 1985) found a significant correlation between prototypicality and production frequency of category terms. Thus participants tended to list instances that were more prototypical of the category.

Dahlgren (1985) obtained family resemblance measures for 20 of the 50 instances generated. She asked participants to list attributes for each of the 20 instances. The attributes were weighted based on how many times an attribute had been listed for each instance in the category and a family resemblance score was computed as the sum of the weights of the attribute for that instance. When the family resemblance scores were ranked Dahlgren (1985) found a significant correlation between prototypicality and family resemblance for politician, worker, and professional. Instances rated as highly prototypical were those with the greatest number of attributes.

Dahlgren (1985) argued that social categories reflect cultural factors. She proposed that word frequency was a linguistic measure of cultural influence and reasoned that if social categories reflect cultural influence then word frequency (a measure of the number of times a word appears in a corpus) and prototypicality would correlate; whereas actual frequencies of occupations would not. As predicted, she found significant correlation for word frequency and prototypicality for three of the four categories: 'professional', 'employer', and 'politician'. Whereas the correlation between actual frequencies of occupations and prototypicality for professional and worker were non-significant (Dahlgren could only obtain occupation frequencies for 'professional' and 'worker'). She concluded that prototypicality of social terms is not a function of environmental frequency. However, it should be noted that the only category that Dahlgren (1985) could obtain both word frequency and an actual frequency for was 'professional'. The correlation between word frequency and prototypicality for 'professional' was reported as r=.37 ($p<.1$), the level of significance reported is higher than is normally accepted by convention. Although, level of significance is

an arbitrary metric, researchers who digress from the usual .05 convention generally make this clear and state their reasons.

Dahlgren (1985) hypothesised that features for social categories would be criterial because the nature of social categories is elemental. This view is contrary to the findings for non-social categories where features are considered non criterial (Rosch & Mervis, 1975). To test this hypothesis, Dahlgren (1985) asked participants to list attributes for the four category names: worker', 'employer', 'politician', and 'professional'. Dahlgren (1985) compared attributes listed for the category names (superordinate level) and attributes listed in a previous study for the instances (subordinate level). She found that although some features were shared, for example, 'politician' shared 'educated', 'male' and 'authority' with 18 instances, generally, the majority of instances had few features in common. In addition, Dahlgren (1985) asked participants to provide definitions for instances of the category 'hospital employee', for example, nurse. Features that were listed by more than one third of the participants were analysed to see if they contained singly necessary and jointly sufficient features to define the category. Dahlgren (1985) found that no feature list provided an adequate definition of the category. The findings from both of these studies lend support to Rosch's (1975) notion that attributes are not criterial.

Dahlgren (1985) hypothesised that social categories are more complex than non-social categories because they comprise of more complex information. To test this prediction she compared attribute lists for non-social objects such as 'vehicle' (Ashcraft, 1978) to the attribute list generated for the four category terms, 'professional', 'employer', 'politician' and 'worker'. The two tasks were compared for complexity of information on five dimensions: perceptual (external,

observable characteristics), functional (function types), behavioural (action other than functional ones), relational (relation between people), and internal (personality traits, educational status). Dahlgren (1985) found that social categories were described by more dimensions than non-social objects. Non-social categories were described by three dimensions, whereas social categories were described by all five dimensions. She also found that the attributes listed for social contained complex syntactic constructions and the proportion of multi-word attributes was greater for social categories. Dahlgren (1985) concluded that social categories were more complex than non-social categories.

This set of studies by Dahlgren (1985) has highlighted some important similarities and differences and in the processing of social and non-social entities. Dahlgren (1985) found that instances rated as highly prototypical were those with the greatest number of attributes. She also found that attributes were not criterial. However, she found that compared to physical object categories social categories were more complex and described by more dimensions. These studies provide further evidence that prototype theory is a valid methodology to use to explore person categories.

4.5 Methodological Issues

However, before uncritically adopting prototype theory as a suitable methodology, there are issues, which need to be considered. The first concerns the nature of introspective evidence. It is argued that introspective data is prone to situational bias. To overcome this, Hampton and Dubois (1993) suggested that in order to gain an insight into conceptual structures researchers must use multiple

approaches to provide converging evidence. Many of these methodologies are reliant on interpreting averaged data; a technique used to reduce noise in the data. However, it is argued that instead of describing an individuals' concept, averaging techniques may lead to describing a culturally derived representation of the concept.

A further issue is that language plays a large role in the study of concepts (Murphy, 1991), in so much as words stand for concepts and it is argued that data thought to reflect a concept may instead say more about the word used to describe it. Hampton and Dubois (1993) suggests that evidence of flexibility and context dependent categorisation may reflect word meaning and not concepts. It is also suggested that not enough research has been undertaken to explore the processes underlying peoples' judgements. The assumption is that when people are asked for judgements, for example, typicality ratings, what they provide is data directly from stored knowledge in memory.

4.6 Alternative accounts of conceptual representation

The discussion thus far has been based on the assumption that conceptual knowledge is an internalised representation of the external environment. However, a number of theorists disagree with this perspective and argue instead that representations are the property of the social group, and are externally held and derive from social exchange (Gregen & Gregen, 1991; Moscovici, 1981).

Moscovici (1981) holds this view, arguing that some knowledge structures are externally located within social groups and that they can be better understood from a group level analysis. Moscovici (1981) introduced the concept of 'social

representations' as a mechanism for representing social information. He suggested they serve two important functions. Firstly, as a mechanism to structure reality, orienting individuals in the social world and secondly to provide a 'social code', a mechanism for understanding and communicating, and also for classifying unfamiliar entities. Entities are classified by two independent though interrelated processes, anchoring and objectification. Anchoring is the process of categorisation, where an entity is allocated to a category and objectification is the transformation of the abstract into the concrete. Internalised cognitive representations account for both naming and classifying entities but it is argued that social representations provide a better account of shared knowledge within social groups. Some theorists take a harder line arguing that all knowledge is held as external representations and thus socially constructed (Gregen & Gregen, 1991).

4.7 Conclusions

The application of principles from cognitive psychology to social psychology has produced an understanding of many social processes. As previously discussed in chapter three, the difficulty of theorists to define 'family' and 'friend' (Davis & Todd, 1985; Surra, 1991b) suggests that a classical conceptualisation of these concepts in terms of singularly necessary and jointly sufficient defining features is unlikely. The finding that social categories are more complex support this view. Although exemplar theory has been used by researchers to explore person concepts (e.g.Allen & Ebbesen, 1981), prototype theory has proved a particularly useful and widespread model for exploring the

content and structure of a number of social categories. Therefore, the use of this approach to explore the concepts of 'family' and 'friendship' seems a logical extension of this methodology. It is envisaged that the prototype approach will provide an insight into the content and structure of these concepts and that this in turn may enable the extent to which people represent pets as members of these categories to be explored. Such an approach could enable the usefulness of these concepts for describing the relationship between people and pets to be evaluated.

CHAPTER FIVE | PROTOTYPE ANALYSIS OF THE CONCEPT 'FAMILY'

5.1 Introduction

As previously discussed, researchers examining the association between people and pets argue that pets provide a relational role as a family member. Evidence supporting this notion comes from studies exploring the person-pet relationship (Cain, 1985). However, the notion of pets as family members is not universally acknowledged and receives mixed support from academics outside the person-pet field. Studies exploring the extension of the concept of 'family' generally find that the structure of the family is a nuclear grouping, consisting of parents and their children (Gilby & Pederson, 1982; Hodkin, 1983; So & Hodkin, 1987) with generally only a minority of respondents including pets. However, in the context of studies that implicitly or explicitly endorse the inclusion of pets this rate rises dramatically.

The studies undertaken in this chapter seek to understand how people think about pets within the family environment by exploring peoples' cognitive structure of 'family' using prototype theory (Rosch & Mervis, 1975). Prototype theory is a useful framework for exploring the content and structure of peoples' concepts and such methodology has provided insights into a number of social concepts that have proved difficult to define (Fehr, 1988; Fehr et al., 1982). However, to date the prototype approach has not been used to investigate the concept of 'family'.

The theory posits that concepts are structured mental representations, which

encode entities based on the attributes that members possess. Categorisation of an instance is based upon a similarity comparison between the instance and the category prototype. Members of the category tend to have features in common with the prototype, although, for any given feature all members may not posses this feature (Rosch, 1973b). Category members can also be ranked on the basis of how typical they are of the category. Typical instances share more features in common with the prototype and these common features characterise the structure of the concept. Experiments have shown people verify typical instances faster in reaction time studies than non-typical instances, and it is assumed that individuals compare features in a similarity-comparison process (Tversky, 1977). It is hypothesised that the time taken to compare each feature varies and that instances with more features in common with the prototype will be verified faster than those with fewer because a less thorough comparison is needed to make a judgement.

5.2 Study one - Listing of exemplars

5.2.1 Introduction

The present study was designed to establish the extension of the concept 'family'. This process is prompted by the aforementioned discrepancy between the high rates of 'pets as family members' noted in pet oriented research and the lower rates of nomination in the family oriented research. As discussed in chapter 3 it is possible that high rates of nomination are artefactually produced by prompting participants by leading questions or even just questions framed in such a manner as to specifically include or exclude pets as family members.

Generally, researchers exploring the extension of 'family' have framed questions in terms of the participant's family, for example, "who's in your family?" This type of question emphasises current family status, and therefore ones conceptualisation of 'family' can vary from one time to the next. For example, some people may exclude certain relationships either permanently or temporarily from the list because of a dispute and testing at different times may lead to different results. However, although 'family' is not a static concept, it is likely to have higher temporal stability than data of that nature might indicate.

The emphasis on current family status may exclude a range of relationships, for example, an elderly person may consider mother, father, aunt, uncle, spouse/partner, siblings as family members but may no longer have any surviving relationships of this type and so may not list them. Conversely, young people may think that spouse/partner and children may be family members but

they too may not list them. Similarly, people who are not currently pet owners might feel unable to list pets as family members. The use of terminology in this type of question (i.e. the referent use of 'who's'), implicitly emphasis current human relationships.

In this study participants were asked to "list members of the category family", not to "list their own family members". It is hoped that by rephrasing the question in this way the listing task will generate items for the prototypicality study, which in turn will enable the nature of the category 'family' to be explored.

5.2.2 Method

5.2.2.1 Participants

The participants were 50 volunteers, aged 14 to 72 years old (M =36.02 years, SD =13.85 years) recruited from local colleges, factories, offices, and social groups in order to collect data from a varied population. The majority of the sample was female (62%, n=31), and White (87.8%, n=43). Approximately half the respondents had a pet in the household (52%, n=26); this figure is close to the national rate.

5.2.2.2 Materials

The questionnaire was divided into three sections: section one contained instructions and information on the purpose of the study, making no reference to pets. In section two, the free listing task, respondents were asked to list members of the category 'family'. Respondents were asked to make their responses general, rather than listing their own personal family members. Section three asked for

demographic information including age, gender, ethnicity, family category, and pet keeping experience and was sealed to counter the possibility that participants might include pets from a desire to be a 'good subject' (i.e. acting in a way consistent with their perceived 'aims' of the research). A copy of the questionnaire is shown in Appendix A.

5.2.2.3 Procedure

Participants were approached and asked to take part in the study. Respondents were informed that the study was about the nature of modern families. Consenting respondents were asked to complete the written questionnaire. They were given as long as required to complete the task, although the majority took no longer 15 minutes. The questionnaire was collected immediately following completion and participants were then debriefed.

5.2.3 Results

All legible responses were recorded; only one response was indecipherable. A total of 128 different family members were listed, an average of 17.14 per participant. Instances with the same root, for example mother and mum, or father and dad, were collapsed into one category thus the total number of different items generated for the category 'family' was 111. The frequency each item was listed is presented in Table 6.

From the table it can be seen that the items form a gradient from those listed by every participant, (e.g. mother and father) to those listed by only one participant (e.g. step aunt and step uncle). This gradient indicates the availability

of the instances in memory and suggests evidence for an internal structure of the concept (Rosch, 1973b). The table shows that items denoting a biological relation were listed more frequently than items that indicate a legal or social relationship.

Table 6 Frequencies and percentages of items listed in the family listing task. Pet shown highlighted

Item	No.	%	Item	No.	%	Item	No.	%	Item	No.	%
Mother	50	100%	Great Uncle	8	16%	God Son	1	2%	Torturer	1	2%
Father	50	100%	Step daughter	7	14%	God Daughter	1	2%	Rabbit	1	2%
Uncle	46	92%	Cat	7	14%	Great Niece	1	2%	Fish	1	2%
Aunt	46	92%	Pets	7	14%	Great Nephew	1	2%	Budgerigars	1	2%
Sister	43	86%	Step Sister	7	14%	Step Grandmother	1	2%	Offspring	1	2%
Brother	42	84%	Step Son	6	12%	Step Aunt	1	2%	Parents Friends	1	2%
Grandmother	38	76%	Grandparents	6	12%	Step Grandfather	1	2%	Guardian	1	2%
Grandfather	37	74%	Step Brother	6	12%	Step Uncle	1	2%	Argument	1	2%
Cousin	37	74%	Half Sister	5	10%	Step Children	1	2%	Frustration	1	2%
Niece	27	54%	Half Brother	5	10%	Step Parents	1	2%	Laughing	1	2%
Nephew	27	54%	Partner	5	10%	Third Cousin	1	2%	Me	1	2%
Daughter	27	54%	Step Dad	4	8%	In Laws	1	2%	OMA (Grandmother)	1	2%
Son	26	52%	Son in Law	4	8%	Great great aunt	1	2%	OPA (Grandfather)	1	2%
Sister in Law	20	40%	Second Cousin	4	8%	Great Grandchildren	1	2%	Weddings	1	2%
Brother in Law	18	36%	Great Grandson	3	6%	Foster Mum	1	2%	Funerals	1	2%
Father in Law	15	30%	Great Granddaughter	3	6%	Foster son	1	2%	Christmas	1	2%
Mother in Law	14	28%	Step Mum	3	6%	Foster daughter	1	2%	Work	1	2%
Grandson	12	24%	Children	3	6%	Foster Dad	1	2%	Retirement	1	2%
Wife	12	24%	Daughter in Law	3	6%	Foster Parent	1	2%	Support	1	2%
Granddaughter	12	24%	Close Friend	3	6%	Spouse	1	2%	Sleeplessness	1	2%
Husband	10	20%	Siblings	2	4%	Romantic Partner	1	2%	Noise	1	2%
Great Grandfather	10	20%	Great Grandparents	2	4%	Lover	1	2%	Mess	1	2%
Great Grandmother	10	20%	Godfather	2	4%	Common-in-law wife	1	2%	Coal fire	1	2%
Great Aunt	9	18%	Friend	2	4%	Common-in-law daughter	1	2%	Washing	1	2%
Step Father	9	18%	Twin	2	4%	Abuser	1	2%	Garden	1	2%
Dog	8	16%	Baby	2	4%	Persecutor	1	2%	Home	1	2%
Step Mother	8	16%	God Parent	1	2%	Victim	1	2%	Untidiness	1	2%
Grandchildren	8	16%	God Mother	1	2%	Rescuer	1	2%			

The order in which participants output items in a listing task has been found to be related to prototypicality (Barsalou & Sewell, 1985). In this task the order that items were identified in the study has been summarised in Table 7, by ranking the ten most frequently listed items. The order of item listing corresponds to the most frequently listed items, for example, mother was listed first by most participants and was listed as a member of the category 'family' by all participants. Father was the second most frequent family member that was identified first and again all participants listed father. This data may be visualised by plotting the rank order of each item against the percentage of participants who listed the item in their first ten as a scatter diagram (Figure 2). This shows that there is a significant negative correlation between the frequency an item is listed and the order an item is output when listed (r = -71, p=.01). No participant listed a pet as the first item in their list. Indeed, only three participants identified a pet in the first ten family members they recalled. Consanguinal relationships appear to be the most dominant, and these were usually listed before conjugal relationships.

Table 7 Ranks based on position listed by participants

RELATIONSHIP	% IN TOP TEN	AVERAGE RANK (when listed)	HIGHEST RANK	LOWEST RANK
Mother	100	1.8	1	8
Father	100	2.3	1	8
Brother	84	3.9	1	9
Aunt	82	6.4	1	10
Sister	80	4.6	2	10
Uncle	78	6.7	2	10
Grandmother	66	6.9	1	10
Grandfather	60	6.8	2	10
Cousin	54	6.9	2	10
Son	40	4.9	2	10
Daughter	34	4.5	1	7
Niece	30	8.6	5	10
Spouse	26	4.8	1	10
Nephew	24	8.6	6	10
Step Dad	12	7.7	5	10
Sister-in-law	10	8.4	7	10
Dad-in-law	10	8.6	6	10
Brother-in-law	8	7.8	6	10
Grandson/daughter	8	8.0	7	9
Mum-in-law	6	6.7	5	8
Step Mum	6	7.3	6	9
Great Grandmother	6	8.3	7	9
Step Brother	4	6.5	6	7
Step Sister	4	6.5	5	8
Step-son	4	6.5	5	8
Step-daughter	4	7.5	6	9
Dog	4	8.0	7	9
Cat	4	8.0	6	10
Granddaughter	4	8.5	7	10
God Parent	4	8.5	7	10
Close Friend	4	9.5	9	10
Home	2	5.0	5	5
Pet	2	6.0	6	6
Grandson	2	8.0	8	8
Daughter-in-law	2	8.0	8	8
Budgerigar	2	8.0	8	8
Foster mum	2	9.0	9	9
Foster daughter	2	9.0	9	9
Garden	2	9.0	9	9
Foster dad	2	10	10	10
Foster son	2	10	10	10
Washing	2	10	10	10

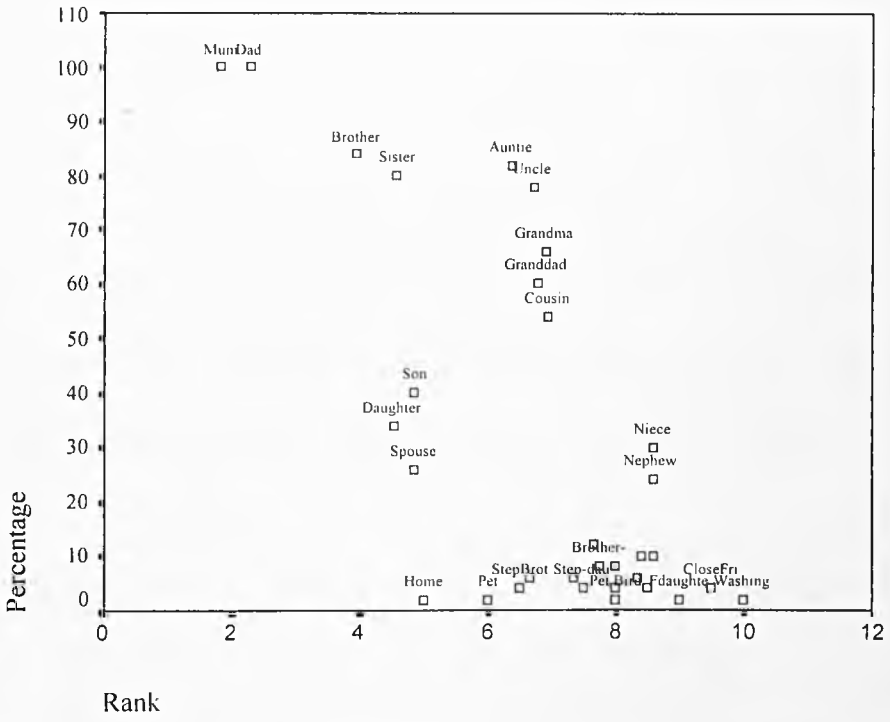

Figure 2 Correlation between rank order and the percentage of participants who listed the item in their first ten

Five specific pet types: dog, cat, rabbit, fish and budgerigar and the generic term 'pets' were included in the list. A position effect is evident with canonical pets such as dog and cat listed by more participants than rabbit and fish. In total, 26% of participants included some sort of pet type in their list and 16% were pet owners. Of the pet types generated by participants with no pets in the household 6% were previous pet owners and 4% had no pet ownership experience.

There were significant differences between the number of items listed by participants with pets in the household and by participants with no pets in the household. Participants with pets in the household listed more items than participants with no pets in the household. A Kruskal-Wallis test was conducted to evaluate the differences between participants with and without pets in the

household on the number of instances generated. With an alpha level of .05 significant differences in the number of instances listed were found by the two groups H (1, N=50) = 7.39, p = .007. Participants with pets in the household generated approximately four more instances than those without pets (see Figure 3). It might be thought that these differences were a function of pet owners including pets. However, significant differences remained when pet instances were excluded from the analysis H(1, N=50) = 7.44, p = .006.

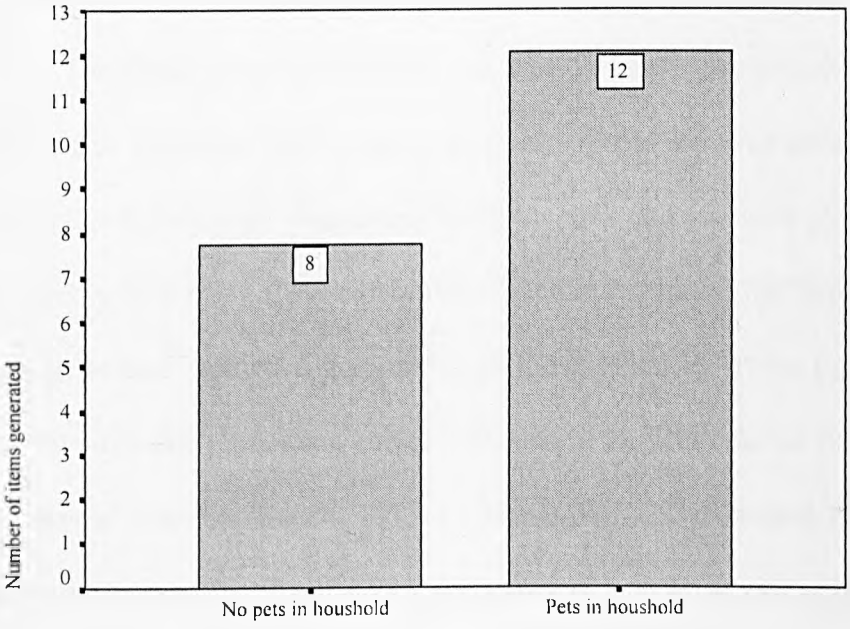

Figure 3 Number of items generated differentiated by ownership status

5.2.4 Discussion

The listing task generated a great variety of item types, although for some of the items listed, such as, coal fire, torturer, noise, it is debatable whether they could be considered to belong to the category 'family'.

All participants listed mother and father and generally consanguinal relationships were followed by conjugal relationships. Participants listed five pet types, with dog the most frequently listed pet type followed by cat, and then rabbit, fish and budgerigar. Pet items were listed by 26% of participants and 16% currently had a pet in the household. This nomination rate for pets as family members is comparable to some of the findings in research exploring the extension of the family in research focussing on human relationships (Hodkin, 1983; Hodkin et al., 1996; So & Hodkin, 1987). It is much lower than in studies exploring the concept of 'family' focusing on pet relationships (Cain, 1985; Soares & Whalen, 1985).

The finding that participants who were not currently pet owners had included pet items in the listing task suggests that participants were not focusing on their own personal circumstances when completing the task and provides evidence supporting the validity of the task for assessing perceived extension of the 'family' concept. The items generated formed a gradient from those listed by every participant to those listed by only one participant and provides some evidence for an internal structure of the 'family' concept (Rosch, 1973b). The order of item output was also analysed. Mother was listed first by most participants and was listed as a category member by all participants, father was the second most frequent family member that was identified first and again all participants listed father. No participant listed a pet as the first item in their list, and only three participants listed a pet in the first ten family members they recalled.

Participants with pets in the household listed significantly more instances than those with no pets in the household and this effect could not be accounted for simply by the fact that participants with pets listed more examples. One explanation

for why participants with pets in the household list more instances is that they have extended the boundaries of the concept to include another species as family member and so more readily include other human instances.

5.3 Study two - Prototypical Rating Task

5.3.1 Introduction

Research has found that some category members are rated by people as being more typical of their category. Members rated as more typical have been demonstrated to be those who have most or all of their features in common with the prototype. In order to demonstrate that a concept is prototypically organised, participants should be able to make judgements about which instances are good examples and which are poor examples of the category (Rosch, 1975). In addition, judged level of typicality should predict outcomes for other tasks, such as the time needed to verify an instance as a category member (RT) (Rosch, 1973b) and the order of item output in a listing task (Barsalou & Sewell, 1985). Research has demonstrated that participants find ranking category members in terms of their typicality 'natural' (Rosch, 1975).

The features of entities are not always directly perceivable. Deriving prototypicality ratings provides an indication of which category members share the most features. Therefore if 'family' were a useful framework for exploring person-pet relationships, it would be expected that pets would share many features in common with other category members and would thus be rated as typical members of the category.

5.3.2 Method

5.3.2.1 Participants

The participants were 100 volunteers, aged 14 to 77 years old (M =38 years, SD =14.7 years) recruited from local colleges, factories, offices, and social groups in order to collect data from a varied population. The majority of the sample was female (68%, n=68), White (94%, n=94), currently pet-owning (62%, n=62) and previous pet-owning (92%, n=46).

5.3.2.2 Materials

The rating task was presented in a questionnaire, divided into three sections, (see Appendix A). Section one contained instructions and information on the purpose of the study. Participants were asked to rate how good an example of 'family', different instances were, on a five point scale. The instances were selected from the listing of exemplar task in study one. The scale was anchored at 5 = extremely good example of a family member, to 1 = extremely poor example of a family member. The scales were reversed every ten instances. Section two of the questionnaire contained the instances and rating scale, section three asked for demographic information including, age, gender, ethnicity, family category, and pet keeping experience. A sealed format was used so that participants completed this section after the rating task and were not influenced by the questions on pets.

5.3.2.3 Procedure

Respondents were approached by the researcher and asked their consent to take part in the study. Respondents were informed that the study was about the nature of modern families. The form of wording used to consenting participants was based on the procedure of Fehr & Russell (1991). Participants were asked to judge how good an example of family member each of the listed instances is. Participants were informed that there are not right or wrong answers and that it is their opinion that is important. Although, it was stressed that they were not to base their judgements on how much they liked a particular member represented by the instance, but to judge how good an example of the category it is. The questionnaires were collected immediately following completion and participants were then debriefed.

5.3.3 Results

The mean prototypicality ratings for each of the 50 instances are presented in Table 8. Higher means indicate better rated examples. The prototypicality ratings indicate a gradient from nuclear family through extended family to pets, non-kin and objects. Thus, nuclear family members are rated as better examples of family member than extended family, which are in turn rated as a better example than non-kin and other objects.

Two methods of determining category membership were compared. Firstly, a median split of values was made to distinguish between central and peripheral members (Table 8), this method was adopted by Fehr (1991). The value 3.29 indicates the point of split. The vast majority of consanguinal relationships

fall into the central group, although, cousin and half-brother fall into the peripheral group. Pets, non-kin and other objects fall into the peripheral category. A position effect is evident with 'pet dog' rated as a better example of family member, then 'pet cat', 'pet rabbit' and 'pet fish'.

Table 8 Prototypicality ratings derived using median split - presented in descending order (N=100)

Instance (central)	(*M*)	Instance (peripheral)	(*M*)
Mother	4.87	Step son	3.28
Father	4.80	Brother in law	3.26
Son	4.73	Sister in law	3.26
Daughter	4.71	Half-brother	3.21
Wife	4.64	Father in law	3.20
Husband	4.57	Step brother	3.18
Sister	4.56	Half sister	3.18
Brother	4.56	Son in law	3.17
Grandmother	4.34	Cousin	3.07
Grandfather	4.33	Girlfriend	3.04
Grandson	4.16	Step sister	3.01
Granddaughter	4.06	Great Aunt	2.97
Aunt	3.77	Great uncle	2.87
Great grandfather	3.67	Boyfriend	2.83
Great grandmother	3.65	Friend	2.79
Uncle	3.59	Godfather	2.32
Great grandson	3.49	Pet dog	2.28
Great granddaughter	3.43	Second cousin	2.16
Nephew	3.43	Home	2.15
Niece	3.39	Pet cat	2.02
Step father	3.39	Colleague	1.91
Daughter in law	3.33	Neighbour	1.90
Step mother	3.31	Pet rabbit	1.60
Step daughter	3.30	Television	1.54
Mother in law	3.30	Pet fish	1.37

However, it could be argued that the median is dependent upon the exemplars in the list. If the word list comprises a disproportionate number of category and non-category words this would effect the median value. A list comprising a majority of category words would have the effect of increasing the median value, correspondingly a list comprising of a majority of non-category words would decrease the median value (J. Archer, personal communication, March 13, 2001). Therefore a second method was used to assess category membership. As three is neutral, representing neither a good or poor example, instances that were significantly higher than 3 (one-sampled t-test) were categorised as central category members, those significantly lower than 3 were classified as peripheral category members. Instances that were not significantly different were classified as intermediate members (Table 9) (J. Archer, personal communication, March 13, 2001).

Table 9. Prototypicality ratings derived using a t-test (N=100)

CENTRAL		INTERMEDIATE	PERIPHERAL
Mother	Great grandmother	Half brother	Godfather
Father	Uncle	Father in law	Pet dog
Son	Great grandson	Half sister	Second cousin
Daughter	Great granddaughter	Step brother	Home
Wife	Nephew	Son in law	Pet cat
Husband	Niece	Cousin	Colleague
Brother	Step father	Girlfriend	Neighbour
Sister	Daughter in law	Step sister	Pet rabbit
Grandmother	Step mother	Great Aunt	Television
Grandfather	Mother in law	Great uncle	Pet fish
Grandson	Step daughter	Boyfriend	
Granddaughter	Stepson	Friend	
Aunt	Brother in law		
Great grandfather	Sister in law		

Both methods produce similar findings, with a gradient of membership. Using the t-test increases central membership by including 'sister in law', 'brother in law' and 'stepson' and in this case produced three groups with the peripheral category sub-divided into Intermediate and Peripheral members. Therefore the use of the analyses based on the median split, in subsequent sections seems justified.

The prototypicality ratings were explored by ownership status to determine whether participants with pets in the household rated pets as more typical. Table 10 shows that participants with pets in the household rated all pet types as more prototypical of family members than those with no pet in the household,

Table 10 Prototypically ratings by ownership status (higher means indicate better example)

	Ownership status	
	Pet in household (n=62)	**No pet in household (n=38)**
Instance	Mean	Mean
Pet dog	2.80	1.93
Pet cat	2.63	1.61
Pet rabbit	1.83	1.45
Pet fish	1.50	1.28
Median split	3.21	3.32

The differences were significant for dog, (H (1, N=50) = 8.907, p = .003) and cat (H (1, N=50) = 13.743, p <.001), although differences between rabbit (H (1, N=50) = 3.324, p = .068) and fish (H (1, N=50) = 1.875, p = .171) were non-significant.

However, whether or not there is a pet in the household participants still judged pets as peripheral members of the category 'family'. The finding that pet instances are judged to be peripheral members of the category by participants with a pet in the household, indicates that they do not share many features in common with the prototype, it also suggests that pets may possess features of another category.

5.3.4 Discussion

The prototypicality ratings form a continuum from nuclear family through extended family, non-kin, pets and objects. A position effect is evident with canonical pets such as dog and cat being approximately on par with other non-kin instances such as friends and colleagues, but rabbit and fish are rated lower and on a par with television. The low prototypical ratings for pets consign pets to

peripheral category members. Although, participants with pets in the household rated pets as more prototypical than participants with no pets in the household and dog and cat as significantly more prototypical, they were still rated as peripheral members.

The rating of pets as peripheral members indicates that they have few basic features in common with the prototype and suggests that they may possess features of another category. These results suggest that the 'family' concept is a less useful framework for exploring the person-pet relationship, because the features common to pets and family members are few.

The finding that pets may have features in common with another category provides a further avenue for research and another commonly proposed category for describing person-pet relationships is that of 'friend'.

5.4 Study three - Reaction time task

5.4.1 Introduction

A Reaction time (RT) task was devised to test whether central members of the 'family' category, derived from the prototypicality rating task would be verified faster than peripheral members. Rosch (1975) argues that in order to claim that a category is prototypically organised, prototypicality ratings should affect cognitive processing, i.e. instances rated as central members should be verified faster in a RT task than items rated as peripheral.

In addition, the RT task is a behavioural rather than an introspective measure and will provide an alternative method for deriving category membership. As previously discussed, researchers exploring the extension of 'family' have found that the methodologies used affects the data collected (Hodkin et al., 1996). Hodkin (1996) found that in a free listing task the instances generated were more constrained with the majority of participants listing only nuclear family members, however, in the checklist task participants included other categories such as extended family and pets. Also, the number of pet instances nominated as family members in the checklist task doubled. However, Hodkin's (1996) qualitative analysis revealed that some participants had included categories because they believed that this was what the experimenter was looking for.

In a reaction time task category members are predetermined, and in that respect the task is similar to the checklist task. In contrast to the checklist task, this methodology does not provide participants with suggested alternative categories, instead, the approach asks participants to verify whether or not the items presented are members of the category 'family'.

5.4.2 Methodological considerations of reaction time tasks

A number of factors may adversely affect RT with sources of *'noise'* distorting true effects. Participant factors contribute a major source of noise. Participants may respond at different rates, because they may not attend fully to the task, become distracted, or become confused about the task and this will add time that is not related to the question. Any or all of these factors can produce slow latencies and a positively skewed distribution (Fazio, 1990). Providing adequate instructions can reduce much of the variability in the data. Participants should be urged to respond as quickly but as accurately as possible, in this way the number of slow latencies will be reduced (Fazio, 1990). Practice can also reduce variability. This serves two functions, firstly, to familiarise the participant with the task and secondly to raise performance to the level where no further performance changes are detectable thus, RT is fairly constant (Fazio, 1990).

The strategy that participants adopt will affect response times. Those who are more careful will be slower than those who are less cautious. Reaction time data is often positively skewed. Transforming data either using reciprocal transforms (1/X) or logarithmic transforms will produce a distribution which more accurately reflects the central tendency (Fazio, 1990) by compressing some values relative to others and making the variation constant across the series (Howell, 1992). Word length will also effect RT as longer and unfamiliar words require longer processing times (Fazio, 1990).

5.4.3 Sample Size

In order to determine the number of participants required power calculations were undertaken using one of the guidelines of Cohen (1997). For guidance the effect size found by (Fehr & Russell, 1991) was calculated. This was 0.44 (medium to large effect). Fehr (1991) used a between subjects design and as the planned methodology for this study was within subjects Fehr (1991) effect size was adjusted using the appropriate formula[1]. A within subjects effect size of 0.62 was determined. To give a 99% likelihood of detecting an effect of this magnitude requires 96 participants.

5.4.4 Method

5.4.4.1 Participants

The participants were 100 volunteers, aged 14-79 years old (M = 36.85; SD = 14.18) recruited from local colleges, factories, offices, and social groups in order to collect data from a varied population. The majority was female (58%, n=58), White (88%, n=88), pet-owning (53%, n=53).

5.4.4.2 Materials

A Macintosh PowerBook 165 microcomputer, programmed using PsyScope (1994 Carnegie Mellon University) was used to control experimental events and record data. The target items, 24 relationship terms (Table 11) were

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[1] $\frac{2d}{\sqrt{2}}$

randomly presented on the screen. Participants' responses and reaction times were measured from the onset of a word presented on the screen. The stimulus appeared on the screen for a duration of 500ms, this was preceded by a fixation cross which appeared on the screen for a duration of 500ms. There was an inter-stimulus interval of 1.5 ms. Response times were made on the specially adapted number keyboard, which was sited remotely from the computer controlling experimental events. The two response buttons (numeric keys 1 & 3 on the remote keyboard) were re-labelled 'YES' and 'NO'. Participants used their dominant hand to make their responses and the key labels were exchanged to minimise any residual data entry effects. Instructions were presented on screen. A short questionnaire provided demographic information including age, gender, ethnicity, family category, and pet keeping experience.

5.4.4.3 Procedure

A free classification paradigm was used (no right or wrong answers). Participants were tested individually. Consenting participants were seated facing the computer, eye to screen distance was approximately 60cm. Participants were informed that the experiment was designed to investigate the nature of modern families and the purpose of this experiment is to examine whether ***YOU*** would consider the following list count as members of the family. Participants were instructed to respond 'YES' or 'NO' as quickly and accurately as possible to the target words indicating whether the word was an instance was a member of the category 'family'. Instructions were presented 'on screen', in addition participants were verbally urge to respond *"as quickly and accurately as possible"*.

Participants completed a practice trial, which was analogous to the experimental session except the category was 'fruits'. The stimulus words were possible prototypical instances. The trial began with the appearance of a cross, followed at an interval by the stimulus word. The 'real' experimental trial began directly after the practice trial and lasted approximately 15 minutes. Following completion of the entire task participants completed a short questionnaire (Appendix A) and were then debriefed.

Table 11 Stimulus list

CATEGORY	STIMULUS	WORD LENGTH	WORD FREQUENCY[2]
CENTRAL	Brother	7	92
	Daughter	8	92
	Father	6	213
	Mother	6	275
	Sister	6	72
	Son	3	142
	Wife/Husband	4/7	256/134
	Aunt	4	21
	Granddad	7	1
	Nan	3	19
	Nephew	6	7
	Niece	5	14
	Uncle	5	24
MEAN		5.38/5.62	94.46/85.07
PERIPHERAL	Cat	3	15
	Cousin	6	16
	Dog	3	47
	Fish	4	119
	Friend	6	163
	Girl/Boyfriend	10/9	1/3
	Home	5	538
	Neighbour	9	26
	Rabbit	6	6
	Television	9	66
	Workmate	8	1
Mean		6.27/6.18	90.72/90.90

[2] The Lancaster-Oslo/Bergen (LOB) Corpus (British English texts).

5.4.5 Results

The results are analysed for both responses, whether pets were nominated as members of the family ('YES'/'NO') and for reaction time, the time taken to respond 'YES' to whether stimuli were considered members of the family.

5.4.5.1 Responses

The frequency that participants verified targets as members of the category 'family' are presented in Table 12. The target words representing nuclear and extended family relationships were verified as family members by over 80% of the participants. Pet targets were verified family members by less than 20% of participants. Again, a position effect was evident for pets and dog was verified as a family member by more participants then cat, rabbit and fish. In all, 26% of participants with pets in the household verified dog as a family member, 11% cat and rabbit and 8% fish.

5.4.5.2 Response time

The response times recorded are also summarised in Table 12 and presented with the prototypicality ratings from study two.

5.4.5.3 Data screening

The data were screened and found to be positively skewed. RTs with values equal to or less than 150 ms and RTs with values equal to or greater than 3000 ms were excluded from the analysis, as it is generally considered that such times are too fast or too slow for meaningful interpretation (Fazio, 1990). These

outliers accounted for 1.38% of the total data from the study. The remaining RTs were averaged across the 24 target words. Although, removing the outliers improved the distributional properties of the data, the data remained skewed.

In order to address the skew, a reciprocal and $\log_{10}$ transformation was undertaken. Although these measures produced a further improvement in the distribution, the data still failed to meet the necessary assumptions of ANOVA and therefore non-parametric analyses were undertaken.

Table 12 Prototypically ratings, reaction times, and percent responding yes (N=100).

STIMULUS	PROTOTYPICALITY	MEAN RT	% YES	AVERAGE RANK (WHEN LISTED)
Mother	4.87	787.27	93	1.8
Father	4.80	733.31	96	2.3
Son	4.73	700.77	95	4.9
Daughter	4.71	737.62	95	4.5
Brother	4.56	658.50	96	3.9
Sister	4.56	688.65	94	4.6
Spouse	4.61	809.41	88	4.8
Nan	4.34	851.56	95	6.9
Granddad	4.33	711.47	96	6.8
Aunt	3.77	762.18	95	6.4
Uncle	3.59	773.78	93	6.7
Nephew	3.43	758.60	93	8.6
Niece	3.39	1015.45	94	8.6
Cousin	3.07	915.53	93	6.9
Girl/Boyfriend	2.94	1046.89	38	-
Friend	2.79	748.65	23	-
Dog	2.28	868.72	18	8.0
Home	2.15	1304.57	7	5.0
Cat	2.02	762.92	13	8.0
Fish	1.37	628.50	4	-
Workmate	1.91	1324.00	3	-
Neighbour	1.90	834.80	15	-
Rabbit	1.60	1325.78	11	-
Television	1.54	922.40	5	-

A Kruskal-Wallis ANOVA[3] was used to examine the difference in RT between targets which had previously been rated as central members and those rated as peripheral members. It was anticipated that instances in the central group

[3] The power calculation undertaken was for a parametric ANOVA, however, as the data violated the assumptions for a parametric ANOVA a non-parametric ANOVA was conducted. Significant effects were found for both reaction time studies and therefore re-calculation of power based on non-parametric ANOVA was not necessary. However, it is likely that because the power of non-

would be verified quicker than instances in the peripheral group. Significant differences were found between groups $H(1, N=100) = 4.443$, $p=.035$). Instances in the central group were verified on average, 200 ms more quickly than instances in the peripheral group (Figure 4)[4].

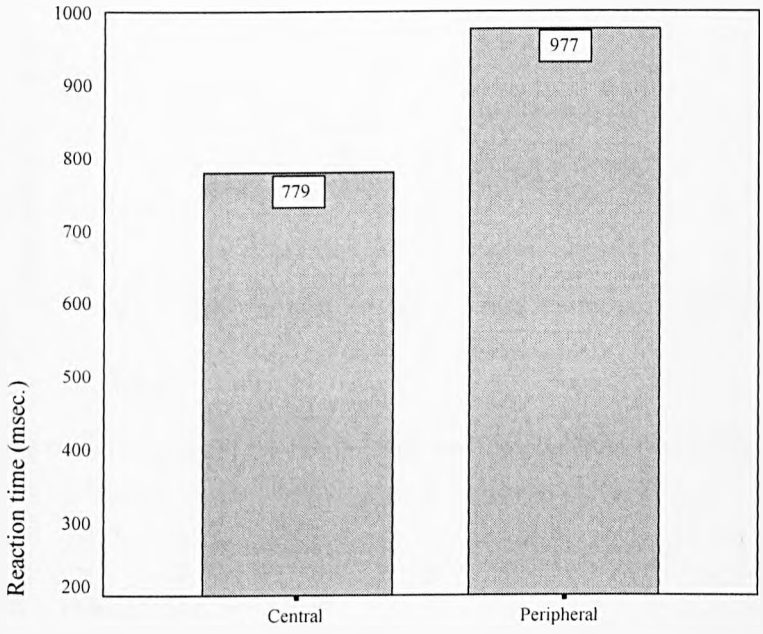

Figure 4 Reaction times for central and peripheral targets.

Previous research has found a correlation between RT and prototypicality rating. This reflects the higher degree of uncertainty that accompanies decisions regarding more peripheral targets and the consequent longer reaction times. In the current study, a similar pattern was found (Figure 5), with a significant negative correlation between RT and prototypicality rating (r = -517, p=.01). This finding is consistent with previous research that uses this methodology (Rosch, 1973b).

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parametric ANOVA is similar to parametric ANOVA (Siegel & Castellan, 1988) the power of the parametric ANOVA will approximate the power for a non-parametric ANOVA.

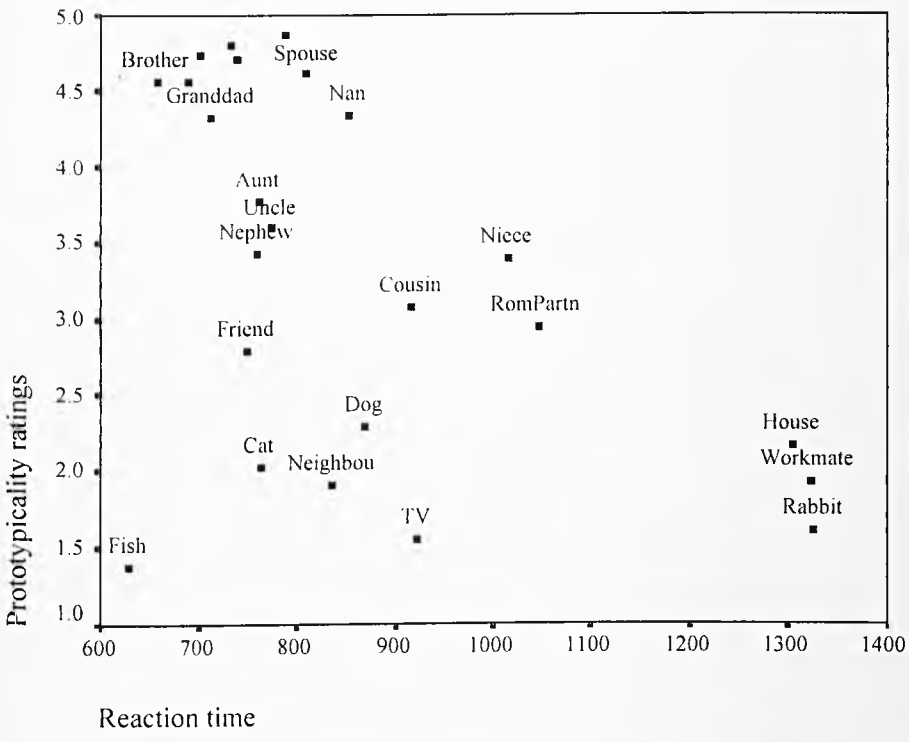

Figure 5 Scattergram of the relationship between reaction time and prototypicality rating

5.4.6 Discussion

Prototypicality ratings and reaction times are correlated, i.e. research has demonstrated that prototypicality ratings are predictive of reaction, the more prototypical an item is rated the faster the item will be verified.

Although, there were significant differences between central and peripheral instances, and reaction times for central instances were faster, these results should be interpreted with caution. Because of the nature of the topic under investigation, it is not possible to control for word length, frequency or familiarity. In fact the words in the central category were on average shorter in

[4] Further analyses between human, pet, and object stimuli were not undertaken because of the small numbers of responses in the pet and object groups.

length than those in the peripheral category and this rather than the centrality of the instances may have caused the effect.

5.5 Study four - Categorisation of 'family'

5.5.1 Introduction

In the listing task it was found that just 16% participants with a pet in the household nominated a pet as a family member. However, in the literature much higher nomination rates for pets as family members have been found (Cain, 1985; Voith, 1985). Other researchers have found that people use 'hedges', by describing items as 'technically' or 'loosely' members of a category in order to extend category boundaries (Lakoff, 1987). In order to determine whether people use 'hedges' to extend the category boundary of 'family' to include pets, a task was devised to explore the gradedness of category membership. The task comprised of four categories, two classical categories of clear member and clear non-member and two 'hedge' categories, 'technically speaking' a category member and 'technically speaking' not a category member. It was predicated that participants would categorise pets as technically a non-member, that is pets are 'loosely speaking' family members but not 'technically speaking' family members.

5.5.2 Method

5.5.2.1 Participants

Participants were 51 volunteers aged 18 to 60 years old (one participant declined to give their age), (M =34.42; SD = 7.83) attending various conferences at The University of Warwick. The majority were male (58.8%, n=30), White (92.2%, n=47), non-pet owning households (64.7%, n=33).

5.5.2.2 Materials

The questionnaire was divided into three sections: section one contained information on the purpose of the study, and instructions for the task. Participants were asked to indicate which instances are genuine family members and which are not by placing a tick in one of the four definitional categories:

- Family, "If the instance is clearly a member of the category".
- Only 'technically speaking' family, "If the instance refers to a thing, which is only technically speaking in the category. In other words it is not like other typically category members, yet in a technical sense it does belong in the category".
- Not 'technically speaking' family, "If the instance refers to a thing which may loosely speaking be called by the category name but is technically speaking not a member of the category. It may be similar to or easily confused with other category members, but in a technical sense it does not belong".
- Not a family, "If the instance is clearly not a member of the category".

Section two contained the instances and section three asked for demographic information.

5.5.2.3 Procedure

This study was based on the procedure used by Hampton (1993). Consenting respondents completed a written questionnaire (see Appendix A) containing instructions, space to indicate responses. Participants were informed that the study explored the nature of family. Respondents were asked to indicate which instances are genuine family members and which are not by placing a tick in one of the four definitional categories. Following completion of the task participants completed a short closed-ended questionnaire which provided demographic information including, age, gender, ethnicity, family category, and pet keeping experience. The questionnaire was collected immediately following completion and participants were then debriefed.

5.5.3 Results

The frequency and percentage of responses for each category for all participants are presented in Table 13. The table shows that nuclear and some extended family instances are rated as clear members of the category 'family'. However, there was some variability across the categories for conjugal family members, for example, daughter-in-law, son-in-law, mother-in-law and father-in-law their rating were mainly distributed across both member and non-member categories.

Table 13 Nomination rate of family member

	Member				Non-member			
	clear member		technically member		technically non-member		clear non-member	
Target	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Granddaughter	51	100.0%	0	-	0	-	0	-
Daughter	50	98.0%	0	-	0	-	1	2.0%
Son	50	98.0%	0	-	1	2.0%	0	-
Brother	50	98.0%	0	-	0	-	1	2.0%
Grandson	50	98.0%	0	-	0	-	1	2.0%
Grandfather	49	96.1%	2	3.9%	0	-	0	-
Grandmother	49	98.0%	1	2.0%	0	-	0	-
Sister	49	98.0%	1	2.0%	0	-	0	-
Mother	48	98.0%	0	-	1	2.0%	0	-
Father	48	96.0%	1	2.0%	0	-	1	2.0%
Niece	46	92.0%	4	8.0%	0	-	0	-
Spouse	46	90.2%	1	2.0%	4	7.8%	0	-
Aunt	44	86.3%	6	11.8%	1	2.0%	0	-
Nephew	44	86.3%	6	11.8%	1	2.0%	0	-
Uncle	44	86.3%	6	11.8%	1	2.0%	0	-
Cousin	41	82.0%	8	16.0%	1	2.0%	0	-
Daughter in law	30	58.8%	13	25.5%	8	15.7%	0	-
Son in law	28	56.0%	16	32.0%	5	10.0%	1	2.0%
Mother in law	27	52.9%	16	31.4%	6	11.8%	2	3.9%
Father in law	26	52.0%	15	30.0%	7	14.0%	2	4.0%
Cohabiting partner	21	42.9%	4	8.2%	19	38.8%	5	10.2%
Sister in law	20	41.7%	20	41.7%	8	16.7%	0	-
Pet dog	6	11.8%	7	13.7%	11	21.6%	27	52.9%
Home	6	11.8%	3	5.9%	7	13.7%	35	68.6%
God father	5	9.8%	9	17.6%	17	33.3%	20	39.2%
God father	5	9.8%	9	17.6%	17	33.3%	20	39.2%
Pet cat	5	10.0%	6	12.0%	12	24.0%	27	54.0%
Pet rabbit	4	7.8%	5	9.8%	8	15.7%	34	66.7%
Girl/boyfriend	4	7.8%	2	3.9%	20	39.2%	25	49.0%
Pet fish	3	5.9%	2	3.9%	6	11.8%	40	78.4%
Close friend	2	4.0%	2	4.0%	10	20.0%	36	72.0%
Television	2	4.0%	1	2.0%	2	4.0%	45	90.0%
Best friend	1	2.0%	6	11.8%	4	7.8%	40	78.4%
Colleague	1	2.0%	0	-	1	2.0%	49	96.1%
Family friend	1	2.0%	2	3.9%	7	13.7%	41	80.4%
Neighbour	0	-	1	2.0%	0	-	50	98.0%
Friend	0	-	2	3.9%	3	5.9%	46	90.2%
Acquaintance	0	-	0	-	0	-	51	100.0%

For pet instances the variability is more pronounced with ratings appearing across all four categories. Consistent with the expectations for all four types of stimuli, the extent of the responses in classical categories of clear member and clear non-member was less than 100% (Table 14).

Table 14 Categorisation of instances for participants with pets in household (n=18)

Stimuli	Clear member	Only technically member	Technically non-member	Clear non-member	Sum of clear member & clear non-member	Sum of technically member & technically non-member
Pet dog	33.3%	5.6%	27.8%	33.3%	66.6%	33.4%
Pet cat	29.4%	5.9%	35.3%	29.4%	58.8%	41.2%
Pet rabbit	16.7%	5.6%	16.7%	61.1%	77.8%	22.3%
Pet fish	11.1%	0%	5.6%	83.3%	94.4%	5.6%

In the case of 'pet cat' the expected outcome was supported by the data, that is to say the most frequently used description for cat was that of 'technically speaking' a non-member (i.e. a cat is 'loosely speaking' but not 'technically speaking' a family member). The other two frequent categories were clear member and clear non-member. For the stimuli 'pet dog', the results were similar except that numerically this category was slightly less frequent than the clear member and clear non-member. In contrast for 'pet rabbit' and 'pet fish' participants appear to be much clearer that these are not in any sense a member of the family. Within this pair a gradation is also noticeable with the responses for 'pet rabbit' being considerably closer than those for 'pet fish' to the pattern of responses for 'pet dog' and 'pet cat'.

5.5.4 Discussion

Generally there was little variability in the categorisation of nuclear and some extended family stimuli which were rated as clear members of the category 'family'. However, there was some variability across the categories for conjugal family members, for example, 'daughter-in-law', 'son-in-law', 'mother-in-law' and 'father-in-law', although generally rated, as clear family member there was some gradual gradation across the four categories.

The variability for pet stimuli was more marked and overall, in the case of 'pet dog' and 'pet cat' there is an interesting three-fold split for people with pets in the household. Roughly, equal numbers fall into the categories of believing that the pet is: A) fully a member of the family, B) definitely not a member of the family, and C) loosely speaking a member of the category.

The finding of three groups of pet owners is important and may be relevant to understanding some of the differences which exist in the literature concerning peoples thoughts towards pets, that is different studies may unwittingly have focussed to different extents on these three different groups. For example, the prevalence of the three groups may differ across cultures and therefore a culture which encourages group C cognitions will tend to yield experimental results that reveal more ambiguous attitudes toward pets than would those from cultures for which either group A or group B predominate.

5.6 General discussion

One of the central issues of this thesis is whether the 'family' concept is a useful general framework for describing the person-pet relationship. The purpose

of this study was to investigate the structure of peoples' concept of 'family' using a prototype approach. The decision to use this methodology was based on the applicability other researchers have reported in using prototype theory to explore other difficult to define concepts (Fehr, 1988).

Overall the research findings suggest that the concept 'family' is not a useful general framework for describing the person-pet relationship for all pet owners. In the listing task only 16% of participants with pets in the household listed pets as family members. Similar results were found in the reaction time task although these were differentiated between species with pet dog verified as a family member more frequently than any other pet stimuli. In the prototypicality study pets were found to be peripheral category members and as such share few features in common with other category members and may share features characteristic of other categories.

In the categorisation task three groups of pet owners were found with different cognitions about the place of pets within the concept 'family'. Those believing that the pet is a full member of the category, those who consider the pet is definitely not a member of the category and finally and those who believe the pet is 'loosely speaking' a member of the category. There is some support for these groupings. Cain (1983) found that 36% of participants considered their pets as human and in later study she found that 39% of participants claimed their pets had people status (Cain, 1985). The finding of these three groups of pet owners is important as it may explain some of the differences in the literature regarding peoples' conceptualisation of pets as family members. Sampling predominantly from any one group may bias research findings. For example, it could be

envisaged that people who consider their pets as family members may have more positive attitudes towards their animals than those who consider that their animals are definitely not family members and therefore may be more likely to participate in studies concerning pets. However, as always one has to be cautious about extrapolating from small scale studies to inferences about the general population.

Although these grouping may account for some of the discrepancies found in the data, they do not account for task order effects such as those found by Hodkin, Vacheresse, and Buffet (1996).

CHAPTER SIX | STUDY FIVE: A PAIR WISE SIMILARITY RATING TASK-'FAMILY'

5.1 Introduction

In chapter five it could not be fully confirmed that the concept of 'family' was prototypically organised. Rosch (1975) maintains that in order to claim that a concept is prototypically organised (has internal structure) participants must be able to make judgements about the typicality of category members and use these judgements in the processing of information. The prototype analysis did indeed reveal a prototypical gradation of category members, evidenced by a tendency for central category members to be verified faster than peripheral members were. However, the Reaction Time (RT) task data was confounded because word length, string length and word frequency could not be held constant. In addition, the RT task was a free response task and for some instances, for example 'fish', the number of participants nominating 'fish' as a member of the category was very small (n=4) and therefore the validity of this analysis is questionable. In order to overcome these problems a pair-wise similarity rating task was used in this study. A similarity task solves the problem of word length and word frequency by replacing the two RT variables with a single similarity rating score.

Multi-Dimensional Scaling (MDS) was used to analyse the pair-wise similarity data. MDS is a method used to reveal the structure and identify differences across populations of stimulus domains by scaling the proximity of pairs of stimuli. Stimuli are represented as points in multidimensional space such

that those perceived as similar are closer together. The points are configured so that their positions are defined by a set of co-ordinate axes. MDS can also recover the characteristics people use when they classify objects as belonging to categories. Such characteristics are hypothesised to exist in peoples' minds and MDS yields a conceptual map in which "perceived stimulus attributes are represented as directions or vectors through the spatial representation" (Uslaner, 1978).

MDS is an established data analysis technique and as such is well described in a number of texts (Kruskal & Wish, 1978). For this study the (dis)similarity ratings were analysed using a Euclidean distance metric, and transformed into a 3-dimesional conceptual space for the purpose of visualisation. The Euclidean distance metric was used in this case as it has been found most suitable for mapping concepts where some interaction between dimensions exist (Garner, 1974). Mapping the multidimensional data to a reduced dimensional space introduces an error, so that the geometrical configuration of stimuli in the lower dimensional space is an approximation of the configuration implied by the raw data. The MDS algorithm can be thought of as performing a search for a lower dimensional geometrical configuration that gives the best approximation, in terms of minimising the mean squared error between distances derived from the raw data and those derived from the mapping.

A multidimensional scaling technique was used to analyse the similarity ratings between 20 relationship types in order to determine their relative position in a 3-dimensional psychological space. Additionally the analysis attempts to reveal the overall structure of the concept 'family'; to discover the dimensions

that characterise peoples' perception of the concept of 'family'; and to evaluate the similarities and differences in multidimensional structures between pet owners and non-pet owners.

6.2 Method

6.2.1 Sample size

The sample size was determined based on published studies using multidimesnional scaling anaysis in the psychological literature (Chan, Butters, & Salmon, 1997; Yendrikhovskij, de Ridder, Fedorovskaya, & Blommaert, 1997).

6.2.2 Participants

The participants were 30 volunteers, aged 17 to 75 years old, (M =37.70; SD =16.98). All of the participants were White, approximately half were female (53.3%, n=16), from non-pet owning households (53.30%, n=16). Following completion of the study, a summary sheet was forwarded to those participants who had requested a copy.

6.2.3 Apparatus and materials

The stimuli were 20 words describing relationship terms, taken from the listing task, representing, nuclear family, extended family, non-kin and pet (Table 15). The words were created in Microsoft Paint® using the Arial 16pt. character

set (yellow) on a blue background (280 x 210 pixels) and presented as Device Independent Bitmaps (DIB) by a program[5] running under Windows98®.

Table 15 Stimuli for MDS study.

INSTANCE		
Aunt	Grandfather	Pet rabbit
Best friend	Grandmother	Sister
Brother	Mother	Son
Cousin	Neighbour	Spouse/partner
Daughter	Pet cat	Uncle
Father	Pet dog	Workmate
Friend	Pet fish	

6.2.3.1 Procedure

Participants were tested individually during a procedure that lasted approximately 60-90 minutes. Pairs of words were presented on the computer screen and participants were instructed to rate the similarity of the words in each pair on a scale from 0 to 9, with 0 being 'not at all similar' and 9 being 'extremely similar'. Participants were not given guidance on which characteristics to base their judgements. Each of the 20 stimulus words were paired once with each of the other 19 stimulus words to provide a total of 210 paired similarity judgements. Each word pair remained on the screen until participants made their similarity judgement. Each participant completed the task twice, each time the words were presented in a different order. Following completion of the two computer based

[5] The program was written in Pascal by Louise Alton and modified for this experiment by Eoghan Clarkson.

tasks, participants completed a short demographic questionnaire and were then debriefed.

6.2.3.2 Methodological Issues

A number of participants (13/31) did not enter a maximal similarity rating score when presented with identical stimuli. In 5/30 cases this affected more than half the possible identical pairings. This may suggest that these participants did not fully understand the task and that rating for other instances may to have been affected by the participant's uncertainty regarding the task. The validity of spatial models is based on several axioms, the first of which states that self similarity is maximal. Although, self similarity values are not entered into the *INDSCAL* analysis the effect on the participant's uncertainty with respect to similarity values which were entered, is unknown. Therefore, in order to determine whether these ratings had adversely effected the data, these five participants were excluded and a reanalysis was performed. Although the reanalysis produced new values for stress and R squared which produced a marginal improvement on the original values, this did not change the solution, which remained at three dimensions and therefore all cases were processed.

6.3 Results

Dissimilarity values were computed[6] from similarity ratings for the 20 relationship terms inferring the position of points in multidimensional space using the formula dissimilarity = (9.0 – similarity). Large numbers indicate dissimilarity and small numbers indicate similarity. Thus instances which are similar have points which are closer together. From these, the mean dissimilarity ratings for each of the 210 pairs were computed. The analysis is based on the whole group of participants, denoted 'all' (Table 16) and two subdivisions of this group denoted 'pet' (Table 17), for those from households with a pet and 'no pet' (Table 18), for those from households with no pets.

Generally, the tables show that for all groups ('all', 'pet' and 'no pet'), the participants rated pet/pet pairings as more similar than pet/human family parings. For example, in all groups, pet dog/pet rabbit pairings were rated as very similar with dissimilarity ratings not exceeding 0.07. However, pet dog and any other human family pairings received dissimilarity ratings much higher than the pet dog/pet rabbit pair. The greatest similarity rating for any pet/human family stimuli was between pet cat and spouse/partner with a dissimilarity rating not exceeding 1.53, in all groups. However, generally pet fish was not rated as very similar to other pets, for example pet fish/pet dog received dissimilarity ratings of not less than 7.3 for all groups.

[6] Dissimilarity matrices were computed from the similarity ratings using a program written in C++ by Neil Stewart.

Table 16 Matrix of mean dissimilarity ratings for the 20 family instances (All – N=36)

	Son	Spouse	B'Friend	Brother	Pet dog	Workmate	Neighbour	Rabbit	Aunt	Mother	Sister	Father	Uncle	G.mother	Daughter	Pet fish	Pet cat	Cousin	G.father	Friend
Son	0.12																			
Spouse/Partner	3.05	1.07																		
Best Friend	0.13	6.35	4.57																	
Brother	4.97	6.42	7.47	4.32																
Pet dog	3.48	5.40	6.15	1.43	4.15															
Workmate	0.87	6.32	6.07	7.22	0.78	0.28														
Neighbour	3.05	7.40	7.67	6.13	2.95	3.73	1.58													
Pet rabbit	4.22	4.65	0.38	6.25	0.03	3.93	2.88	0.13												
Aunt	4.78	1.02	2.32	7.70	4.27	4.80	4.58	7.80	7.32											
Mother	0.30	7.62	3.03	3.70	5.02	3.72	3.03	7.85	7.85	7.67										
Sister	7.10	7.83	4.32	2.27	5.58	7.67	7.30	7.65	7.80	7.32	5.33									
Father	7.13	7.50	2.75	0.17	3.85	6.62	6.47	7.80	0.88	7.43	4.18	3.03								
Uncle	6.47	7.75	7.37	1.88	7.28	6.20	6.35	3.65	7.32	7.57	7.47	4.27	3.43							
Grandmother	7.15	3.60	6.65	3.43	6.00	7.73	7.78	7.70	7.42	7.65	6.00	4.78	7.43	2.18						
Daughter	0.65	7.83	6.43	5.00	5.95	3.25	4.10	7.83	7.27	7.47	5.78	7.65	6.47	3.62	0.12					
Pet fish	6.53	7.70	7.83	2.33	7.70	2.32	1.60	3.10	7.60	7.00	7.62	7.52	6.07	0.78	5.48	4.60				
Pet cat	6.22	0.88	3.52	7.30	1.33	3.45	2.67	7.88	2.77	3.35	3.48	0.30	7.83	3.88	4.20	4.48	4.93			
Cousin	4.93	4.72	0.25	6.17	4.57	3.03	2.38	7.58	7.62	0.58	4.78	3.67	3.90	7.82	3.23	7.18	4.87	5.05		
Grandfather	6.05	5.05	3.05	6.35	4.33	3.67	4.85	7.60	7.38	4.63	4.48	4.45	3.15	7.58	5.08	5.42	5.73	7.70	4.62	
Friend	7.45	5.18	3.62	7.73	3.35	0.23	3.43	7.83	3.20	5.37	4.97	5.47	4.33	4.07	6.40	4.62	5.32	7.15	5.30	0.50

Table 17 Matrix of mean dissimilarity ratings for the 20 family instances (Pet Owners – N=14)

	Son	Spouse	Best Friend	Brother	Pet dog	Workmate	Neighbour	Rabbit	Aunt	Mother	Sister	Father	Uncle	G.mother	Daughter	Pet fish	Pet cat	Cousin	G.father	Friend
Son	0.25																			
Spouse/Partner	2.36	0.86																		
Best Friend	0.29	6.36	4.29																	
Brother	4.86	6.29	7.21	4.04																
Pet dog	2.82	5.07	5.79	1.32	3.79															
Workmate	0.54	6.32	5.79	6.89	0.79	0.46														
Neighbour	2.61	7.21	7.14	5.89	2.11	3.21	1.00													
Pet rabbit	3.50	4.21	0.46	6.04	0.07	3.36	2.68	0.21												
Aunt	4.46	0.71	1.89	7.36	4.07	4.54	4.29	7.54	7.04											
Mother	0.18	7.32	2.50	3.39	4.82	3.18	2.61	7.79	7.50	7.25										
Sister	6.54	7.71	3.86	1.82	5.36	7.36	6.89	7.18	7.54	6.61	4.89									
Father	6.75	7.11	2.18	0.18	3.71	6.39	6.50	7.43	0.46	6.96	3.82	2.54								
Uncle	6.11	7.32	7.04	1.43	6.86	5.96	6.36	2.86	6.61	7.18	7.21	3.61	3.07							
Grandmother	6.75	2.86	6.43	2.82	5.50	7.57	7.57	7.25	6.79	7.14	5.64	4.64	7.07	2.29						
Daughter	0.57	7.43	6.14	4.75	5.57	2.96	3.82	7.43	6.54	6.89	5.18	7.18	6.36	3.32	0.18					
Pet fish	6.25	7.36	7.61	1.86	7.32	2.00	1.50	2.68	7.14	6.39	7.14	7.18	5.86	0.93	5.25	4.11				
Pet cat	6.39	0.93	3.11	6.86	1.25	3.04	2.00	7.54	1.86	2.61	3.07	0.29	7.50	3.50	3.54	3.89	4.68			
Cousin	4.50	4.25	0.54	5.89	4.71	2.36	1.79	7.36	7.14	0.43	4.75	3.39	3.50	7.46	2.68	6.25	4.18	5.00		
Grandfather	5.54	4.54	2.43	6.29	4.14	3.32	4.75	7.11	7.04	4.18	4.36	4.07	3.14	7.04	4.89	5.04	5.36	7.32	4.07	
Friend	7.07	4.75	2.96	7.50	3.36	0.39	3.07	7.57	2.86	5.04	4.96	5.32	4.46	3.64	5.89	3.86	4.75	6.68	4.75	0.43

Table 18 Matrix of mean dissimilarity ratings for the 20 family instances (Non-Pet Owners – N=16)

	Son	Spouse	Best Friend	Brother	Pet dog	Workmate	Neighbour	Rabbit	Aunt	Mother	Sister	Father	Uncle	G.mother	Daughter	Pet fish	Pet cat	Cousin	G.father	Friend
Son	0.00																			
Spouse/Partner	3.66	1.25																		
Best Friend	0.00	6.34	4.81																	
Brother	5.06	6.53	7.69	4.56																
Pet dog	4.06	5.69	6.47	1.53	4.47															
Workmate	1.16	6.31	6.31	7.5	0.78	0.13														
Neighbour	3.44	7.56	8.13	6.34	3.69	4.19	2.09													
Pet rabbit	4.84	5.03	0.31	6.44	0.00	4.44	3.06	0.06												
Aunt	5.06	1.28	2.69	8.00	4.44	5.03	4.84	8.03	7.56											
Mother	0.41	7.88	3.50	3.97	5.19	4.19	3.41	7.91	8.16	8.03										
Sister	7.59	7.94	4.72	2.66	5.78	7.94	7.66	8.06	8.03	7.94	5.72									
Father	7.47	7.84	3.25	0.16	3.97	6.81	6.44	8.13	1.25	7.84	4.50	3.47								
Uncle	6.78	8.13	7.66	2.28	7.66	6.41	6.34	4.34	7.94	7.91	7.69	4.84	3.75							
Grandmother	7.50	4.25	6.84	3.97	6.44	7.88	7.97	8.09	7.97	8.09	6.31	4.91	7.75	2.09						
Daughter	0.72	8.19	6.69	5.22	6.28	3.50	4.34	8.19	7.91	7.97	6.31	8.06	6.56	3.88	0.06					
Pet fish	6.78	8.00	8.03	2.75	8.03	2.59	1.69	3.47	8.00	7.53	8.03	7.81	6.25	0.66	5.69	5.03				
Pet cat	6.06	0.84	3.88	7.69	1.41	3.81	3.25	8.19	3.56	4.00	3.84	0.31	8.13	4.22	4.78	5.00	5.16			
Cousin	5.31	5.13	0.00	6.41	4.44	3.63	2.91	7.78	8.03	0.72	4.81	3.91	4.25	8.13	3.72	8.00	5.47	5.09		
Grandfather	6.50	5.50	3.59	6.41	4.50	3.97	4.94	8.03	7.69	5.03	4.59	4.78	3.16	8.06	5.25	5.75	6.06	8.03	5.09	
Friend	7.78	5.56	4.19	7.94	3.34	0.09	3.75	8.06	3.50	5.66	4.97	5.59	4.22	4.44	6.84	5.28	5.81	7.56	5.78	0.56

The categories of human relationships most often ascribed to pets are that of child or sibling (Beck & Katcher, 1996; Veevers, 1985; Voith, 1985). To assess whether pets are rated as being similar to children or siblings the mean dissimilarity ratings between these relationship types and all pets are plotted in Figure 6, Figure 7, Figure 8 and Figure 9. Interestingly, the plots demonstrate a gender/pet type effect. The greatest similarity for female relationship types (sister, daughter) is for cats, and the greatest similarity for male relationship types (brother, son) is for dogs. However, son/daughter pairings demonstrated greater similarity with ratings not exceeding 0.72 in all groups. Multidimensional scaling (MDS) allows these comparisons to be explored in more depth.

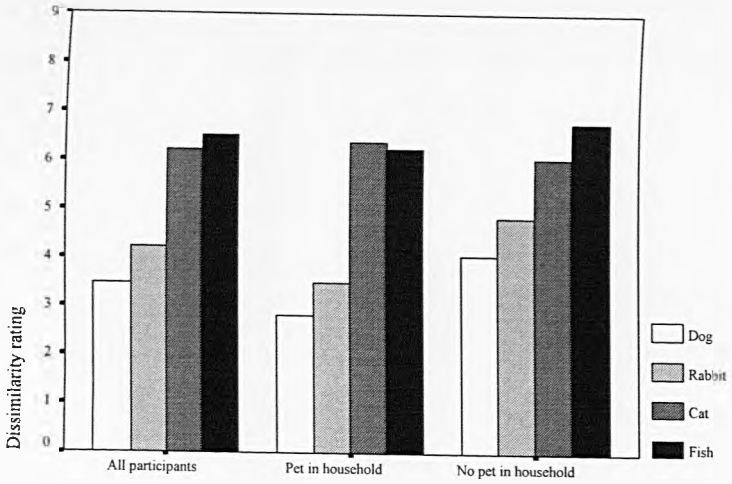

Figure 6 Perceived dissimilarity to son

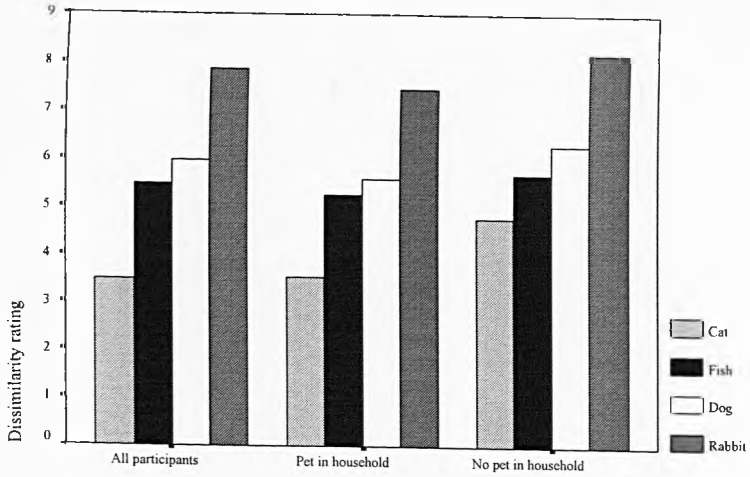

Figure 7 Perceived dissimilarity to daughter

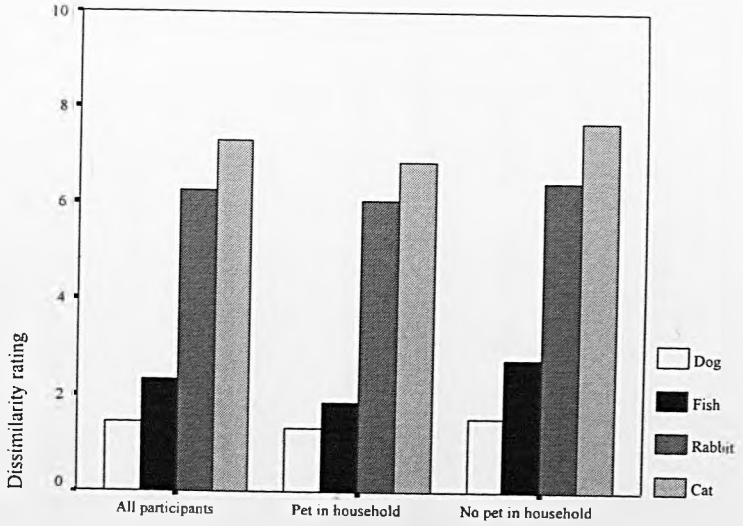

Figure 8 Perceived dissimilarity to brother

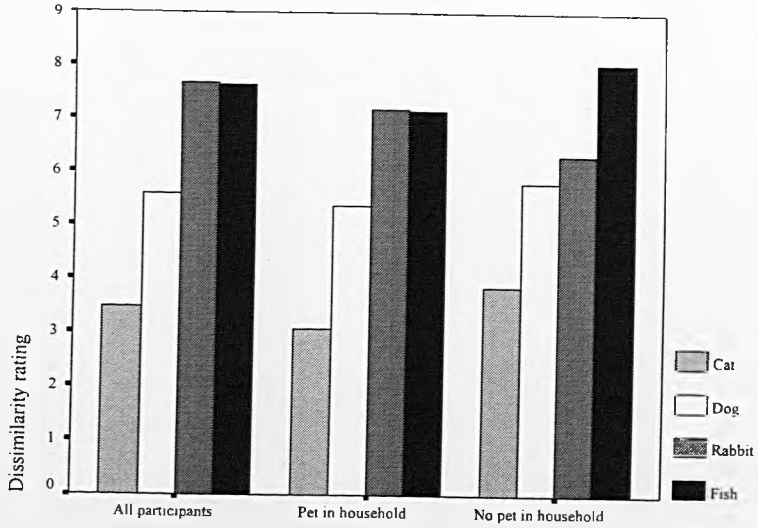

Figure 9 Perceived dissimilarity to sister

The data were analysed using the SPSS® *INDSCAL* individual differences model, which enables the identification of similarities and differences of a stimulus domain and takes account of the different ways in which participants use the scale (Uslaner, 1978). For example, some participants may use extreme values or the middle values whereas other participants may use the range of values. To achieve this individual participant matrices are entered into the program rather than the mean matrices (Table 16, Table 17 and Table 18). The re-scaling of individual participant data is a major advantage of *INDSCAL* over other MDS programs.

The input data comprising the individual dissimartlity matrices were symmetric, that is values above and below the diagonal were equal. As *INDSCAL* only computes values below the diagonal the values in the upper matrices were not entered on the data sheet.

A plot of stress x dimensionality (Appendix B) revealed an 'elbow' and a decrease in stress (stress = .25, r^2 = .68) at three dimensions[7]. The positions for each instance for all participants were plotted in three-dimensional space (Figure 10). The plot shows four distinct clusters of stimuli, which correspond to 'nuclear family' (mother, father, sister, brother, daughter, son), 'extended family' (grandmother, grandfather, aunt, uncle, cousin), 'pets' (pet dog, pet cat, pet rabbit, pet fish), and 'non-kin' (best friend, friend, workmate, neighbour). It is interesting that spouse/partner has no near neighbour.

[7] Goodness-of-fit is not the only criteria on determining dimensionality, stability and interpretability are also factors.

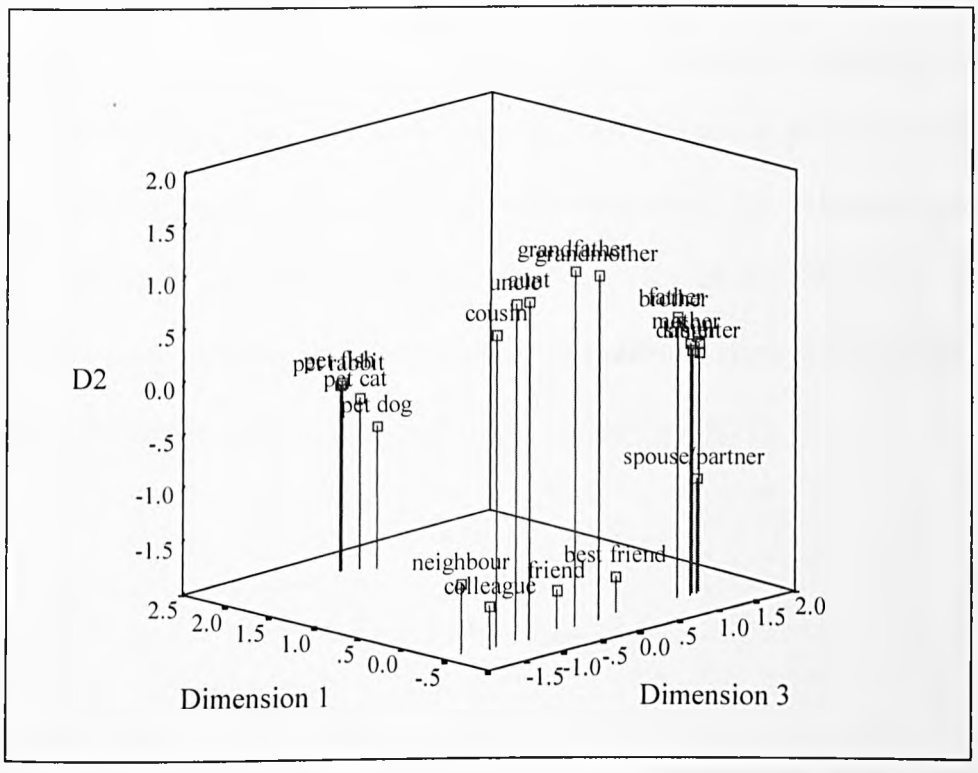

Figure 10 Three-dimensional representation of the concept 'family'.

Dimension-one (.46) best explained the data, followed by dimension-two (.12) and dimension-three (.10).

In order to explore whether the stimulus domain differed between participants with pets in the household (n=14), and participants with no pets in the household (n=16), the data were re-analysed for these subgroups. Individual analyses were conducted for each of the subgroups 'pets in the household' and 'no pets in the household'. The individual data matrix for each participant were entered simultaneously and analysed.

It was anticipated that if pet owners conceptualised pets as members of the family, there would be a convergence of family relationship stimuli and pet relationship stimuli.

The reanalyses produced similar three-dimensional solutions for both subgroups. For pets in the household: dimension-one (.47), dimension-two (.11) and dimension-three (.11), participants and with no pet in household dimension-one (.47) dimension-two (.13) and dimension-three (.11). Although there were differences in the positions of the stimuli on each of the three dimensions the overall configuration remained the same with distinct clusters for nuclear family, extended family, non-kin and pet (Figure 11 and Figure 12).

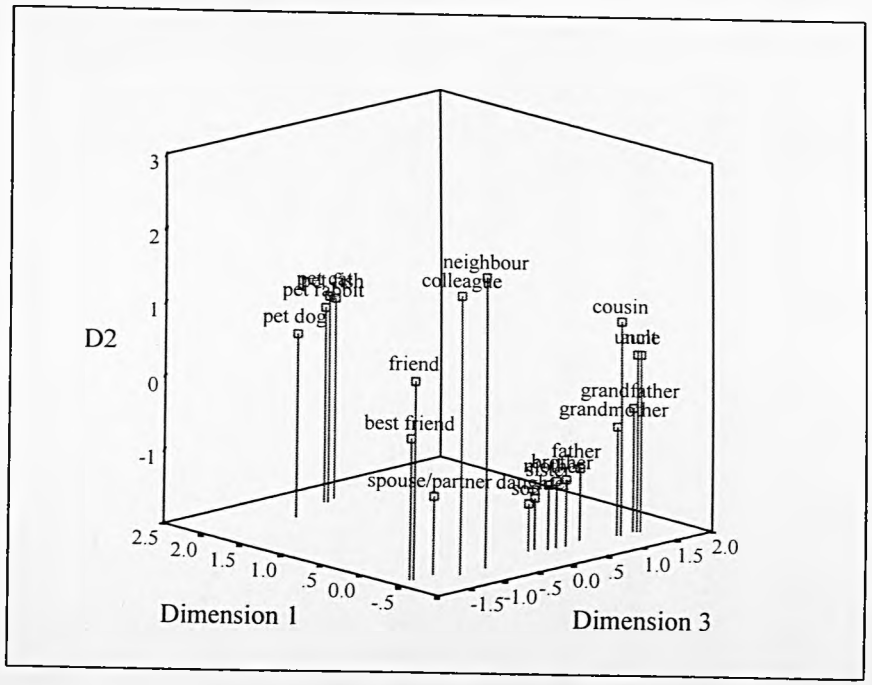

Figure 11 Three dimensional plot (no pet in household)

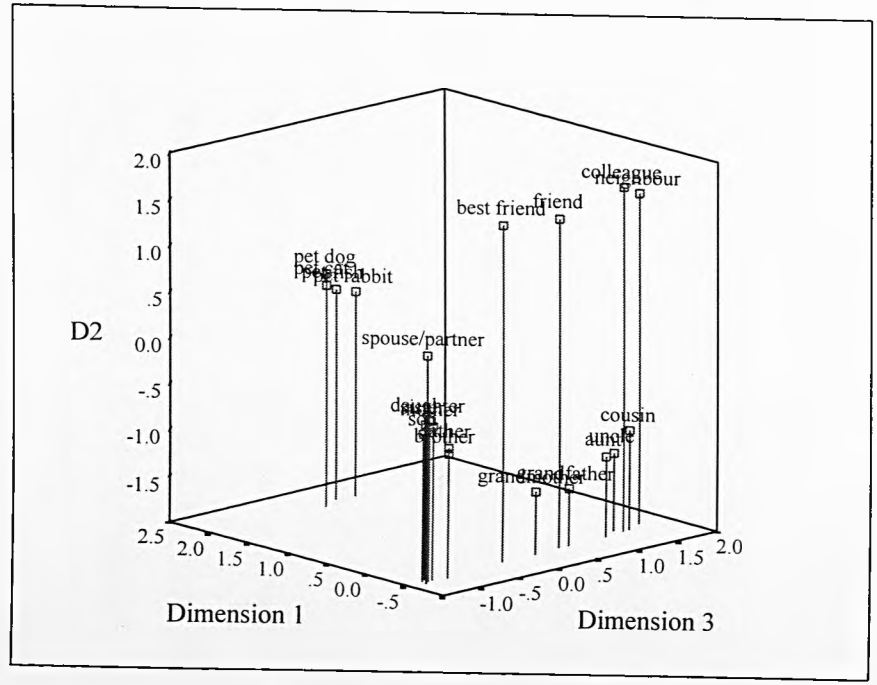

Figure 12 Three dimensional plot (pet in household)

6.3.1 Interpretation of dimensions

It will be argued here that the three-dimensions revealed in the multidimensional scaling analysis may be interpreted as 'humanness', 'voluntariness' and 'closeness'. For ease of visualisation the co-ordinate values for each dimension were plotted in two-dimensions for all three groups (Figure 13-Figure 21).

Dimension one, was clearly interpreted and labelled 'humanness' reflecting the polarisation of the human and non-human stimuli along this dimension. This pattern was repeated for all groups (.46 'all', .47 'pet' .47 'no pet'), which suggests that dimension one is an important characteristic in the conceptualisation of 'family'.

The co-ordinate values differed within the pet stimuli, pet dog was always located closer to the human stimuli for all groups than the other stimuli, followed by pet cat and generally, although, not always, pet rabbit and pet fish. Differences were also evident between the pet owning/non pet owing subgroups; particularly in the similarity they perceived between pet and human stimuli (Figure 22). The pet subgroup located pet cat, pet rabbit and pet fish closer to human stimuli on dimension one than the no-pet subgroup. Conversely, the no-pet subgroup located pet dog closer to the human stimuli than the pet owning subgroup. Relative closeness to humans of the four pet types was invariant, with pet dog always located nearest.

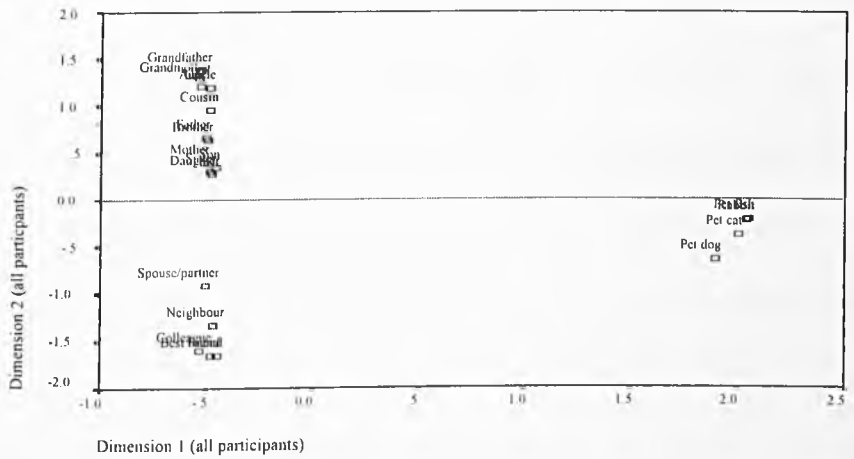

Figure 13 Dimensions 1 and 2 of the three dimensional solution (all participants)

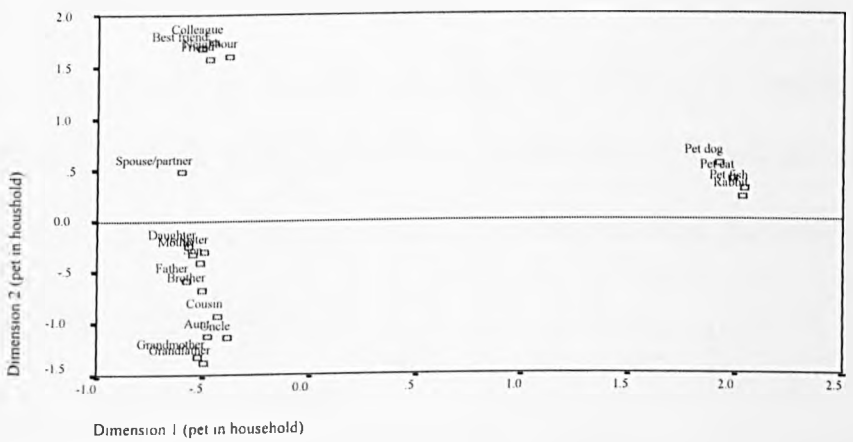

Figure 14 Dimensions 1 and 2 of the three dimensional solution (pet in household)

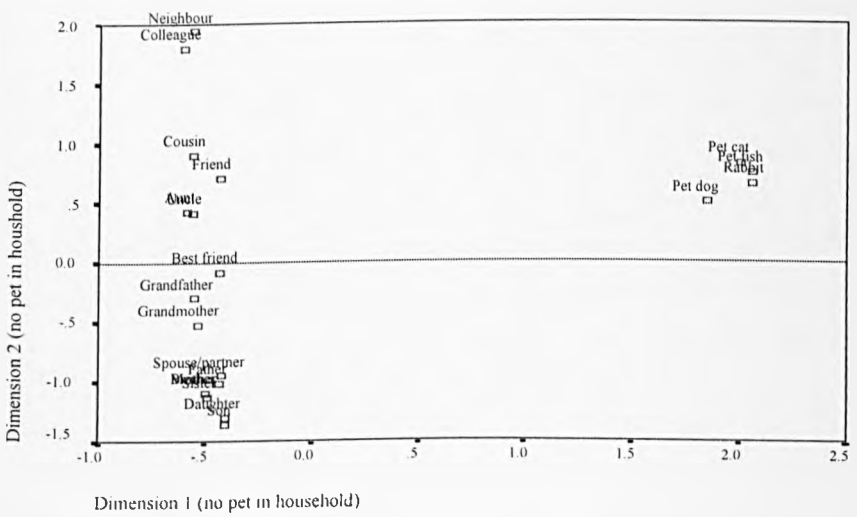

Figure 15 . Dimensions 1 and 2 of the three dimensional solution (no pet)

Dimension two (.12-all participants; .11 pet in household; .13 no pet in household) was broadly interpreted as 'voluntariness', based on the notion that some relationships such as those with family members are involuntary whereas those with friends are voluntary. Pets are located towards the centre of this dimension and this may reflect their intermediary status, for some household members pets are a voluntary relationships, however, for other household members they are imposed. Other interpretations are possible, for example, dimension two, might be captured by a 'superficial/intense' dimension as reported by Wish, Deutsch, and Kaplan (1976) or a 'intimate/less intimate' dimension (Argyle, 1985). However, the location of stimuli across this dimension varies between the groups (Figure 23) and therefore the interpretation of this dimension is not reliable.

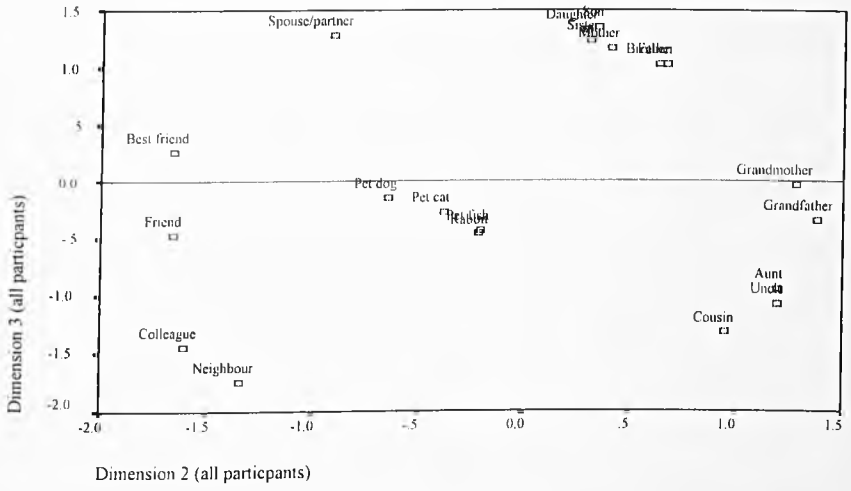

Figure 16 Dimensions 2 and 3 of the three dimensional solution (all participants)

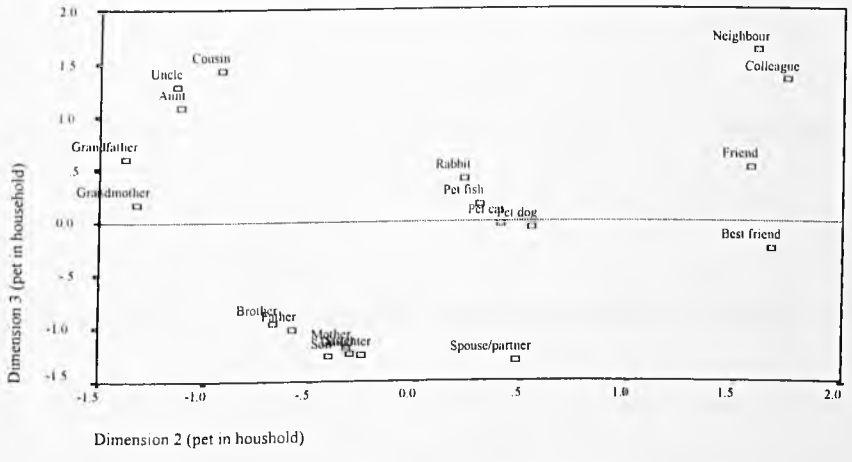

Figure 17 Dimensions 2 and 3 of the three dimensional solution (pet in household)

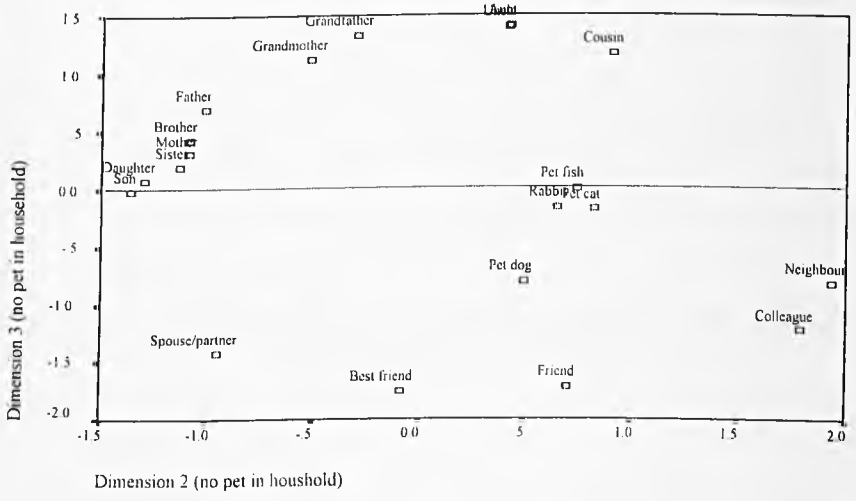

Figure 18 Dimensions 2 and 3 of the three dimensional solution (no pet in household)

Dimension three (.10-all participants; .11 pet in household; .11 no pet in household) was also difficult to discern, 'closeness' and 'affect' may be possible candidates. However, the changing positions of the stimuli between groups (Figure 24) makes this dimension difficult to label.

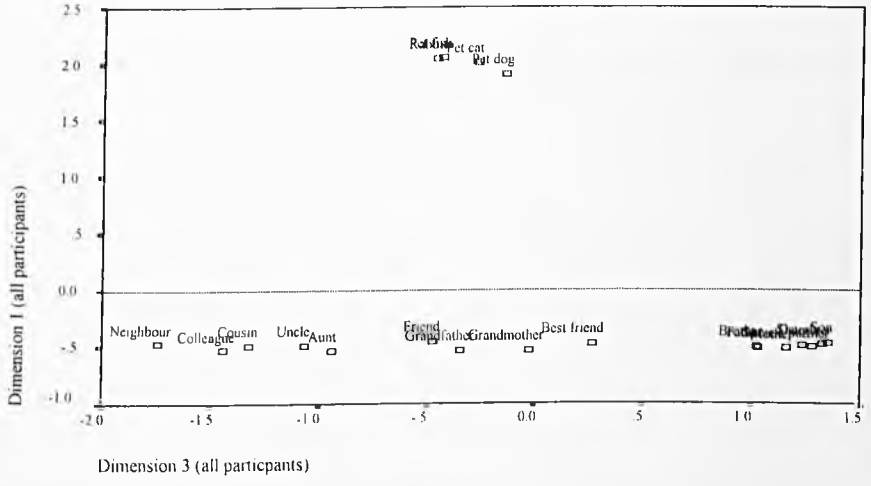

Figure 19 Dimensions 3 and 1 of the three dimensional solution (all participants)

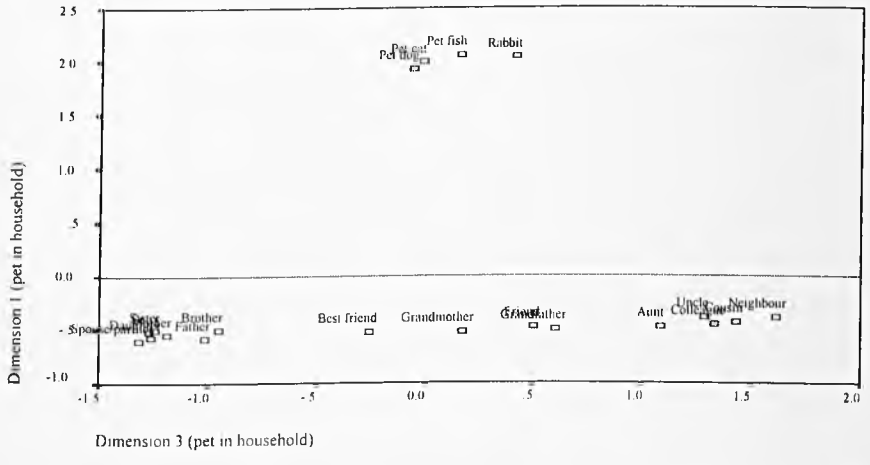

Figure 20 Dimensions 3 and 1 of the three dimensional solution (pet in household)

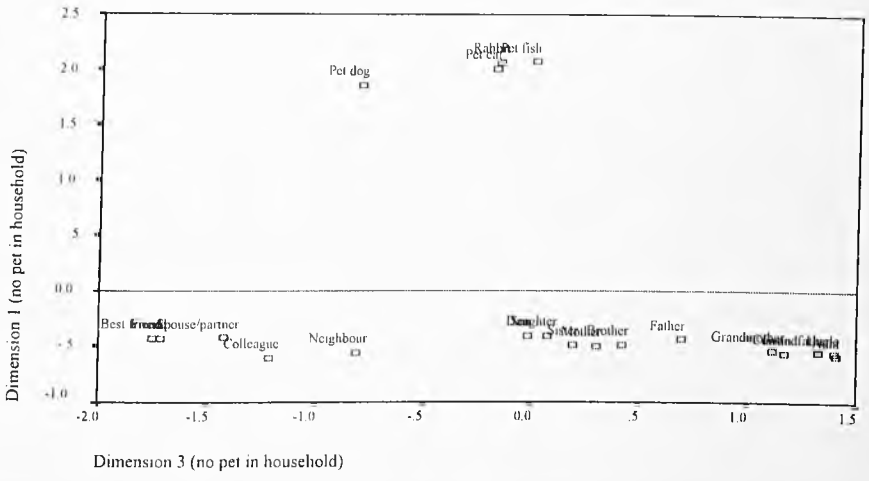

Figure 21 Dimensions 3 and 1 of the three dimensional solution (no pet in household)

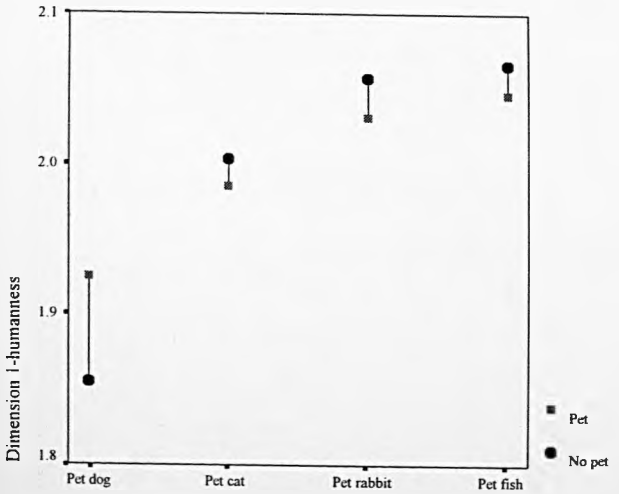

Figure 22 Mean difference for dimension 1 (humanness)

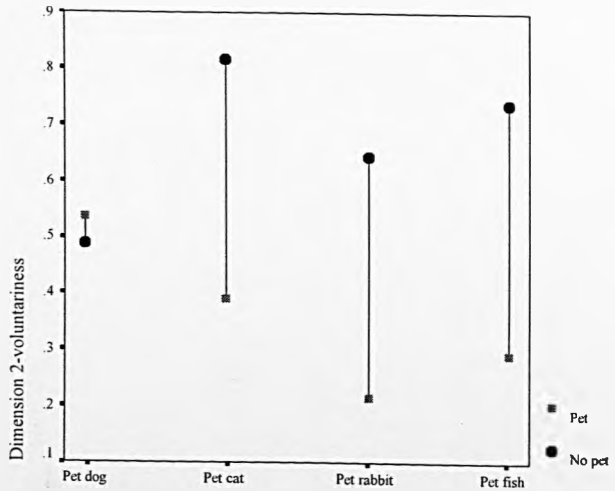

Figure 23 Mean difference for dimension 2 (voluntariness)

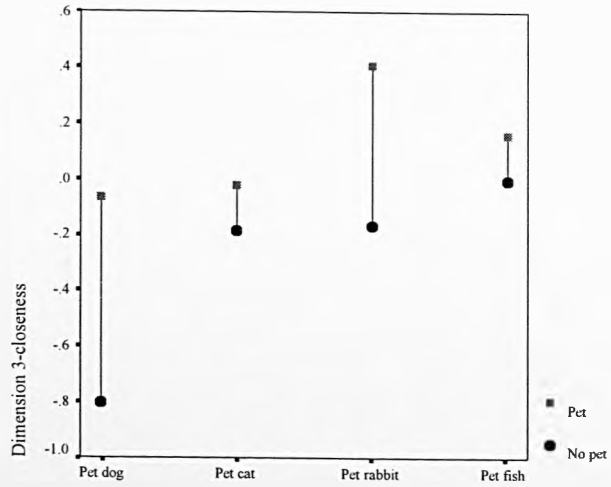

Figure 24 Mean difference for dimension 3 (closeness)

Inspection of the three-dimensional plot revealed three distinct groupings which were denoted 'A' (pet dog, pet cat, pet rabbit, pet fish); 'B' (best friend, friend, neighbour, colleague); 'C' (mother, father, daughter, son, sister, brother); 'D' (grandmother, grandfather, aunt, uncle and cousin); spouse/partner did not have any near neighbours. The average Euclidean intra/inter class distances for these selected clusters were calculated and presented as a confusion matrix (Table 19, Table 20 and Table 21). The results show that the average intra class distance for all relationship categories is always less than the average inter class distance for all groups. This suggests that the selected clusters are viable groupings consistent with the similarity criteria used by the lower dimensional space and therefore the four pet types are more similar to each other than to any other groups. These findings are similar to those of Berryman, Howells, and Lloyd-Evans (1985) who found that compared to a pet owners 'current pet' the most similar relationship type was 'previous pet'.

Table 19 Mean inter and intra cluster distances (N=30) (all participants)

	A	B	C	D
	M	***M***	***M***	***M***
A	**0.32**	2.93	3.04	3.04
B	2.93	**1.19**	2.94	2.92
C	3.04	2.94	**0.27**	2.10
D	3.04	2.92	2.10	**0.70**

Table 20 Inter and intra cluster distances (n=14) (pet in the household)

	A	B	C	D
	M	***M***	***M***	***M***
A	**0.34**	2.95	2.96	3.06
B	2.95	**1.09**	2.91	2.96
C	2.96	2.91	**0.27**	2.23
D	3.06	2.96	2.23	**0.70**

Table 21 Inter and intra cluster distances (no pet in household n=16)

	A	B	C	D
	M	***M***	***M***	***M***
A	**0.47**	2.92	3.14	3.10
B	2.92	**1.36**	2.92	2.99
C	3.14	2.92	**0.37**	1.72
D	3.10	2.99	1.72	**0.74**

6.3.2 Individual differences

There were individual differences in the pet subgroup. If the data shown in Figure 12 are broken down further to examine individual participant plots, it can be seen that some participants with pets in the household included pet stimuli either within or close to the 'family' cluster. For example, pet dog is located within the 'family' cluster in Figure 25 and this reflects the familial role of the pet as perceived by this participant. Similarly, in Figure 26 pet dog and pet cat are located very close to the 'family' cluster. Figure 26 has been reproduced as a set of 2-dimensional plots (Figure 27, Figure 28 and Figure 29) for clarity.

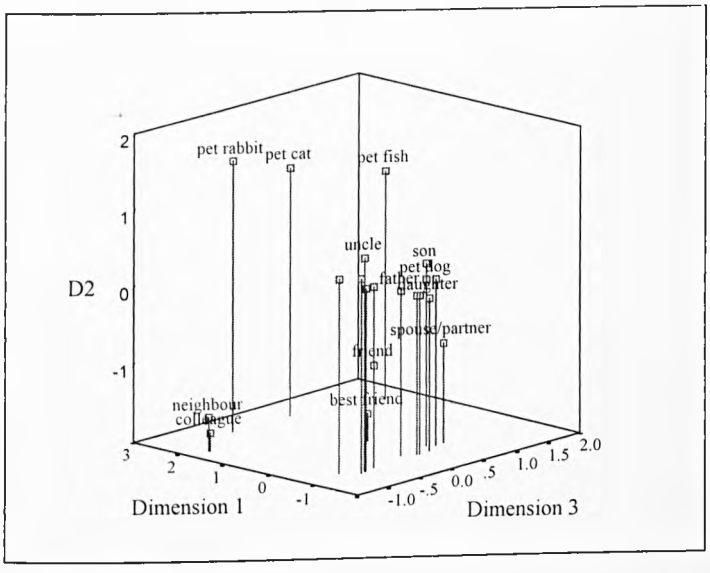

Figure 25 Individual three-dimensional plot for dog owner (n=1)

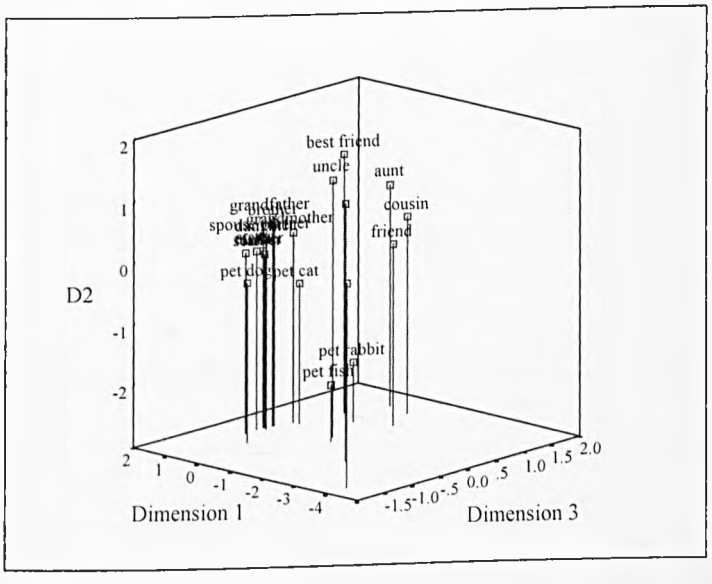

Figure 26 Individual three-dimensional plot for dog and cat owner (n=1)

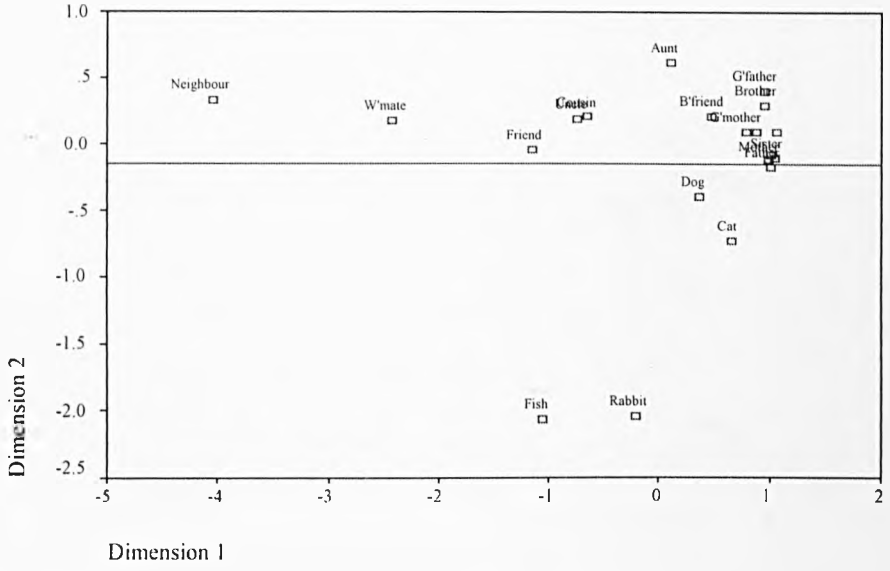

Figure 27 Individual two-dimensional plot for a dog and cat owner

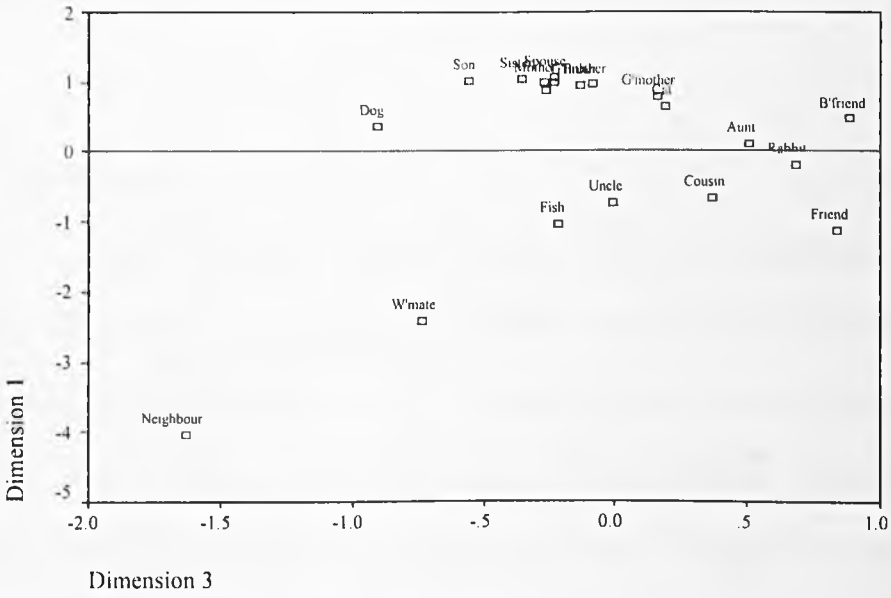

Figure 28 Individual two-dimensional plot for a dog and cat owner

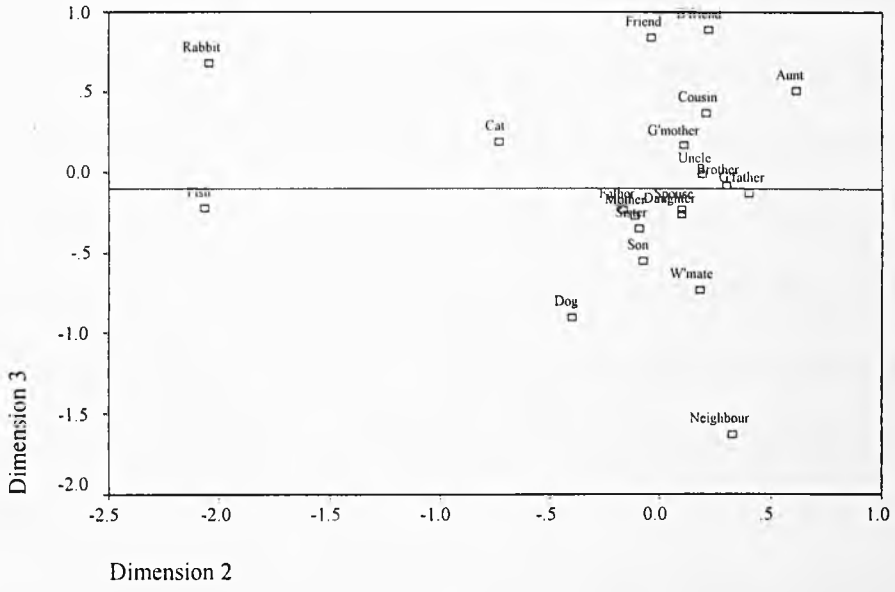

Figure 29 Individual two-dimensional plot for a dog and cat owner

6.4 Discussion

The MDS analysis of the data clearly demonstrate groupings for pet, non-kin, nuclear, and extended groupings, with spouse/partner not located within any cluster. This configuration was found for all groups. The mean intra distance for each of these stimuli clustered into pet, nuclear, extended, and non-kin groups. The average inter/intra class distances were also calculated and presented as a confusion matrix, these also give support for these groupings.

Further evidence to support the validity of the groupings comes from the findings of the prototypical task (Study 2). The selected clusters corresponded to the prototypical rating they received in the prototypical rating task. Thus typical members of the category 'family', such as, mother, father, son, daughter tend to grouped together and less typical members such as, pet dog, pet cat, pet rabbit, and pet fish are also grouped together.

As participants were given no prior information on the similarity criteria to use or the nature of the research there is a danger that each individual might base their judgement on their own unique past experience. In this case there would be no basis to conclude that their conceptual mappings could be generalised. However, there is a degree of consistency between results from all three groups. Although, some pet owning participants did locate some pet instances such as dog and cat closer to the 'family' grouping and this was found to reflect the type of pet they owned.

Some participants did not enter maximal similarity rating score when presented with identical stimuli. In one case this affected more than half the possible identical pairings. This may suggest that these participants did not fully understand the task and that rating for other instances may to have been affected by the participant's uncertainty regarding the task. Although, the effect of these cases was assessed as minimal with hindsight it may have been prudent to have excluded these data sets completely from the analysis.

This study suggests that some pet owners may consider their pets family members, however, it is clear that this is not a universal description of peoples' pets. Therefore the general framework of 'family' may not be useful in describing all person-pet relationships.

CHAPTER SEVEN | STUDIES EXPLORING THE CONCEPT OF 'FRIEND'

7.1 Introduction

The notion that the majority of pet owners represent pets as family members has not been supported. The prototype analysis of the concept 'family' has shown that pets were found to be peripheral members of the category and as such share only a few features in common with the prototype. Peripheral category members have been shown to have features in common with other categories and therefore pets may be better represented by another category. Another possible candidate category that has been identified by others could be 'friend'. A number of studies have shown that pet owners consider their pets as friends (Hirschman, 1994; Serpell, 1989).

The studies presented in this chapter are designed to explore the degree to which pets are conceptualised as 'friends' using the prototype approach. This approach has not been used to explore the concept of 'friend', although Davis and Todd (1985) advocate its use.

7.2 Study six – Prototypicality

7.2.1 Introduction

A prototypicality task was devised to determine whether pets are considered typical or atypical members of the category 'friend'. As previously discussed some features of category members are not always directly perceivable. Deriving prototypicality for pets will provide an indication of whether they possess features common to 'friend' in order to assess whether the friendship framework is useful for describing the person-pet relationship.

7.2.2 Method

7.2.2.1 Participants

Participants were 52 14 to 67 year old volunteers, (M =39.06; SD = 14.30) attending various conferences at The University of Warwick. The majority were female (61.5%, n=32), White (98.1%, n=51) and non-pet owning (35.3%, n=18).

7.2.2.2 Materials

The rating task was presented in a questionnaire, divided into three sections. Section one contained instructions and information on the purpose of the study. Participants were asked to rate how 'good an example' of friend, different items were on a five point scale. The items comprised seven 'friend' items ('best friend', 'close friend same sex', 'close friend opposite sex', 'social acquaintance', 'former friend', 'girl/boy friend' and 'family friend') used in previous studies

exploring friendship (Davis & Todd, 1985); four pet items ('pet dog', 'pet cat', 'pet rabbit' and 'pet fish'); fourteen family items ('wife/husband', 'mother', 'father', 'daughter', 'son', 'sister', 'brother', 'grandfather', 'grandmother', 'aunt', 'uncle', 'cousin', 'nephew' and 'niece'); two non-kin items ('neighbour' and 'workmate') and two other objects ('home' and 'television'). The scale was anchored at 5= extremely good example of a 'friend', to 1 extremely poor example of a 'friend'. The scales were reversed every ten instances. Section two of the questionnaire contained the instances and the rating scale. Section three asked for demographic information including, age, gender, ethnicity, 'family' category, and pet keeping experience.

7.2.2.3 Procedure

The procedure was identical to that used in study three (chapter 5, section 5.4), with the exception of the stimuli and the instructions given to participants. Participants were informed that the study explored the nature of friendship and asked rate how good an example of each instance presented was of a 'friend'. The form of wording used to consenting participants was based on the procedure of Fehr & Russell (1991). Participants were asked to judge how good an example of 'friend' each of the listed instances is. Participants were informed that there are not right or wrong answers and that it is their opinion that is important. Although, it was stressed that they were not to base their judgements on how much they liked a person represented by the instance, but to judge how good an example of the category it is. The questionnaires were collected immediately following completion and participants were then debriefed.

7.2.3 Results

The mean prototypicality rating for each of the 32 instances are presented in Table 22. In the table, higher prototypical means indicate better rated examples. The prototypicality ratings show a gradient with 'friend' instances such as 'best friend', 'close friend (same sex)', 'friend' and 'girlfriend' receiving high ratings and 'former friend', 'neighbour', and 'home' receiving lower ratings.

Table 22 Prototypically ratings derived using a median split - presented in descending order (N=51)

INSTANCE (CENTRAL)	(M)	INSTANCE (PERIPHERAL)	(M)
Best friend	4.85	Workmate	3.29
Close friend (same sex)	4.52	Family friend	3.27
Friend	4.44	Cousin	3.08
Girlfriend	4.33	Pet dog	3.04
Wife	4.29	Aunt	3.00
Close friend (opposite sex)	4.28	Uncle	2.81
Husband	4.21	Nephew	2.73
Sister	4.16	Niece	2.71
Mother	4.08	Neighbour	2.62
Boyfriend	4.00	Pet cat	2.62
Daughter	3.69	Former friend	2.25
Brother	3.67	Home	2.07
Father	3.57	Acquaintance	2.00
Grandmother	3.49	Pet rabbit	1.80
Son	3.39	Pet fish	1.65
Grandfather	3.30	Television	1.61

Again, two methods of determining category membership were compared, median split (Fehr & Russell, 1991) (Table 22), and a one-sampled t-test (Table 23) (J. Archer, personal communication, March 13 2001). Both methods produced similar results, although the t-test included as central members, 'workmate', and 'family friend' and 'Grandfather' became an intermediate member. As both methods produce similar findings the analysis based on the median split was reported.

The value of 3.30 indicates this split. Table 22 shows that pet instances that fall below this value and are considered to be peripheral members of the category 'friend'. A position effect is evident with 'pet dog' rated as a better example of 'friend', then 'pet cat', 'pet rabbit' and 'pet fish'.

Table 23 Prototypically ratings – (t-test) (N=51)

CENTRAL	INTERMEDIATE	PERIPHERAL
Close friend (same sex)	Grandfather	Neighbour
Friend	Cousin	Pet cat
Girlfriend	Pet dog	Former friend
Wife	Aunt	Acquaintance
Close friend (opposite sex)	Uncle	Pet rabbit
Husband	Nephew	Pet fish
Sister	Niece	Television
Mother		
Boyfriend		
Daughter		
Brother		
Father		
Grandmother		

The prototypicality ratings were explored by ownership status to determine whether participants with pets in the household rated pets as more typical of the category than participants with no pets in the household. Table 24 shows that participants with pets in the household rated all pet types as more prototypical than those with no pet in the household. The differences were significant for 'pet cat' (H (1, N=49) = 5.415, p =.020), although differences between 'pet dog', (H (1, N=48) = 0.259, p = .611) 'pet rabbit' (H (1, N=48) = .783, p = .376) and 'pet fish' (H (1, N=47) = .019, p = .891) were non-significant. However, whether or not there was a pet in the household participants still judged pets as peripheral members of the category 'friend'. The finding that participants judged that pets were peripheral category members indicates that they share few features in common with the prototype and suggest that they share features in common with other categories.

Table 24 Prototypicality ratings for types of ownership status – median split (higher means indicate better example)

	Ownership status	
	Pet in household (n=34)	**No pet in household (n=18)**
Instance	Mean	Mean
Pet dog	3.00	2.71
Pet cat	3.17	2.89
Pet rabbit	1.89	1.51
Pet fish	1.50	1.49
Median split	3.31	3.25

7.2.4 Discussion

The prototypicality ratings demonstrate a continuum of 'friend' items, with 'best friend' and 'close friend' receiving high ratings and 'former friend' and 'acquaintance' receiving low ratings. 'Pet dog' received a prototypicality rating comparable to that of 'family friend'. In contrast 'pet rabbit' and 'pet fish' received almost the lowest ratings. Further analysis revealed that all pet stimuli were classified as peripheral members of the category 'friend'. As has been previously discussed peripheral category members tend to have fewest features in common with central category members and it also indicates that they share features in common with another category. These results indicate that in terms of friendship, pets possess few features in common with people. Therefore it is questionable how useful the friendship framework is for describing the person-pet relationship.

7.3 Study seven - Reaction time study

7.3.1 Introduction

A reaction time (RT) task was devised to explore the extension of the category 'friend'. Reaction time is a behavioural measure rather than an introspective measure and provides an alternative method to derive category membership.

7.3.2 Sample Size

The calculations were based on the effect size found by Fehr (1991). However, compared to study three, a less conservative more pragmatic 80% likelihood of effect detection was adopted. Thus only 46 participants were required.

7.3.3 Method

7.3.3.1 Participants

Participants were 50 volunteers, aged 17 to 75 years old (M =39.20; SD = 16.03) attending various conferences at The University of Warwick. The majority were female (52.0%, n=26), White (98%, n=49) and 50% (n=25) were from pet owning households.

7.3.3.2 Apparatus and materials

A Macintosh PowerBook 165 microcomputer, programmed using PsyScope (1994 Carnegie Mellon University) controlled experimental events and record data, participants' responses and reaction times (RTs), measured from the onset of the word. The words were randomly presented on the screen. Each stimulus appeared on the screen for a duration of 500ms, this was preceded with a fixation cross which appeared on the screen for a duration of 500ms. There was an inter-stimulus interval of 1.5ms. Response times were made on a specially adapted number keyboard, which was sited remotely from the computer controlling experimental events. The two response buttons (numeric keys 1 & 3) on the keyboard were labelled 'YES' and 'NO'. The 'YES' and 'NO' labels identifying these keys were interchanged for each participant to reduce any 'noise' effects produced by physical key ordering. Participants used their dominant hand to make their responses. Instructions were presented on screen.

7.2.2.1 Procedure

A free classification paradigm was used (no right or wrong answers). Consenting participants were tested individually. Participants were seated facing the computer, eye to screen distance was approximately 60cm. Participants were informed that the experiment was designed to investigate the nature of friendship and the purpose of this experiment is to examine whether ***YOU*** would consider the following list count as friends. The list comprised 30 target items (Table 25) representing candidate friends. Participants were instructed to respond 'YES' or 'NO' as quickly and accurately as possible to the target items to indicate whether

the given target is an instance of the category 'friend'. The instructions were presented 'on screen' and in addition participants were verbally urged to respond as "quickly and accurately as possible". Participants were informed to make judgements by pressing the adapted keyboard in response to target items that would appear on the screen. Participants completed a practice trial, which was analogous to the experimental session except the stimulus items were fruits. The beginning of each stimuli event was signalled by the appearance of an asterix, followed 500 ms later by the stimulus item. The experimental session lasted approximately 15 minutes. Following completion of the task participants completed a short closed ended questionnaire (see Appendix C) which provided demographic information including the participant's, age, gender, ethnicity, family category, and pet keeping experience. Participants were then debriefed.

Table 25 Stimulus list grouped by prototypicality rating

CATEGORY	STIMULUS	WORD LENGTH	WORD FREQUENCY[8]
CENTRAL	Best friend	4/6	369/163
	Close friend (same sex)	5/6/4/3	204/163/768/40
	Friend	6	163
	Girlfriend	10	1
	Wife	4	256
	Close friend (opposite sex)	5/6/8/3	204/163/88/40
	Husband	7	134
	Sister	6	72
	Mother	6	275
	Boyfriend	9	3
	Daughter	8	92
	Brother	7	92
	Father	6	213
	Grandmother	11	4
	Son	3	142
	Grandfather	11	18
PERIPHERAL	Workmate	8	1
	Family friend	6/6	281/163
	Cousin	6	16
	Pet dog	3/3	2/47
	Aunt	4	21
	Uncle	5	24
	Nephew	6	7
	Niece	5	14
	Neighbour	9	26
	Pet cat	3/3	2/15
	Former friend	6/6	119/163
	Home	4	538
	Acquaintance	12	23
	Pet rabbit	3/6	2/6
	Pet fish	3/4	2/119
	Television	10	66

7.3.4 Results

The results are analysed for both responses, whether pets were nominated as members of the family ('YES'/'NO') and for reaction time, the time taken to respond 'YES' to whether stimuli were considered members of the family.

7.3.4.1 Responses

The percentage of 'YES' responses for all participants and those with a pet in the household are presented in Table 26. For all respondents, instances labelled 'friend' or containing 'friend' in the label were verified 'friend' by all or the majority of participants, with the exception of 'former friend'. The next group to be verified 'friend' by the majority of participants tended to be those considered family members. With the exception of 'pet dog' the majority of respondents did not verify other pet targets 'friend'.

This pattern is similar for respondents with pets in the household, except that 'pet cat' is also verified as a 'friend' by the majority of participants reporting pets in their household. However, the majority of participants did not nominate other pet instances as 'friends'. Pet instances were nominated friends below all other animate stimuli including that of 'acquaintance'.

7.3.4.2 Response time

The response times recorded are summarised in Table 26 and presented with the prototypicality ratings from study two.

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[8] The Lancaster-Oslo/Bergen (LOB) Corpus (British English texts).

7.3.4.3 Data screening

Again, as with the data for study four, the data in this study were also found to be positively skewed. RTs with values equal to or less than 150 ms and RTs with values equal to or greater than 3000 ms were excluded from the analysis, as it is generally considered that such times are too fast or too slow for meaningful interpretation (Fazio, 1990). These outliers accounted for 0.20% of the total data from the study. The remaining RTs were averaged across the 30 target words. Although, removing the outliers improved the distributional properties of the data, the data remained skewed.

In order to address the skew, a reciprocal and $\log_{10}$ transformation was undertaken. Although these measures produced a further improvement in the distribution, the data still failed to meet the necessary assumptions of ANOVA and therefore non-parametric analyses were undertaken.

Table 26 Prototypically ratings, reaction times, and percent responding yes.

STIMULUS	PROTOTYPICALITY	MEAN RT	% (ALL - N=50)	% (PET - n=25)
Best friend	4.85	819.41	98	100
C friend (same sex)	4.52	1102.44	100	100
Friend	4.44	806.32	100	100
C friend (opp. sex)	4.28	1322.07	94	92
Spouse	4.25	983.00	88	92
Girl/boyfriend	4.17	873.87	90	96
Sister	4.16	820.91	70	76
Mother	4.08	730.70	74	76
Daughter	3.69	942.68	74	80
Brother	3.67	915.75	80	88
Father	3.57	894.34	76	72
Grandmother	3.49	1080.94	66	72
Son	3.39	916.78	72	72
Grandfather	3.30	923.88	68	72
Workmate	3.29	1129.14	70	76
Family friend	3.27	960.02	92	96
Cousin	3.08	972.66	76	76
Pet dog	3.04	1003.07	56	52
Aunt	3.00	832.50	64	64
Uncle	2.81	942.43	60	60
Nephew	2.73	925.74	62	68
Niece	2.71	1167.68	62	68
Neighbour	2.62	990.85	68	60
Pet cat	2.62	1063.64	50	52
Former friend	2.25	1160.79	56	68
Home	2.07	1048.50	20	28
Acquaintance	2.00	1209.72	50	52
Pet rabbit	1.80	993.12	36	28
Pet fish	1.65	1442.25	24	20
Television	1.61	836.80	10	16

A Kruskal-Wallis ANOVA was used to examine the difference in RT between targets which had previously been rated as central members and those

rated as peripheral members. It was anticipated that instances in the central group would be verified quicker than instances in the peripheral group. Significant differences were found between groups $H(1, \underline{N}=50) = 5.228$, $p=.022$). Instances in the central group were verified on average, 200 ms more quickly than instances in the peripheral group (Figure 30).

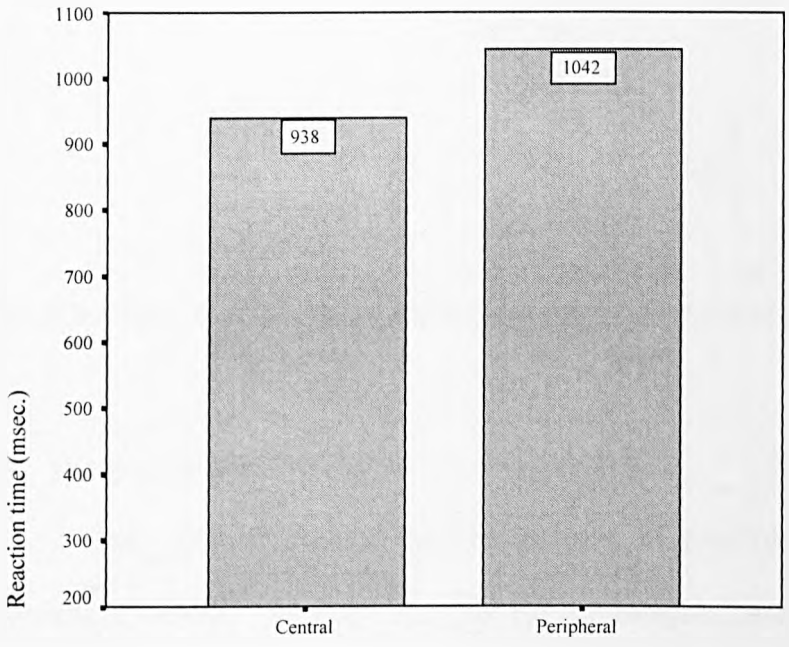

Figure 30 Reaction times for central and peripheral targets.

Previous research has found a correlation between RT and prototypicality rating. This reflects the higher degree of uncertainty that accompanies decisions regarding more peripheral targets and the consequent longer reaction times. In the current study, a similar pattern was found (Figure 31) with a significant negative correlation between RT and prototypicality rating (r = -.386, p=.035). This finding is consistent with previous research that uses this methodology (Rosch, 1973b).

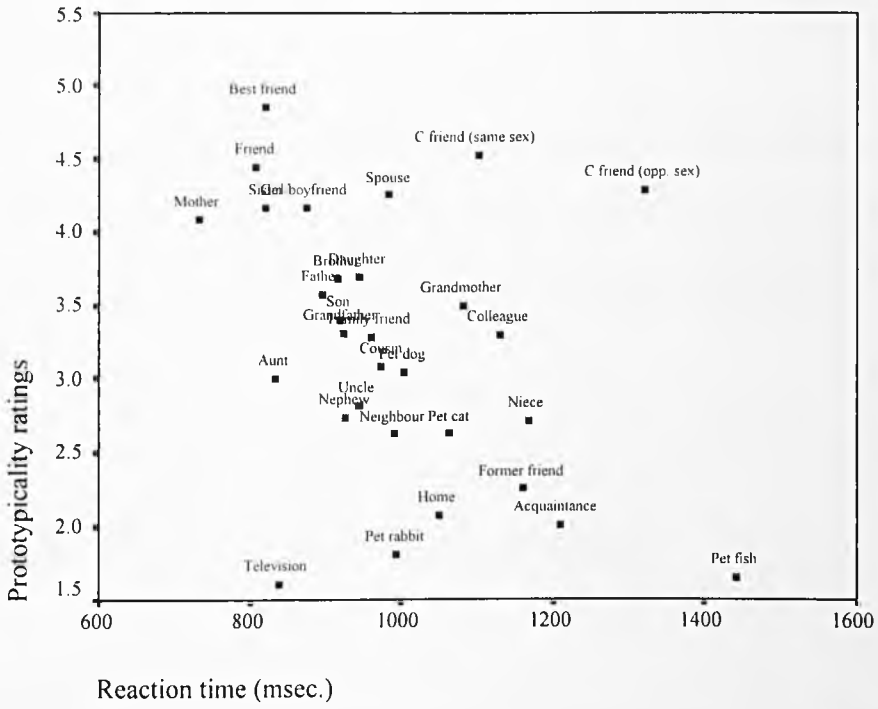

Figure 31 Scattergram of the relationship between reaction time and prototypicality rating

7.3.5 Discussion

The analysis revealed that the majority of participants with pets in the household verified 'pet dog' and 'pet cat' as category members. This contrasts with 'pet rabbit' and 'pet fish', where only a minority of participants with pets in the household verified these stimuli as category members. These findings are much lower than those reported by some researchers exploring the person-pet relationship (Peretti, 1990).

Although, there were significant differences between central and peripheral instances, and reaction times for central instances were faster, these results should be interrupted with caution. Because of the nature of the topic under investigation, it is not possible to control for word length, frequency or familiarity. Although, the average word length in the central category were longer

than those in the peripheral category which adds further support for the reaction time findings.

Prototypicality ratings and reaction times are correlated, i.e. research has demonstrated that prototypicality ratings are predictive of reaction, the more prototypical an item is rated the faster the item will be verified.

7.4 Study eight - Categorisation of 'friend'

7.4.1 Introduction

In the reaction time study it was found that just over half of participants with a pet in the household nominated 'pet dog' and 'pet cat' as a 'friend' and approximately one third nominated 'pet rabbit' and 'pet fish' as a 'friend'. However, in the literature much higher nominations rates for pets as friends have been found (Peretti, 1990). As discussed previously (chapter 5, section 5.5) it is found that people use 'hedges', by using words such as 'technically speaking' or 'loosely speaking', to extend category boundaries (Lakoff, 1987). In order to determine whether people use 'hedges' to extend the category boundary of friendship to include pets, a task was devised to explore the gradedness of category membership. As in study four the task comprised of four categories, two classical categories of clear member and clear non-member and two 'hedge' categories, 'technically speaking' a category member and 'technically speaking' not a category member. Based on the findings from the reaction time task it was predicated that the majority of participants with pets in the household would

categorise 'pet dog' and 'pet cat' as clear category members. It was also predicted that a high percentage of the remaining participants with pets in the household would categorise 'pet dog' and 'pet cat' as 'loosely speaking' friends but not 'technically speaking' friends.

7.4.2 Method

7.4.2.1 Sample size

A similar sample size to that reported in study five was retained for the second study.

7.4.2.2 Participants

Participants were 50 volunteers aged 23 to 68 years old, ($\underline{M}$ =41.0; $\underline{SD}$ = 11.91) attending various conferences at The University of Warwick. The majority of participants were female (62%, n=31), White (98%, n=49) and 50% were from pet owning households.

7.4.2.3 Apparatus and materials

The questionnaire was divided into three sections: section one contained information on the purpose of the study and contained instructions for the task. Participants were asked to "indicate which instances are genuine friends" by placing a tick in one of the four definitional categories:

- 'Friend', "If the instance is clearly a member of the category".

- Only 'technically speaking' a 'friend', "If the instance refers to a thing, which is only technically speaking in the category. In other words it is not like other typically category members, yet in a technical sense it does belong in the category".
- Not 'technically speaking' a 'friend', "If the instance refers to a thing which may loosely speaking be called by the category name but is technically speaking not a member of the category. It may be similar to or easily confused with other category members, but in a technical sense it does not belong".
- Not a 'friend', "If the instance is clearly not a member of the category". Section two contained the instances. Section three asked for demographic information.

7.4.2.4 Procedure

This study was based on the procedure used by Hampton (1998). Consenting respondents completed a written questionnaire (see Appendix C). The questionnaire contained instructions and space to indicate responses. Respondents were informed that the study explored the nature of friendship and were asked to indicate which instances are genuine friends and which are not by placing a tick in one of the four definitional categories. Following completion of the task participants completed a short questionnaire, which provided demographic information including age, gender, ethnicity, family category, and pet keeping experience. The questionnaires were collected immediately following completion. Participants were then debriefed.

7.4.3 Results

The frequency and percentage of responses for each category for all participants are presented in Table 27. The 'friend' items, such as 'friend', 'best friend', 'close friend', as would be expected were all rated as clear members. However, there was some variability across the categories for stimuli such as 'spouse', and 'family friend'.

Table 27. Nomination rate of family member

	Member				Non-member			
	clear member		technically member		technically non-member		clear non-member	
Target	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
Best friend	48	96.0%	2	4.0%				
Friend	47	95.9%	2	4.1%				
Close friend (same sex)	47	94.0%	2	4.0%	1	2.0%		
Close friend (opposite sex)	45	91.8%	3	6.1%	1	2.0%		
Spouse	42	84.0%	4	8.0%	3	6.0%	1	2.0%
Girl/boyfriend	41	82.0%	6	12.0%	2	4.0%	1	2.0%
Cohabiting partner	39	78.0%	8	16.0%	2	4.0%	1	2.0%
Mother	21	42.0%	7	14.0%	16	32.0%	6	12.0%
Son	20	40.0%	7	14.0%	15	30.0%	8	16.0%
Daughter	20	40.0%	10	20.0%	13	26.0%	7	14.0%
Grandmother	18	36.7%	8	16.3%	15	30.6%	8	16.3%
Family friend	17	34.0%	24	48.0%	7	14.0%	2	4.0%
Sister	16	32.7%	13	26.5%	12	24.5%	8	16.3%
Father	15	30.0%	10	20.0%	18	36.0%	7	14.0%
Brother	14	28.6%	15	30.6%	12	24.5%	8	16.3%
Grandfather	12	24.0%	14	28.0%	16	32.0%	8	16.0%
Former friend	10	20.0%	16	32.0%	7	14.0%	17	34.0%
Uncle	9	18.0%	15	30.0%	14	28.0%	12	24.0%
Pet dog	9	18.0%	11	22.0%	7	14.0%	23	46.0%
Pet cat	8	16.0%	8	16.0%	10	20.0%	24	48.0%
Colleague	7	14.3%	27	55.1%	10	20.4%	5	10.2%
Aunt	7	14.0%	13	26.0%	17	34.0%	13	26.0%
Nephew	7	14.3%	16	32.7%	15	30.6%	11	22.4%
Niece	6	12.0%	15	30.0%	17	34.0%	12	24.0%
Home	5	10.0%	3	6.0%	10	20.0%	32	64.0%
Cousin	4	8.0%	20	40.0%	15	30.0%	11	22.0%
Neighbour	2	4.1%	16	32.7%	15	30.6%	16	32.7%
Pet rabbit	2	4.0%	10	20.0%	12	24.0%	26	52.0%
Acquaintance	1	2.0%	15	30.0%	15	30.0%	19	38.0%
Television	1	2.0%	1	2.0%	4	8.0%	44	88.0%
Pet fish	1	2.0%	4	8.0%	10	20.0%	35	70.0%

For pet instances the variability is more pronounced with rating across all four categories (Table 28). Consistent with the expectations, for all four types of stimuli, the extent of the responses in classical categories of clear member and clear non-member was less than 100%.

Table 28 Categorisation of instances for participants with pets in household (n=25)

Stimuli	Clear member	Only Technically member	Technically non-member	Clear non-member	Sum of clear member & clear non-member	Sum of technically member & technically non-member
Pet dog	32%	28%	24%	16%	48%	52%
Pet cat	24%	20%	20%	36%	60%	56%
Pet rabbit	4%	24%	36%	36%	40%	60%
Pet fish	4%	8%	24%	64%	68%	32%

It was expected that the majority of participants with pets in the household would describe 'pet dog' as a clear member of the category and this was supported in the research findings, that is the most frequently used description for 'pet dog' was that of clear member. The other two frequent categories were technically a member and technically not a member.

In the category pet cat, the expected was not supported by the data, that is the most frequently used description for pet cat was clear non-member and roughly equal numbers fell into the remaining three categories.

For 'pet rabbit' the most frequently used descriptions were clear non-member and 'technically speaking' a non-member. For 'pet fish' participants appear to be much clearer that it is not in any sense a friend.

7.4.4 Discussion

In this study, in the case of 'pet dog' and 'pet cat' there is a four-fold split of responses for people with pets in the household, with roughly equal numbers of responses across the four categories. Interestedly, the results are similar to those reported for the categorisation of pet as a family member (study 4, chapter 5, section 5.5). That is, in the population of pet owners there are present distinct groupings of people with different cognitions about the place of pets in social groups. Although, in this study, in the case of pet dog and pet cat there were roughly equal responses across the four categories, the data confirms the notion of three distinct groups: A) those who consider pets in a fully "human" way, whether they are typical or atypical of the category, B) those who consider pets are definitely not "human" and C) those who although aware that technically their pet is not "human" nevertheless are prepared to treat the pet as a member of the category of these social groups.

As previously discussed the finding of these groups within the pet owning population has important implications to the understanding of some of the discrepancies in the literature. However, the pet owning group in this study was small n=25 and thus the corresponding responses for each of the categories were also small and therefore one has to be cautious about extrapolating from this small scale study to inferences about the general population.

7.5 General Discussion

Although the majority of people with pets in the household consider some pets such as pet dog and pet cat as members of the category 'friend', the

prototypicality ratings indicate that pets are considered atypical of the category and as such have few features in common with other category members. However, in the categorisation task it was shown that the pet owing population is not a homogeneous group and comprises three distinct sub-groupings. As previously discussed in chapter five these findings have important implications for understanding some of the discrepancies in the literature and suggests that future research should not consider the pet owning population as a homogenous group.

CHAPTER EIGHT | STUDY NINE – PAIRWISE SIMILARITY RATING TASK – 'FRIEND'

8.2 Introduction

The results of the studies presented in chapter seven do not provide conclusive evidence that the concept of 'friend' is prototypically organised. As previously discussed in order to claim that a concept is prototypically organised participants must not only be able to make judgements about the typicality of category members but these judgements must predict certain experimental outcomes (Rosch, 1975). Although participants were able to make prototypicality judgements for category members, the experimental stimuli could not be held constant. In order to lend further support the findings reported in chapter 7 a pair-wise similarity rating task was undertaken in order to discover the overall structure of the concept 'friend'.

8.2 Method

8.2.1 Participants

The participants were 32 volunteers aged 21 to 76 year old (M =43.38; SD =11.98). All of the participants were White. Equal numbers of male and female participated, the majority of participants were pet owning households (65.60%,

n=21). Following completion of the study, a summary sheet was forwarded to those participants who had requested a copy.

8.2.2 Apparatus and materials

The stimuli were 20 words describing relationship terms (Table 29). The words were created in Microsoft Paint® using an Arial 16pt. character set (yellow) on a blue background (280 x 210 pixels) and presented as Device Independent Bitmaps (DIB) by a program[9] running under Windows98®.

Table 29 Stimuli for MDS study.

INSTANCE		
Best friend	Girl/boy friend	Pet fish
Brother	Grandfather	Pet rabbit
Close friend opposite sex	Grandmother	Sister
Close friend same sex	Mother	Son
Daughter	Neighbour	Spouse/partner
Father	Pet cat	Workmate
Friend	Pet dog	

8.2.2.1 Procedure

The procedure was identical to used in study 5 (see chapter 6) with the exception of the stimuli and the instructions given to participants. Participants were asked to rate the similarity of stimuli on a scale from 0 (not at all similar) to 9 (very similar).

[9] The program was written in Pascal by Louise Alton and modified for this experiment by Eoghan Clarkson.

8.2.2.2 Methodological issues.

The validity of spatial models is based on several axioms, the first of which states that self similarity is maximal. Dissimilarity was calculated using the formula:

$$dissimilarity = (9.0 - similarity)$$

Thus in the dissimilarity data set presented in this study the dissimilarity values corresponding to comparisons made between instances to themselves should be zero. A number of participants (19/32) did not enter a maximal similarity rating score when presented with identical stimuli. In one case this affected more than half the possible identical pairings. This may suggest that these participants did not fully understand the task and that rating for other instances may to have been affected by the participant's uncertainty regarding the task. The validity of spatial models is based on several axioms, the first of which states that self similarity is maximal. Although, values below the diagonal are not entered into the analysis the effect on the participant's uncertainty for values, which were entered, is unknown. Therefore, in order to determine whether these ratings had adversely effected the data, this one participant was excluded from the analysis. Although the re-analysis produced new values for stress and R squared which produced a marginal improvement on the original values, this did not change the solution, which remained at three dimensions and therefore all cases were processed.

8.3 Results

Dissimilarity values were computed[10] from similarity ratings for the 20 relationship terms inferring the position of points in multidimensional space using the formula dissimilarity = (9.0 – similarity). Large numbers indicate dissimilarity and small numbers indicate similarity. Thus instances which are similar have points which are closer together. From these, the mean dissimilarity ratings for each of the 210 pairs were computed. The analysis is based on the whole group of participants, denoted 'all' (Table 30), and two subdivisions of this group denoted 'pet' (Table 31), for those from households with a pet and 'no pet' (Table 32), for those from households with no pets.

The tables show that for all groups ('all', 'pet' and 'no pet') overall participants rated 'pet dog'/'friend', 'pet cat'/'friend' and 'pet fish'/'friend' pairings as similar with dissimilarity ratings not exceeding 3.32, and these were to be comparable with human-human pairings such as those between 'friend'/'best friend'. However, 'pet rabbit'/'friend' pairings were not rated as very similar and received dissimilarity ratings of not less than 7.81 for all groups. The mean dissimilarity ratings for all pet types and all friend types are presented in Figure 32, Figure 33, Figure 34 and Figure 35.

[10] Dissimilarity matrices were computed from the similarity ratings using a program written in C++ by Neil Stewart.

Table 30 Matrix of mean dissimilarity ratings for the 20 friend instances (all participants) (N=32)

	Son	Spouse	Best friend	Brother	Pet dog	Colleague	Neighbour	Pet Rabbit	G-mother	Mother	Sister	Father	G-dfather	Close friend (op. sex)	Daughter	Pet fish	Pet cat	Girl/Boy friend	Close friend (same sex)	Friend
Son	0.50																			
Spouse/partner	2.56	1.03																		
Best friend	0.44	5.53	3.80																	
Brother	3.20	4.95	6.16	2.84																
Pet dog	2.80	4.08	5.73	1.77	3.25															
Colleague	0.64	5.03	5.33	6.11	1.64	0.78														
Neighbour	2.61	6.06	7.28	5.28	3.09	3.88	1.56													
Pet Rabbit	2.88	3.63	0.56	5.09	0.56	2.70	2.78	0.66												
Grandmother	3.17	0.81	2.81	7.34	3.69	2.22	3.16	7.61	7.63											
Mother	0.70	6.73	3.19	3.19	4.14	3.73	3.00	7.70	7.86	6.78										
Sister	6.39	7.48	3.39	2.34	4.03	5.88	5.94	7.70	7.56	6.77	2.16									
Father	5.78	7.39	2.86	0.70	3.44	4.61	5.56	7.52	1.13	6.22	3.19	4.52								
Grandfather	5.00	7.42	6.63	2.67	5.83	4.28	5.42	4.08	7.03	6.80	6.34	1.91	3.16							
Close friend (opp. sex)	6.27	3.33	5.53	3.17	5.42	7.19	7.36	7.63	7.03	6.78	4.88	4.16	5.78	3.39						
Daughter	1.00	6.95	5.36	3.64	5.02	4.27	3.30	7.44	6.78	6.72	4.89	7.91	4.22	4.44	0.72					
Pet fish	5.78	7.00	7.44	2.47	7.59	3.72	2.81	3.38	6.97	7.00	7.41	6.84	4.08	1.98	3.14	4.02				
Pet cat	5.31	0.80	2.83	6.22	1.64	3.52	2.52	7.61	2.45	4.06	4.27	0.50	7.34	3.64	2.89	3.75	3.08			
Girl/boyfriend	4.66	3.48	0.86	5.44	3.69	4.28	3.05	7.78	6.97	1.19	4.06	3.44	4.06	7.94	2.17	6.94	3.31	3.84		
Close friend (same sex)	5.08	4.05	3.03	5.16	3.84	4.42	3.69	7.84	6.86	3.42	3.61	3.38	3.56	6.78	3.38	3.88	4.16	7.27	2.52	
Friend	6.33	4.28	3.44	7.41	3.03	0.72	3.34	7.83	4.03	2.55	3.95	1.94	3.63	2.48	5.34	3.19	2.28	6.59	2.19	0.38

Table 31 Dissimilarity data (pets in household) (n=21)

	Son	Spouse	Best friend	Brother	Pet dog	Colleague	Neighbour	Pet Rabbit	G-mother	Mother	Sister	Father	G-father	Cl.friend (opp. sex)	Daughter	Pet fish	Pet cat	Girl/Boy friend	Cl.friend (same sex)	Friend
Son	0.48																			
Spouse/partner	2.02	0.76																		
Best friend	0.55	5.29	3.43																	
Brother	3.05	4.95	5.95	2.40																
Pet dog	2.55	3.86	5.14	1.21	2.90															
Colleague	0.55	4.48	5.12	5.60	1.07	0.64														
Neighbour	2.05	5.62	7.31	5.26	2.62	3.74	0.90													
Pet Rabbit	2.45	3.17	0.48	4.83	0.69	2.31	2.60	0.48												
Grandmother	2.98	0.81	2.36	7.17	3.86	1.81	2.93	7.62	7.57											
Mother	0.50	6.81	3.10	3.00	4.26	3.05	2.76	7.81	7.69	6.67										
Sister	6.12	7.38	3.26	2.05	3.86	5.10	5.64	7.83	7.71	6.79	1.90									
Father	5.10	7.38	2.29	0.50	3.36	4.40	5.40	7.62	1.17	5.98	2.83	4.62								
Grandfather	4.52	7.21	6.38	2.36	5.64	3.95	5.50	3.71	6.76	6.45	5.74	1.31	3.07							
Close friend (opp. sex)	5.67	2.79	5.45	2.86	5.17	7.07	7.26	7.31	7.00	6.60	4.71	3.83	5.12	3.40						
Daughter	0.57	6.64	5.38	3.60	5.00	4.26	3.26	7.33	6.60	6.36	4.48	7.86	4.00	4.57	1.05					
Pet fish	5.50	6.81	7.50	2.10	7.40	3.55	2.62	2.83	6.86	6.81	7.21	6.57	3.86	1.26	3.12	3.93				
Pet cat	5.33	0.90	2.81	5.69	1.00	3.14	2.31	7.48	1.33	3.43	3.90	0.50	7.24	3.36	2.93	3.40	2.98			
Girl/boyfriend	4.74	3.31	0.76	5.26	3.40	4.02	2.98	7.81	6.76	0.57	4.00	3.33	3.81	7.81	2.00	6.74	3.45	3.83		
Close friend (same sex)	4.69	4.12	2.55	5.00	3.88	4.19	3.71	7.74	6.55	3.21	3.17	3.07	3.33	6.50	3.21	3.88	4.02	7.48	2.36	
Friend	5.67	4.12	3.12	7.19	3.12	0.76	3.05	7.81	3.31	2.50	3.81	1.71	3.36	2.00	4.74	3.12	1.90	6.24	1.88	0.50

Table 32 Dissimilarity data (pets not in household) (n=11)

	Son	Spouse	Best friend	Brother	Pet dog	Colleague	Neighbour	Pet Rabbit	G-mother	Mother	Sister	Father	G-father	Cl.friend (opp. sex)	Daughter	Pet fish	Pet cat	Girl/boy friend	Cl.friend (same sex)	Friend
Son	0.55																			
Spouse/partner	3.59	1.55																		
Best friend	0.23	6.00	4.50																	
Brother	3.50	4.95	6.55	3.68																
Pet dog	3.27	4.50	6.86	2.82	3.91															
Colleague	0.82	6.09	5.73	7.09	2.73	1.05														
Neighbour	3.68	6.91	7.23	5.32	4.00	4.14	2.82													
Pet Rabbit	3.68	4.50	0.73	5.59	0.32	3.45	3.14	1.00												
Grandmother	3.55	0.82	3.68	7.68	3.36	3.00	3.59	7.59	7.73											
Mother	1.09	6.59	3.36	3.55	3.91	5.05	3.45	7.50	8.18	7.00										
Sister	6.91	7.68	3.64	2.91	4.36	7.36	6.50	7.45	7.27	6.73	2.64									
Father	7.09	7.41	3.95	1.09	3.59	5.00	5.86	7.32	1.05	6.68	3.86	4.32								
Grandfather	5.91	7.82	7.09	3.27	6.18	4.91	5.27	4.77	7.55	7.45	7.50	3.05	3.32							
Close friend (opp. sex)	7.41	4.36	5.68	3.77	5.91	7.41	7.55	8.23	7.09	7.14	5.18	4.77	7.05	3.36						
Daughter	1.82	7.55	5.32	3.73	5.05	4.27	3.36	7.64	7.14	7.41	5.68	8.00	4.64	4.18	0.09					
Pet fish	6.32	7.36	7.32	3.18	7.95	4.05	3.18	4.41	7.18	7.36	7.77	7.36	4.50	3.36	3.18	4.18				
Pet cat	5.27	0.59	2.86	7.23	2.86	4.23	2.91	7.86	4.59	5.27	4.95	0.50	7.55	4.18	2.82	4.41	3.27			
Girl/boyfriend	4.50	3.82	1.05	5.77	4.23	4.77	3.18	7.73	7.36	2.36	4.18	3.64	4.55	8.18	2.50	7.32	3.05	3.86		
Close friend (same sex)	5.82	3.91	3.95	5.45	3.77	4.86	3.64	8.05	7.45	3.82	4.45	3.95	4.00	7.32	3.68	3.86	4.41	6.86	2.82	
Friend	7.59	4.59	4.05	7.82	2.86	0.64	3.91	7.86	5.41	2.64	4.23	2.36	4.14	3.41	6.50	3.32	3.00	7.27	2.77	0.14

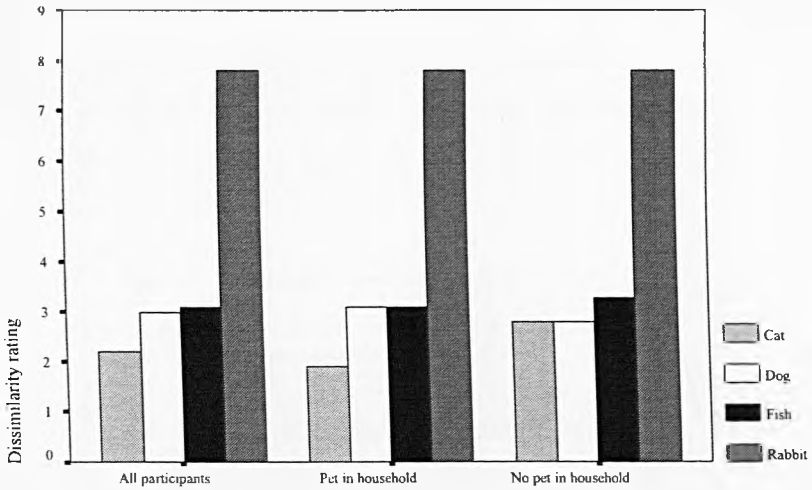

Figure 32 Perceived dissimilarity to friend

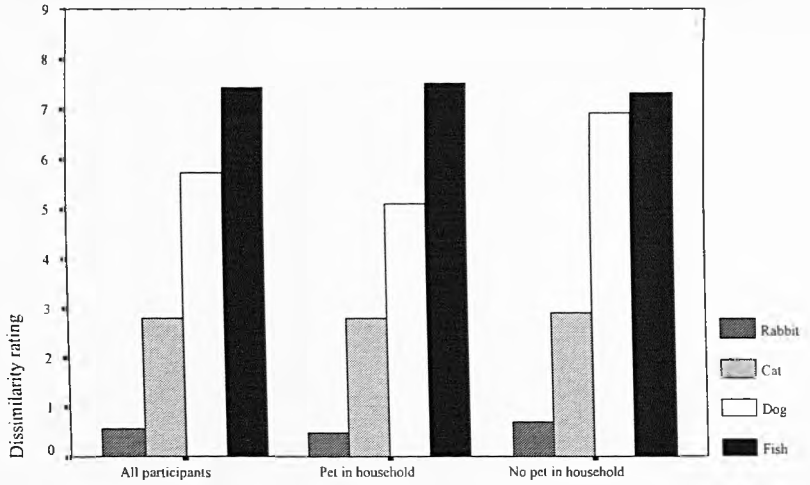

Figure 33 Perceived dissimilarity to best friend

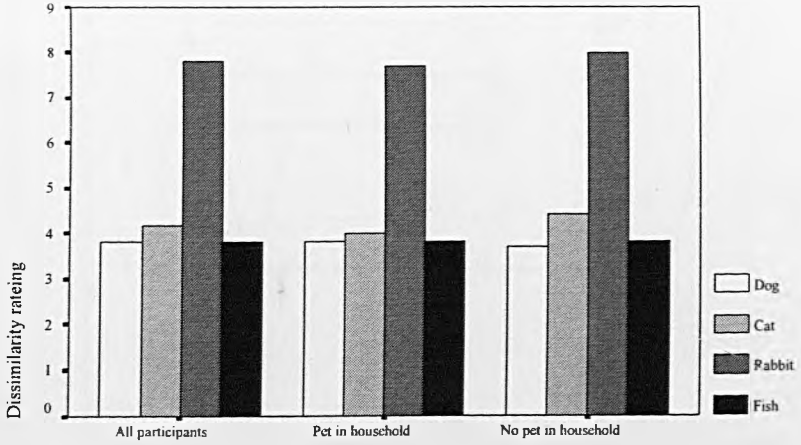

Figure 34 Perceived dissimilarity to close friend (same sex)

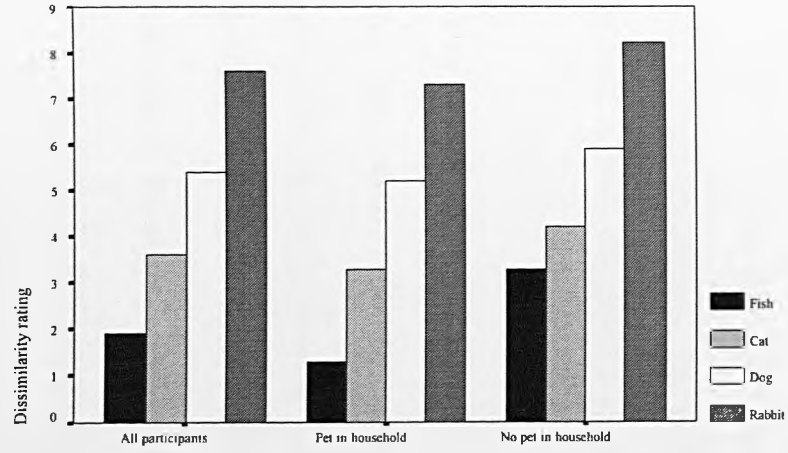

Figure 35 Perceived dissimilarity to close friend (opposite sex)

The data were analysed using the INDSCAL, individual differences model. A plot of stress x dimensionality (Appendix D) revealed an 'elbow' and a decrease in stress (stress = .27, r^2 = .55) at three dimensions. The positions for each instance for all participants were plotted in three-dimensional space (Figure 36).

The plot shows distinct clusters of stimuli which correspond to 'family members' (mother, father, daughter, son, sister, brother, grandmother, grandfather); 'pets' (pet dog, pet cat, pet rabbit, pet fish); 'non-kin' (neighbour, colleague); 'friend' (spouse/partner, girl/boy friend, best friend, friend, close friend {same sex}, close friend {opposite sex}). However, spouse/partner was included within the 'friend' category as it was closer to that cluster than to any other.

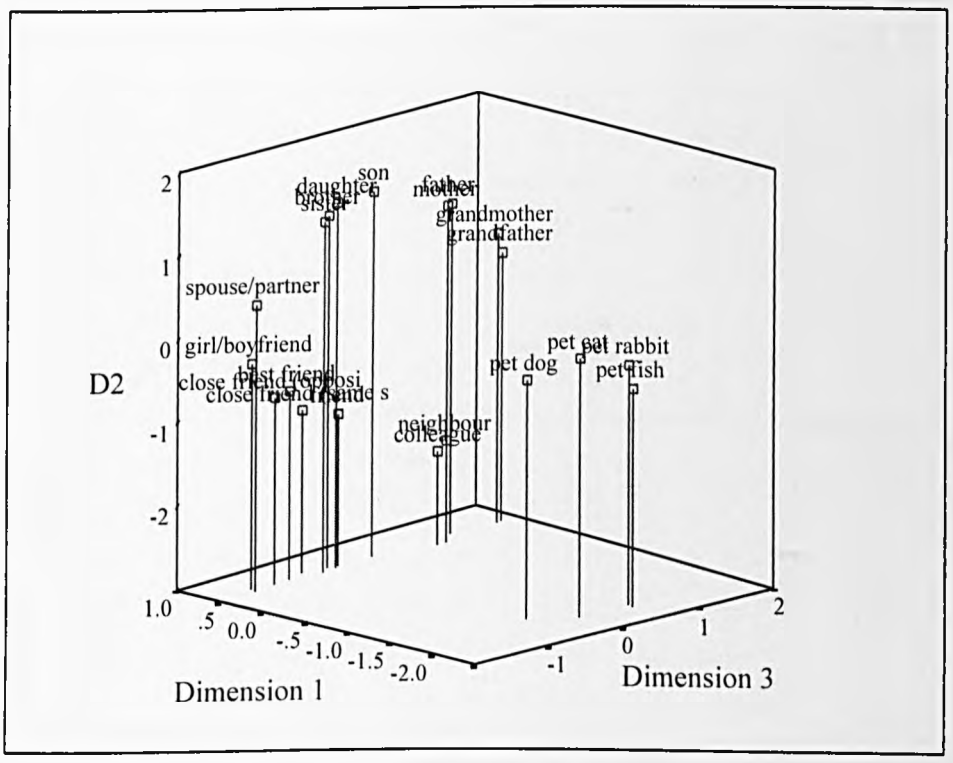

Figure 36 Three dimension representation of the concept 'friend'.

Dimension one (.42) best explain the data, followed by dimension-two (.08) and dimension-three (.06). The data shown in Figure 36 were broken down further to explore whether the stimulus domain differed between participants with pets in the household and participants with no pets in the household. It was predicted that if participants with pets in the household consider pets as friends, there would be a convergence of friend and pet stimuli. However, following re-analysis the overall configuration did not change (Figure 37 and Figure 38). The re-analysis also produced a three dimensional solutions for both subgroups. Pets in the household: dimension-one (.44), dimension-two (.09) and dimension-three (.07), and no pet in the household dimension-one (.41) dimension-two (.08) and dimension-three (.06).

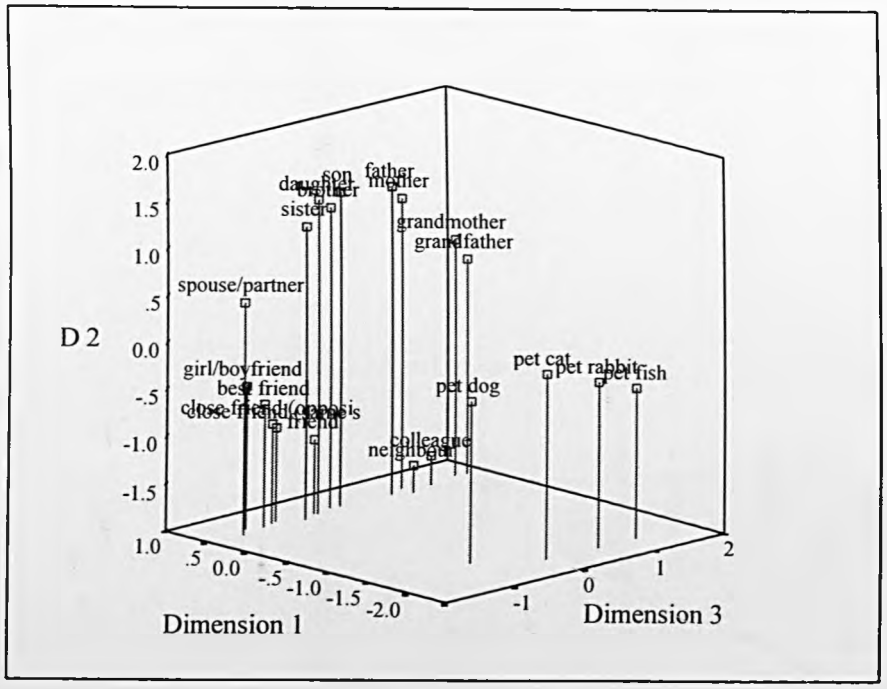

Figure 37 Three dimensional plot (pet in household)

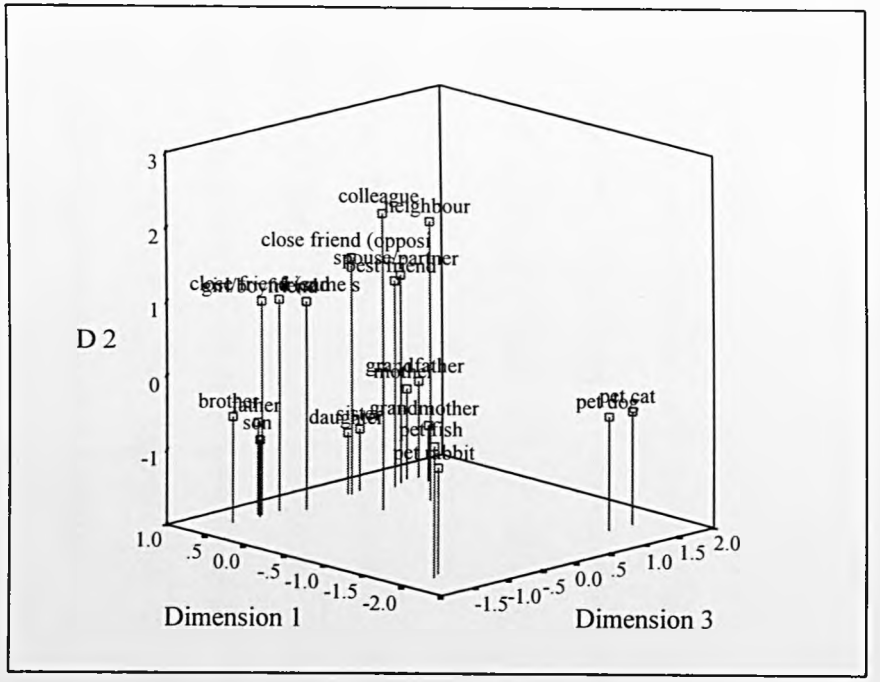

Figure 38 Three dimensional plot (no pet in household)

8.3.1 Interpretation of dimensions

The three dimensions revealed in the MDS analysis may be interpreted as 'humanness', and 'voluntariness' and 'closeness'. The co-ordinate values for each dimension were projected in two dimensions for all three groups (Figure 39 - Figure 47).

For dimension one (.42, all; .44, pet; .41 no pet) 'humanness' was proposed as this reflects the polarisation of the human and non-human stimuli along this dimension. The pattern of stimuli along dimension one was repeated for all groups ('all', 'pet', and 'no pet'). This suggests that 'humanness' is an important characteristic in the conceptualisation of 'friend'.

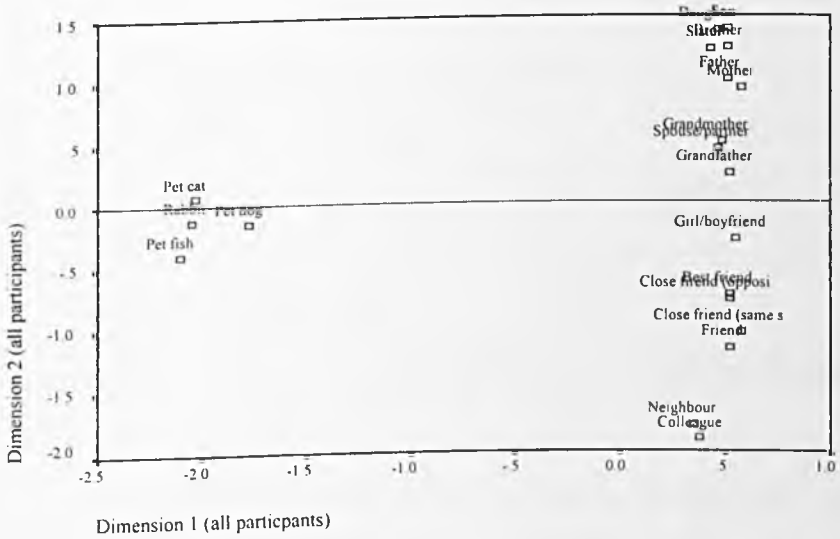

Figure 39 Dimensions 1 and 2 of the three dimensional solution (all participants)

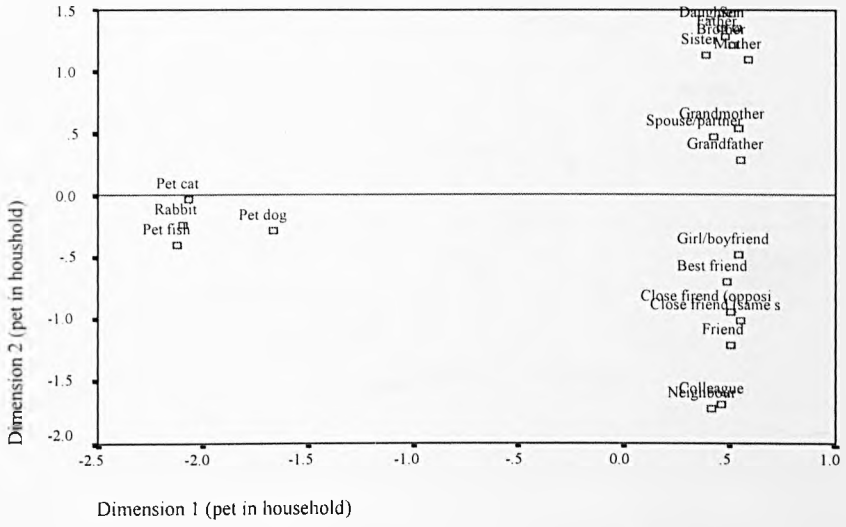

Figure 40 Dimensions 1 and 2 of the three dimensional solution (pet in household)

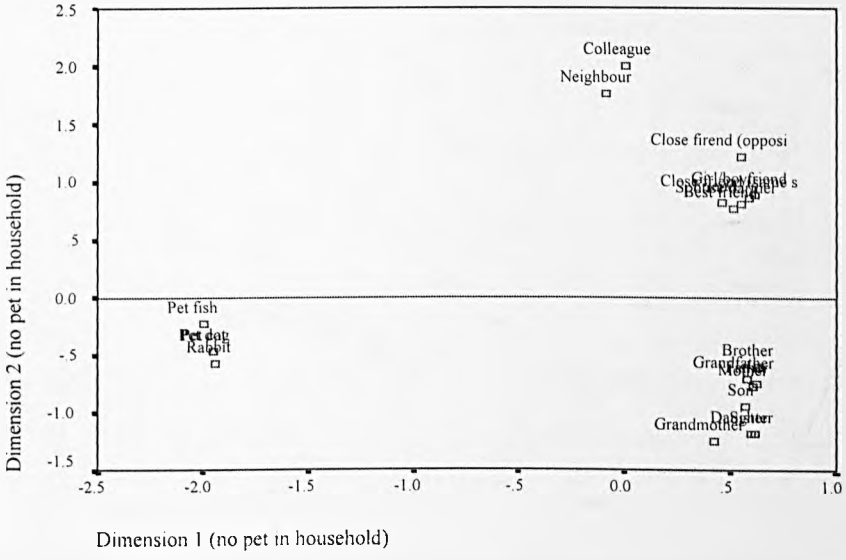

Figure 41 Dimensions 1 and 2 of the three dimensional solution (no pet in household)

Dimension two (.08, all; .09, pet; .08 no pet) was interested as 'Voluntariness' based on the distribution of stimuli along this dimension. With pets located between voluntary relationships, such as those with friends, and involuntary relationships, such as those with family. However, the stimuli vary between groups across this dimension and therefore interpretation of this dimension is not reliable.

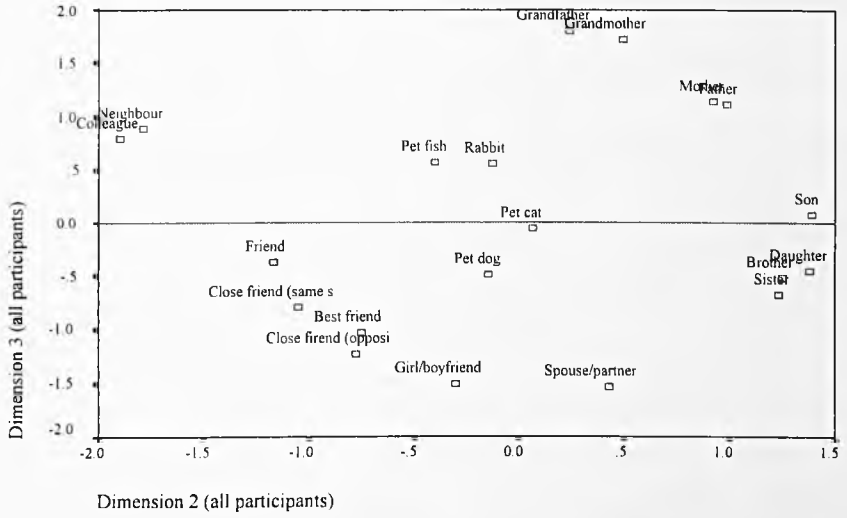

Figure 42 Dimensions 2 and 3 of the three dimensional solution (all participants)

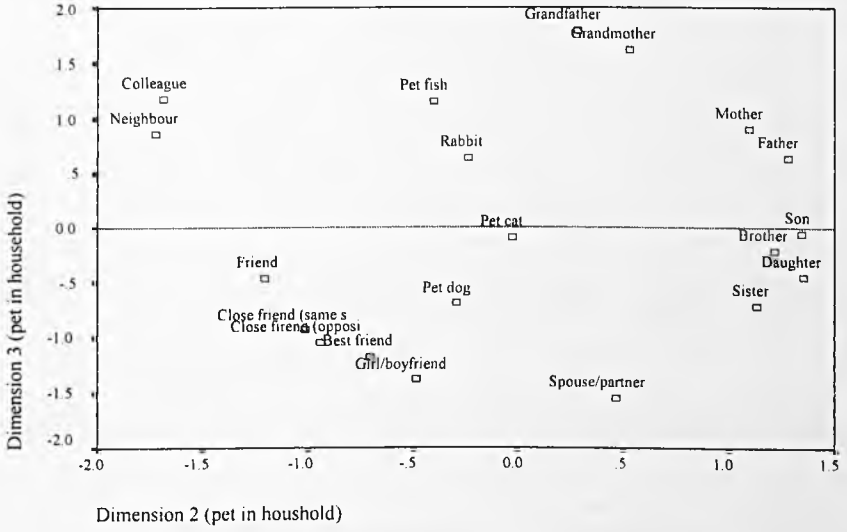

Figure 43 Dimensions 2 and 3 of the three dimensional solution (pet in household)

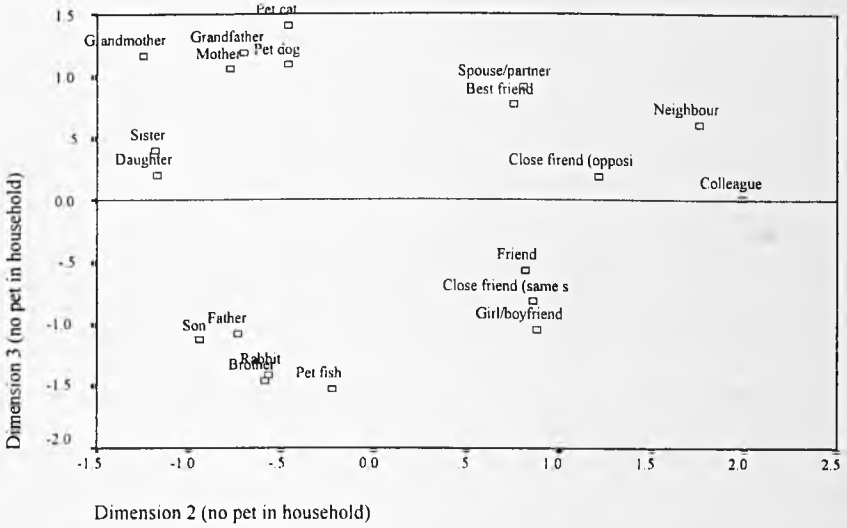

Figure 44 Dimensions 2 and 3 of the three dimensional solution (no pet in household)

Dimension three (.06, all; .07, pet; .08 no pet) was difficult to discern and was broadly interpreted as 'closeness', although, there may be other equally probable interpretations for this dimension. However, the varying locations of stimuli along this dimension between the three groups means a definitive label for this dimension is difficult.

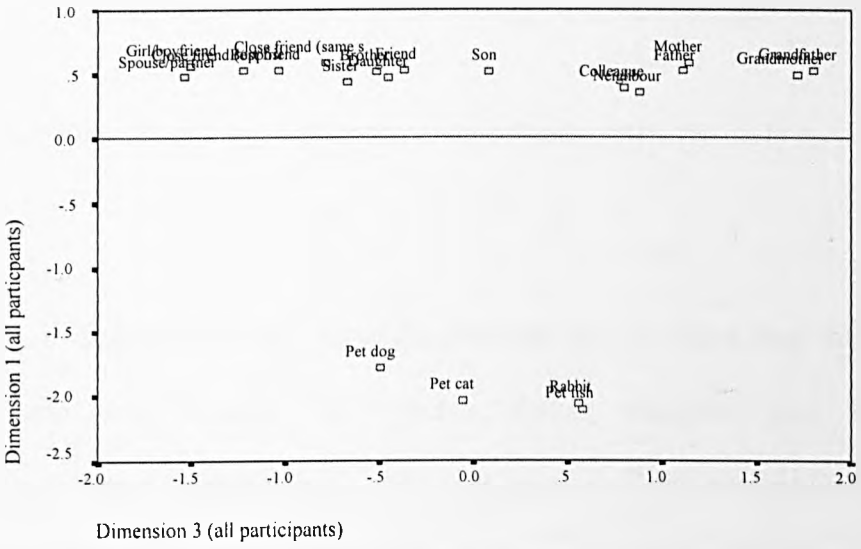

Figure 45 Dimensions 3 and 1 of the three dimensional solution (all participants)

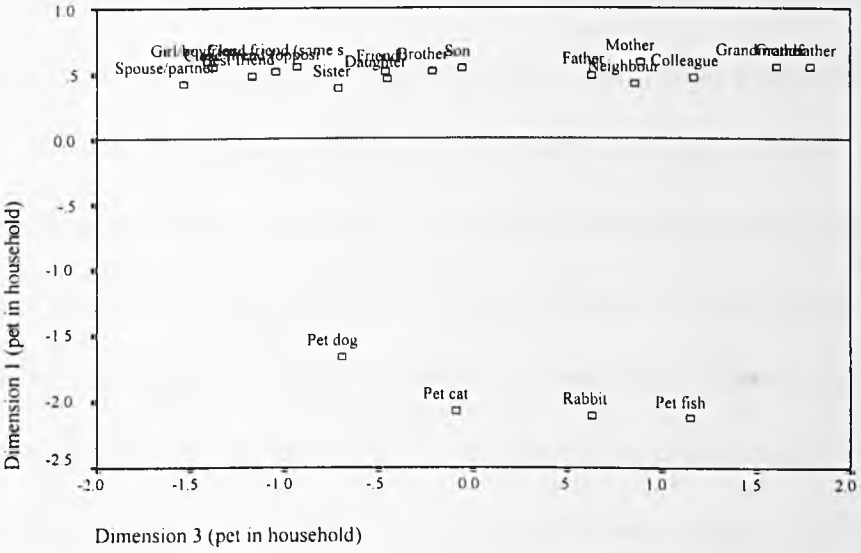

Figure 46 Dimensions 3 and 1 of the three dimensional solution (pet in household)

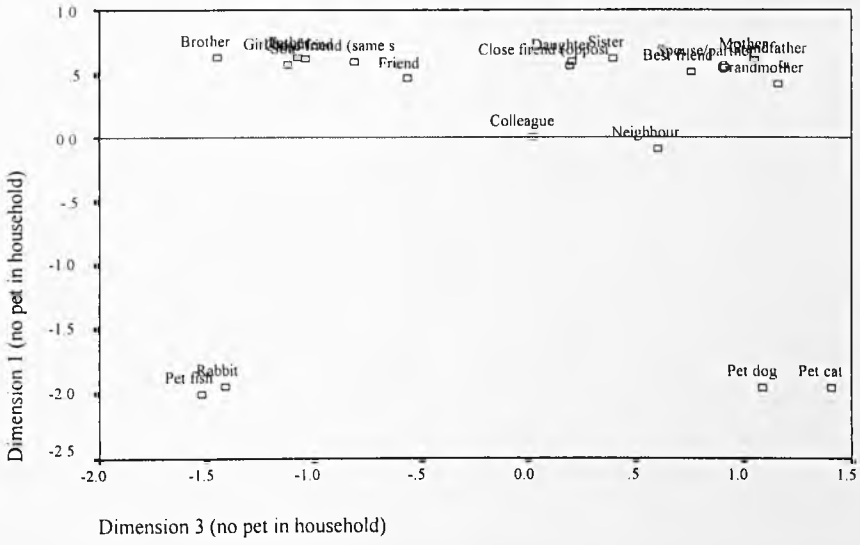

Figure 47 Dimensions 3 and 1 of the three dimensional solution (no pet in household)

Inspection of the three-dimensional plot revealed four distinct groupings which were denoted 'A' (mother, father, daughter, son, sister, brother, grandmother, grandfather); 'B' (pet dog, pet cat, pet rabbit, pet fish); 'C' (neighbour, colleague); 'D' (spouse/partner, girl/boy friend, best friend, friend, close friend {same sex}, close friend {opposite sex}). The average Euclidean inter/intra class distances for these selected clusters were calculated and presented as a confusion matrix for each group (Table 33, Table 34 and Table 35). The results demonstrate that for each cluster the average intra class distance is always less than the average inter class distance and this finding holds for all groups. These findings indicate that the selected clusters are viable groupings consistent with the similarity criteria used by the lower dimensional space. The finding that the intra class distance is always lower for all groups suggests that pets were more similar to each other than they were to friends.

Table 33 Mean inter and intra cluster distances; (all participants N=32)

	A	B	C	D
	M	*M*	*M*	*M*
A	**0.75**	2.95	3.04	3.03
B	2.95	**0.92**	2.59	2.31
C	3.04	2.59	**1.37**	2.21
D	3.03	2.31	2.21	**0.15**

Table 34 Inter and intra cluster distances (pet in the household n=21)

	A	B	C	D
	M	*M*	*M*	*M*
A	**1.11**	2.99	3.12	3.04
B	2.99	**0.86**	2.57	2.39
C	3.12	2.57	**1.26**	2.21
D	3.04	2.39	2.21	**0.32**

Table 35 Inter and intra cluster distances (no pet in household n=11)

	A	B	C	D
	M	*M*	*M*	*M*
A	**1.93**	3.23	3.09	3.34
B	3.23	**1.05**	2.21	1.45
C	3.09	2.21	**1.42**	1.93
D	3.34	1.45	1.93	**0.64**

8.4 Discussion

The MDS analysis of the data revealed four clusters. The finding that pet stimuli formed a distinct cluster and friend stimuli formed another distinct cluster and the average intra class distance within these clusters was less than the average

inter class distance between the clusters suggests that pets are considered more similar to themselves and less similar to friends. This finding is further supported in that dimension one of the MDS analysis polarised pet stimuli and human stimuli. These findings are consistent across all groups and suggest that people consider 'humanness' is an important and distinguishing characteristic in the conceptualisation of 'friend'. These findings suggest that the friendship framework modelled on person-person friendship may not be a useful general framework for describing the person-pet relationship.

The findings from this study are consistent with those found in the MDS analyses of 'family' in study 5. Both studies found distinct clusters for pet stimuli and both found 'humanness' is an important characteristic in the conceptualisation of these concepts.

CHAPTER NINE | DISCUSSION

9.1 Introduction

The research undertaken in this thesis explored the extent to which people conceptualise pets as members of two commonly ascribed social groups 'family' and 'friend'. In this chapter the rationale underpinning the approach taken is briefly explained, the research findings are summarised and discussed in relation to the applicability of these frameworks for exploring the person-pet relationship, and avenues for future research are proposed.

Research has reported that pets are conceptualised as family members and/or friends. Support for this view comes from research in person-person relationships and in person-pet relationships. By far the strongest evidence supporting this claim comes from research focussing on person-pet relationships, and a number of studies conclude that the majority of pet owners consider their pets members of these categories. In addition, studies have shown that pet owners behave towards their pets in ways similar to human members of these groups and that pets convey some relational provision comparable to that obtained from human relationships characteristic of these social groups. However marked differences are apparent in the degree to which pets are included, as members of these social groups.

An important objective of this research project was to investigate this dichotomy. It is important to accurately assess pet owners' conceptualisation of pets as members of these groups, because their extension of these categories to

included pets legitimates attempts to model person-pet relationships using concepts from person-person relationships, based on the assumption that relationships between owners and their pets have much in common with relationships between one person and another.

Unfortunately, evaluation of the applicability of the concepts 'family' and 'friend' to describe relationships with pets has been hampered by the lack of an agreed definition for these social concepts. This difficulty was overcome in the research undertaken in this thesis through the use of a social-cognitive approach obtained by prototype theory and multidimensional scaling methodologies. This approach when applied to other social concepts has shown that, difficulty in definition does not impede progress in gaining an understanding of the content and structure of difficult to define concepts such as 'family' and 'friend'. Although other researchers have reported success in using this technique with other 'hard to define' concepts this approach has not previously been knowingly used to map the structure of the social groups 'family' and 'friend' before.

9.2 The Concept 'Family'

Research exploring the extension of 'family' from two research disciplines was reviewed in chapter 3. Research focussing on human relationships report nomination rates for pets from 3% to 75%; depending on the methodology used. For example, unprompted tasks such as those used by Hodkin (1983), So and Hodkin (1987) and Trost (1990) generally produced extension rates of 3% and 29% for pets as members of the family. However, when participants are prompted the extension rate increase to between 35% and 75% (Hodkin, Vacheresse, and

Buffet, 1996). Research focussing on person-pet relationships finds consistently higher nomination rates for pets as family members and in some studies almost all participants described their pets as family members (Voith, 1985; Soares & Whalen, 1985; Jones, 1983). The findings from the literature reviewed in chapter three is consistent with the view that the experimental methodology used by researchers affects the responses given by participants, and a detailed analysis of the methodology used by researchers in this field puts these results in context.

Research reported in this thesis uses a rigorous approach in an attempt to investigate these phenomena in an unbiased way. The studies undertaken in chapter five and chapter six found no evidence to support the widely reported claim that the majority of pet owners consider their pets as family members. However, there was support for the notion that *some* pet owners consider their pets as family members. The findings from study four (categorisation of 'family' - chapter 5) gave some insight into how people conceptualise pets and this enabled a possible explanation accounting for the discrepancies found between the two bodies of research to be proposed.

As anticipated, the concept of 'family' had a prototype structure and further supports the utility of applying cognitive methodologies to social phenomena. The listing task found that 26% of participants listed pets as category members and 16% currently had a pet in the household. In the prototypicality task all participants judged nuclear family instances as most typical of the category, then extended family instances followed by pet instances and other objects.

The low prototypicality ratings for pet instances is indicative of their status as peripheral members of the category. As such they share few features in

common with nuclear family instances rated as central members and it may be concluded that they possess features characteristic of another category, candiate categories include, possessions (Belk, 1988), other pets (Berryman, Howells & Lloyd-Evans, 1985) and friends (Hirschman, 1994; Peretti, 1990). The results found by this research are consistent with the view that the concept of 'family' is prototypicality organised as evidenced by other information processing phenomena, namely time taken to verify an instance and order of item output. From the analysis of the responses in the reaction time task-study three, 26% of participants with pets in the household verified dog as a category member, cat and rabbit were verified by 11% and fish by 8%. An indication of the strength of the methodology used in this thesis may be seen in the pattern of converging results, for the extension of the category 'family', obtained from different metrics.

Some of the most compelling evidence for the structure of the social category 'family' comes from the MDS visualisation of the pair-wise similarity task which shows several distinct groupings comprising; pet; nuclear family; extended family and non-kin members. These clusters are consistent with those predicted by prototype theory (chapter five). In addition, MDS enabled some salient features of the concept 'family' to be visualised. In particular, 'humanness' appeared to be an important dimension that polarised human and pet instances. The findings that only a minority of people with pets in the household conceptualise pets as family members suggests that people may use 'hedges' when describing their pet; the findings of the categorisation task support this view.

This task revealed three categories of pet owner with different cognitions about the place of pets in the family, and concluded that approximately equal numbers of people believe that a) pets are members of the family, b) pets are not members of the family and c) those who although they are aware that they are not technically a member of the family nevertheless treat their pet as a family member. This finding is consistent with Cain (1985) who reported that just over one third of participants considered their pets as "human".

This view of three groups of pet owners is important and may be relevant to understanding some of the differences that exist in the literature. The high rate of nomination of pets as family members found by researchers exploring the person-pet relationship could be an effect of sampling predominantly from one group. For example, pet owners who believe their pet is a family member may have more positive attitudes towards pets and may therefore be more likely to participate in studies about pets. Or researchers investigating person-pet relationships may tend to sample from known groups of pet owners such as those attending veterinary clinics or animal clubs. In addition, the prevalence of the three groups may differ across cultures and therefore a culture that encourages one type of cognitions about pets will tend to yield different experimental results from cultures that emphasise different cognitions about pets.

9.3 The Concept Of 'Friend'

Chapter three found some support for the view that some pet owners conceptualised pets as friends. This is consistent with research by Peretti, (1990) who found that for some pet owners provision from pet dogs was comparable with

the provision from human friends. The findings of the series of studies detailed in chapter seven, lends tentative support to Peretti, (1990), and Hirschman (1994), in that, canonical pets were nominated by the majority of pet owners as friends. However, this finding did not generalise to other pet types such as pet rabbit and pet fish. In addition pet instances were judged as peripheral category members, suggesting that they share few features in common with central members and thus share few features in common with human friends. The Multidimensional scaling analysis supports this finding and revealed distinct clusters, in the data. The two important clusters were those found to comprise all the pet stimuli and all the friend stimuli. This suggests that pets are more similar to each other than to human friends.

Although the majority of participants verified canonical pets as category members the responses for clear members was much less than that reported in the literature (Peretti, 1990) and therefore it was predicted that people may use 'hedges' when describing their pets as friends. The categorisation task supports this view. In the case of canonical pets, there was a four-fold split of responses for people with pets in the household. This suggests that pet owners are not a homogeneous group and have different cognitions concerning the role of pets as friends. Again, this finding may explain some of the differences, which exist in the literature as previously discussed.

9.4 Future Research

Hopefully this research has gone some way towards explaining some of the anomalies that exist in the literature on person-pet relationships. Although

some evidence has been presented supporting the use of terms such as 'family member' and 'friend' it remains unclear whether these terms ascribed to pets are mutually exclusive or whether they are in fact describing to the same relationship. One explanation is that some pet owners perceive their pets as family members and not friends. The naming errors between household members and their pets offer support for the conceptualisation of some pets are considered family members (AAHA, 1996) and study four lends support for this notion. In addition research has shown that some pet owners treat their pets in a similar way to family members including them in family rituals such as Christmas and birthday celebrations and carrying their photographs (Hirschman, 1994) and care giving (Cain, 1985). Conversely, some pet owners may perceive their pets as friends and not family. Peretti (1990) claimed that pet owners valued their friendships with pets as much as with human friends. In addition the findings of study seven support the view that some owners consider pets as friends.

Alternatively, it may be that pet owners use the term interchangeably because they wish to describe their relationship with their pet in relational terms, but are unsure exactly how to describe it. Research findings lend support for an 'interchangability hypothesis'. When the focus of research is 'pets as family' a high proportion concur (Cain, 1983; 1985). Conversely, when the focus of research is 'pets as friends', high nomination rates are found (Peretti, 1990). It would seem unlikely that researchers exploring these concepts were consistently sampling from groups that predominated in pet owners conceptualising pets in the same direction. In addition, some studies have found evidence that pets are conceptualised as both a 'family member' and a 'friend', for example Soares and

Whalen (1985) found 99% of participants considered their dogs members of the family and also that the role most ascribed to pets was friend. Although, it is generally agreed that the attributes of 'family member' and 'friend' have distinct features, people often describe family members as friends and friends as family.

One possible explanation is that the term 'family member' and 'friend' is used interchangeably by pet owners to describe their relationship with their pet. If we are to further our understanding of the way people describe their relationships with their pets then this is an important that this issue that needs to be resolved. A number of methodologies, for example a free sort task, could be used to address this issue in further work.

The limitations of some of the studies should be acknowledged. In both the reaction time tasks (study 3 & 7) the stimulus list could not be matched for word length, string length or word frequency. In study three the word length for central instances was on average shorter than those in the peripheral category and this rather than the centrality of the instance may have caused the effect. However, these shortcomings are difficult to address because of the nature of the stimuli.

The research presented in this thesis comprises of samples drawn from a wide population and not on the basis of their ownership status. Although, this strategy has the advantage of not alerting participants to the nature of the research, it results in reduced samples when partitioned by pet ownership. In the categorisation of instance tasks (study 4 & 8) when the sample was partitioned there were 18 participants for family and 25 participants for friend. Therefore as always one should be cautious about extrapolating from small scale studies to

inferences to the general population. However, the finding that pet owners comprise of different groups with different conceptualisations regarding the role of pets in social groups is an important finding as it offers an explanation for the differences in the literature concerning the extension of these concepts. This study could have benefited from the recruitment of more participants and should be replicated with a larger sample to determine if these groupings remain. If the groupings are robust then researchers may wish to take account of these in design and analysis of their studies.

Exploring relational provision based on whether pets were conceived of as fully a member of the category 'family'/'friend' or definitely not a member of the category may be of particular value. One might envisage that owners who conceived as pets as fully members of the category may perceive more relational provision than pet owners who conceived of their pets as definitely not a member of the category. Categorising participants based on their conceptions in this way has already successfully provided some insights into person-pet relationships (Archer & Winchester, 1994).

An analysis by pet species should also be undertaken to determine whether pet owners' conceptualisation of their pets is a function of the type of pet owned. It could be envisaged that pets that are generally unrestrained in the home, such as, dogs and cats may be more likely to be conceptualised as a full member of the family than restrained pets such as hamsters, and rabbits.

9.5 Conclusions

Collectively, the studies reported in this thesis contribute to the nature of our understanding of the concept 'family' and 'friend' and the conceptualisation

of pets within each of these categories. This thesis explored the extent to which the concepts 'family' and 'friend' are useful frameworks for exploring the person-pet relationship within these social groupings by the application of methodologies borrowed from cognitive psychology. The research findings presented suggest that the degree of usefulness of the concepts 'family' and 'friend' as frameworks to describe the person-pet relationship may be limited because pets are judged as peripheral members of these categories and as such share few features in common with other category members. However, some evidence that pet owners are not a homogeneous group was obtained and is suggestive that there may be different conceptualisations regarding the role of pets within these social groups. If this finding is upheld by replication then the usefulness of these categories may be determined by the conceptualisation by the owner of their pet as a member of the respective category.

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Appendices

APPENDIX A – CATEGORISATION TASK

CATEGORISATION TASK (FAMILY)

No.

WARWICK JOANNE. D. FISHER

Thank you for agreeing to participate. This study is part of a programme of research designed to investigate family.

Sometimes when we use a word, we don't really mean it, other times we do. For example, *"John is a gorilla"* is an example of metaphor, we know John is not a genuine gorilla. We know that Koala bears are not genuine bears, and tomatoes are fruits not vegetables. Also, even though a penguin can't fly, it is a genuine bird, although, not a very typical one.

Our creative use of language may sometimes disguise what is really meant. In this study I'm interested in which instances are genuine examples of 'family member' and which are not. The study is divided into two sections: In ***section one*** I would be grateful if you would indicate which instances are genuine family members and which are not, by placing a ✓ in **one** of the four columns, two columns present membership criteria, and two columns present non-membership criteria. The criteria for assigning instances to categories are described inside. ***There are no right or wrong answers. Section two*** asks for background information.

The information given is anonymous, will be kept strictly confidential and used only for the purposes of this research. Thank you again for taking time to complete this study.

	MEMBER		NON-MEMBER	
	1) FAMILY MEMBER	**2) ONLY TECHNICALLY SPEAKING A FAMILY MEMBER**	**3) TECHNICALLY SPEAKING NOT A FAMILY MEMBER**	**4) NOT A FAMILY**
	If the instance is clearly a member of the category.	If the instance refers to a thing, which is only technically speaking in the category. In other words it is not like other typically category members, yet in a technical sense it does belong in the category.	If the instance refers to a thing which may loosely speaking be called by the category name but is technically speaking not a member of the category. It may be similar to or easily confused with other category members, but in a technical sense it does not belong.	If the instance is clearly not a member of the category.
Great uncle				
Step son				
Pet rabbit				
Great grandson				
Cohabiting partner				
Close friend				
Grandfather				
Uncle				
Mother in law				
Grandson				
Nephew				
Pet cat				
Girl/boy friend				
Great grandfather				
Neighbour				

Mother				
Home				
Half brother				
Sister in law				
Pet fish				
Foster father				
Best friend				
Son				
Granddaughter				
Foster mother				
Step sister				
Aunt				
Foster brother				
Workmate				
Grandmother				
Father in law				
Foster son				
Step brother				
Pet dog				
Great grandmother				
Family friend				
Step daughter				

Father				
Friend				
Step mother				
Brother in law				
Cousin				
Acquaintance				
Daughter				
Foster daughter				
God father				
Great grandaughter				
Spouse				
Sister				
Television				
Step father				
Son in law				
Second cousin				
Brother				
Niece				
Half sister				
Great aunt				
Foster son				
Daughter in law				

APPENDIX A – LISTING TASK

CONCEPT OF FAMILY-FREE LISTING TASK

NO

JOANNE. D. FISHER

Thank you for agreeing to participate. This study is part of a programme of research designed to investigate the nature of modern families. Families are changing, and so are people's views of what they think is a family. In this study I'm interested in how good an example of family are different members.

The study is divided into two sections: In ***section one*** I would be grateful if you would list as many members of the category 'family' as you can think of. Please make your responses general i.e. rather than just listing your own personal family members, try to think about family relationships in general. ***There are no right or wrong answers***. Please write your answers in the space provided overleaf. ***Section two*** asks for background information.

The information given is anonymous, will be kept strictly confidential and used only for the purposes of this research. Thank you again for taking time to complete this study.

Please list as many members of the category 'family' as you can think of in the space below.

• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____
• _____	• _____

APPENDIX A – PROTOTYPICALITY TASK

CONCEPT OF FAMILY-PROTOTYPICAL RATINGS | **NO.**

JOANNE. D. FISHER

Thank you for agreeing to participate. This study is part of a programme of research designed to investigate the nature of modern families. Families are changing, and so are people's views of what they think is a family. In this study I'm interested in how good an example of family different members are.

The study is divided into two sections: In ***section one*** I would be grateful if you would rate how good an example of family member each of the instances presented are by placing a cross on a five point scale from, extremely good example of family member, to extremely poor example of family member. ***There are no right or wrong answers.*** ***Section two*** asks for background information.

The information given is anonymous, will be kept strictly confidential and used only for the purposes of this research. Thank you again for taking time to complete this study.

1. Great Grandmother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
2. Twin	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
3. Grandchildren	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
4. Friend	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
5. Great Grandfather	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
6 Godfather	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
7 Half Brother.	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
8. Son in Law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
9. Dog	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
10. Great Granddad	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
11. Step Father	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
12.Siblings	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
13. Husband	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
14.Second Cousin	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE

15. Granddaughter	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
16. Aunty	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
17. Wife	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
18. Children	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
19. Grandson	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
20. Step Mum	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
21. Nephew	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
22. Great Granddaughter	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
23. Father in Law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
24. Great Grandson	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
25. Brother in Law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
26. Great Grandma	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
27. Daughter	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
28. Sister in Law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE

29. Son	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
30. Step Dad	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
31. Great Grandparents	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
32. Step Mother	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
33. Mother in Law	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
34. Half Sister	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
35. Niece	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
36. Step Brother	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
37. Cat	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
38. Cousin	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
39. Grandfather	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
40.Brother	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
41. Aunt	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
42. Step Sister	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE

43. Grandparents	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
44. Pets	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
45. Father	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
46. Grandmother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
47. Mother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
48. Great Uncle	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
49. Step Son	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
50. Great Aunt	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
51. Sister	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
52. Step daughter	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
53. Uncle	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE

Appendix A – Prototypicality Task (One-Sample Test)

One-Sample Test - Test Value = 3	Mean	SD	Mean Difference	t	Sig.
Central members					
Mother	4.87	.46	1.87	40.306	P <.001
Father	4.80	.57	1.80	31.660	P <.001
Son	4.73	.64	1.73	27.024	P <.001
Daughter	4.71	.73	1.71	23.462	P <.001
Wife	4.64	.84	1.64	19.639	P <.001
Husband	4.57	.95	1.57	16.604	P <.001
Brother	4.56	.89	1.56	17.503	P <.001
Sister	4.56	.93	1.56	16.872	P <.001
Grandmother	4.34	.90	1.34	14.866	P <.001
Grandfather	4.33	.94	1.33	14.098	P <.001
Grandson	4.16	1.09	1.16	10.650	P <.001
Granddaughter	4.06	1.14	1.06	9.335	P <.001
Aunt	3.77	1.04	.77	7.382	P <.001
Great grandfather	3.67	1.18	.67	5.673	P <.001
Great grandmother	3.65	1.30	.65	4.963	P <.001
Uncle	3.59	.10	.59	5.924	P <.001
Great grandson	3.49	1.27	.49	3.867	P <.001
Great granddaughter	3.43	1.31	.43	3.277	P=.001
Nephew	3.43	1.07	.43	4.034	P <.001
Niece	3.39	1.07	.39	3.638	P <.001
Step father	3.39	1.10	.39	3.578	P=.001
Daughter in law	3.33	1.13	.33	2.924	P=.004
Step mother	3.31	1.07	.31	2.897	P=.005
Mother in law	3.30	1.09	.30	2.760	P=.007
Step daughter	3.30	1.07	.30	2.746	P=.007
Step son	3.28	1.11	.28	2.542	P=.013
Brother in law	3.26	1.02	.26	2.572	P=.012
Sister in law	3.26	1.09	.26	2.389	P=.019
Intermediate members					
Half brother	3.21	1.08	.21	1.952	P=.054
Father in law	3.20	1.14	.20	1.759	P=.082
Half sister	3.18	1.09	.18	1.658	P=.101
Step brother	3.18	1.10	.18	1.630	P=.106
Son in law	3.17	1.13	.17	1.506	P=.135
Cousin	3.07	1.12	7.071E-02	.629	P=.531
Girlfriend	3.04	1.38	4.040E-02	.292	P=.771
Step sister	3.01	1.06	1.020E-02	.095	P=.924
Great Aunt	2.97	1.21	-3.0303E-02	-.250	P=.803
Great uncle	2.87	1.13	-.13	-1.146	P=.254
Boyfriend	2.83	1.33	-.17	-1.282	P=.203
Friend	2.79	1.37	-.21	-1.538	P=.127
Peripheral members					
Godfather	2.32	1.1271	-.68	-6.033	P <.001
Pet dog	2.28	1.4219	-.72	-5.064	P <.001
Second cousin	2.16	.9181	-.84	-9.150	P <.001
Home	2.15	1.4240	-.85	-5.929	P <.001
Pet cat	2.02	1.2776	-.98	-7.631	P <.001
Colleague	1.91	1.0550	-1.09	-10.332	P <.001
Neighbour	1.90	1.0449	-1.1010	-10.485	P <.001
Pet rabbit	1.60	.8762	-1.40	-15.979	P <.001
Television	1.54	.9036	-1.46	-16.157	P <.001
Pet fish	1.37	.6765	-1.63	-24.094	P <.001

APPENDIX B – STRESS X DIMENSIONALITY

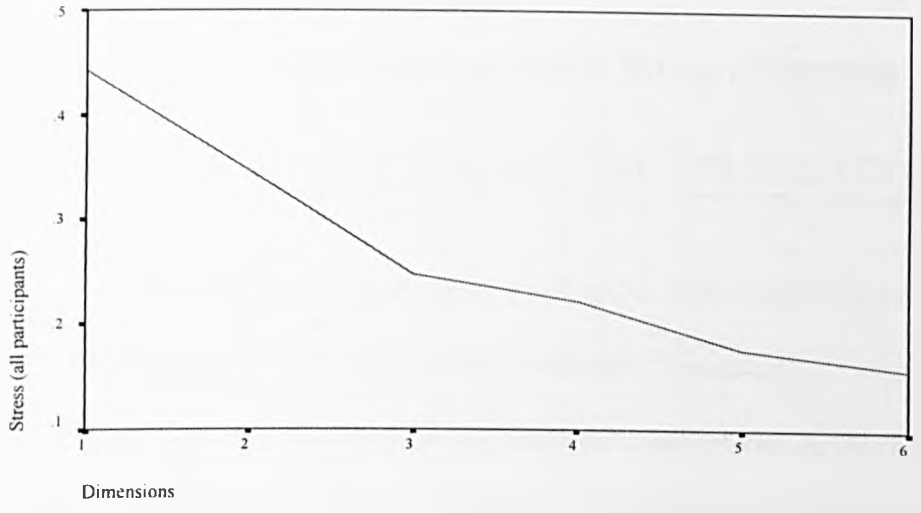

Figure C. 1 Stress x dimensionality-family-all participants

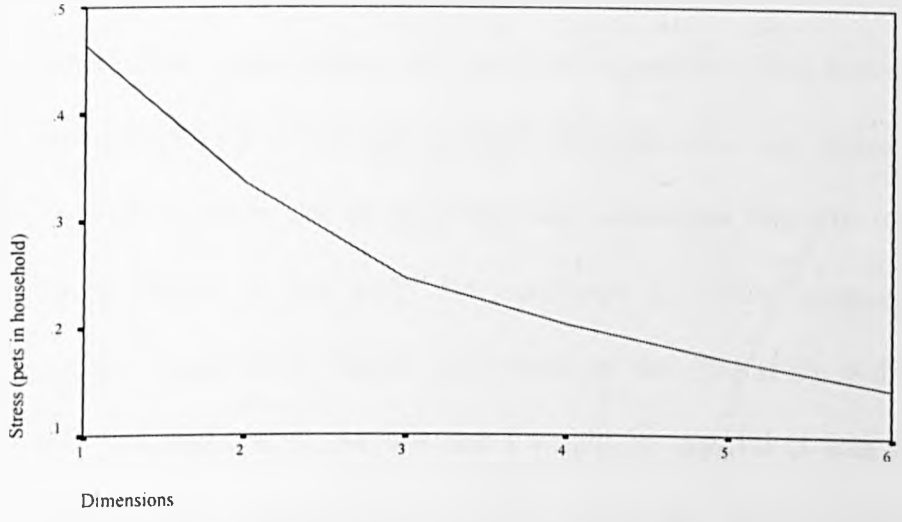

Figure C. 2. Stress x dimensionality-family-pet in the household

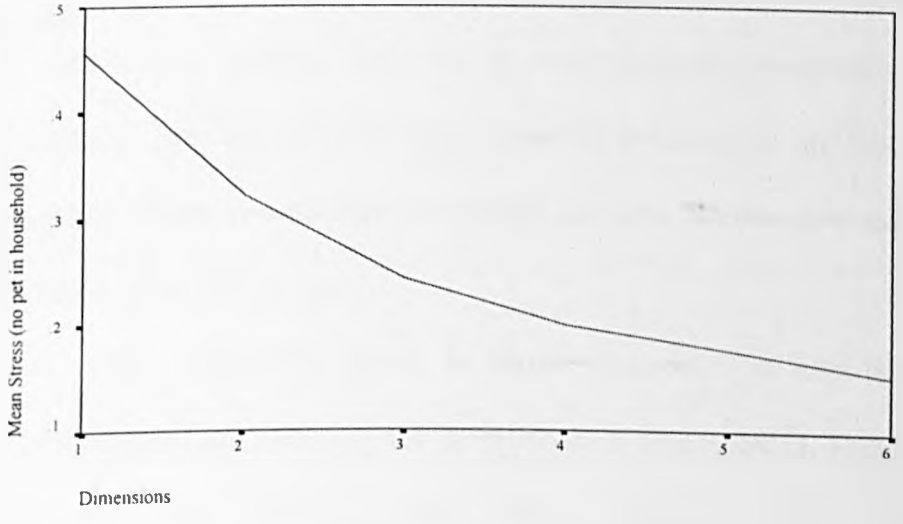

Figure C. 3. Stress x dimensionality-family-no pet in the household

APPENDIX C – CATEGORISATION TASK

CATEGORISATION TASK (FRIEND)

No.

THE UNIVERSITY OF WARWICK

JOANNE. D. FISHER

Thank you for agreeing to participate. This study is part of a programme of research designed to investigate friendship.

Sometimes when we use a word, we don't really mean it, other times we do. For example, *"John is a gorilla"* is an example of metaphor, we know John is not a genuine gorilla. We know that Koala bears are not genuine bears, and tomatoes are fruits not vegetables. Also, even though a penguin can't fly, it is a genuine bird, although, not a very typical one.

Our creative use of language may sometimes disguise what is really meant. In this study I'm interested in which instances are genuine examples of 'friend' and which are not. The study is divided into two sections: In ***section one*** I would be grateful if you would indicate which instances are genuine friends and which are not, by placing a ✓ in **one** of the four columns, two columns present membership criteria, and two columns present non-membership criteria. The criteria for assigning instances to categories are described inside. ***There are no right or wrong answers. Section two*** asks for background information.

The information given is anonymous, will be kept strictly confidential and used only for the purposes of this research. Thank you again for taking time to complete this study

	MEMBER		NON-MEMBER	
	1) FRIEND	2) ONLY TECHNICALLY SPEAKING A FRIEND	3) TECHNICALLY SPEAKING NOT A FRIEND	4) NOT A FRIEND
	If the instance is clearly a member of the category.	If the instance refers to a thing, which is only technically speaking in the category. In other words it is not like other typically category members, yet in a technical sense it does belong in the category.	If the instance refers to a thing which may loosely speaking be called by the category name but is technically speaking not a member of the category. It may be similar to or easily confused with other category members, but in a technical sense it does not belong.	If the instance is clearly not a member of the category.
Grandmother				
Girl/boy friend				
Best friend				
Brother				
Mother				
Close friend opposite sex				
Sister				
Acquaintance				
Father				
Spouse				
Pet rabbit				
Son				
Former friend				

Cousin				
Neighbour				
Grandfather				
Close friend same sex				
Workmate				
Daughter				
Pet dog				
Niece				
Television				
Friend				
Pet cat				
Nephew				
Family friend				
Home				
Pet fish				
Uncle				
Cohabiting partner				
Aunt				

APPENDIX C – PROTOTYPICALITY TASK

CONCEPT OF FRIEND-PROTOTYPICAL RATINGS

No.

JOANNE. D. FISHER TEL:(01203) 523158

Thank you for agreeing to participate. This study is part of a programme of research designed to investigate the nature of friendship. In this study I'm interested in how good an example of friend different instances are.

The study is divided into two sections: In ***section one*** I would be grateful if you would rate how good an example of friend each of the instances presented are by placing a cross on a five point scale from, extremely good example of friend, to extremely poor example of friend. ***There are no right or wrong answers***. ***Section two*** asks for background information.

The information given is anonymous, will be kept strictly confidential and used only for the purposes of this research. Thank you again for taking time to complete this study.

1. Grandmother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
2. Father	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
3.Close friend (same sex)	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
4. Step sister	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
5. Son in law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
6. Granddaughter	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
7. Pet cat	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
8. Boyfriend	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
9. Daughter in law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
10. Wife	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
11. Half brother	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
12. Great granddaughter	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
13. Workmate	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
14. Step daughter	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
15. Nephew	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE

16. Mother in law	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
17. Great uncle	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
18. Step mother	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
19. Best friend	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
20. Pet rabbit	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
21. Great grandson	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
22. Daughter	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
23. Family friend	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
24. Brother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
25. Brother in law	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
26. Son	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
27. Pet dog	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
28. Great grandfather	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
29. Girlfriend	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE

30. Mother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
31. Father in law	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
32. Step Son	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
33. Former friend	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
34. Sister in law	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
35. Great grandmother	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
36. Niece	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
37. House	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
38.Close friend (opposite sex)	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
39. Step father	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
40. Cousin	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
41. Husband	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
42. Pet fish	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
43. Step brother	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
44. Great aunt	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
45. Sister	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE

46. Neighbour	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
47. Half sister	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
48. Television	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
49. Uncle	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
50. Godfather	5	4	3	2	1	
EXTREMELY GOOD EXAMPLE						EXTREMELY POOR EXAMPLE
51. Acquaintance	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
52. Second cousin	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
53. Grandfather	1	2	3	4	5	
EXTREMELY POOR EXAMPLE						EXTREMELY GOOD EXAMPLE
54. Friend						
EXTREMELY POOR EXAMPLE	1	2	3	4	5	EXTREMELY GOOD EXAMPLE
55. Grandson						
EXTREMELY POOR EXAMPLE	1	2	3	4	5	EXTREMELY GOOD EXAMPLE
56. Aunt						
EXTREMELY POOR EXAMPLE	1	2	3	4	5	EXTREMELY GOOD EXAMPLE

APPENDIX C – PROTOTYPICALITY TASK (ONE-SAMPLE TEST)

ONE-SAMPLE TEST - TEST VALUE = 3

	MEAN	SD	MEAN DIFFERENCE	T	SIG.
CENTRAL MEMBERS					
Close friend (same sex)	4.52	.75	1.52	14.533	P <.001
Friend	4.44	.78	1.44	13.378	P <.001
Girlfriend	4.33	.97	1.33	9.476	P <.001
Wife	4.29	1.13	1.29	7.926	P <.001
Close friend (opposite sex)	4.28	.88	1.28	10.267	P <.001
Husband	4.21	1.13	1.21	7.415	P <.001
Sister	4.16	1.00	1.16	8.226	P <.001
Mother	4.08	.97	1.08	8.031	P <.001
Boyfriend	4.00	1.06	1.00	6.448	P <.001
Daughter	3.69	1.20	.69	4.171	P <.001
Brother	3.67	1.08	.67	4.496	P <.001
Father	3.57	1.25	.57	3.241	P=.002
Grandmother	3.49	1.17	.49	2.986	P=.004
Son	3.39	1.11	.39	2.512	P=.015
Workmate	3.29	.87	.29	2.389	P=.021
Family friend	3.27	.95	.27	2.039	P=.047
INTERMEDIATE MEMBERS					
Grandfather	3.30	1.15	.30	1.849	P=.071
Cousin	3.08	1.02	7.84E-02	.551	P=.584
Pet dog	3.04	1.32	4.08E-02	.216	P=.830
Aunt	3.00	1.07	.00	.000	P=1.000
Uncle	2.81	1.05	-.19	-1.322	P=.192
Nephew	2.73	.98	-.27	-1.998	P=.051
Niece	2.71	1.15	-.29	-1.820	P=.075
PERIPHERAL MEMBERS					
Neighbour	2.62	1.05	-.38	-2.640	P=.011
Pet cat	2.62	1.21	-.38	-2.220	P=.031
Former friend	2.25	1.08	-.75	-4.997	P <.001
Home	2.07	1.25	-.93	-5.054	P <.001
Acquaintance	2.00	.80	-1.00	-8.927	P <.001
Pet rabbit	1.80	1.06	-1.20	-7.950	P <.001
Pet fish	1.65	1.19	-1.35	-7.859	P <.001
Television	1.61	.92	-1.39	-10.827	P <.001

APPENDIX D – STRESS X DIMENSIONALITY

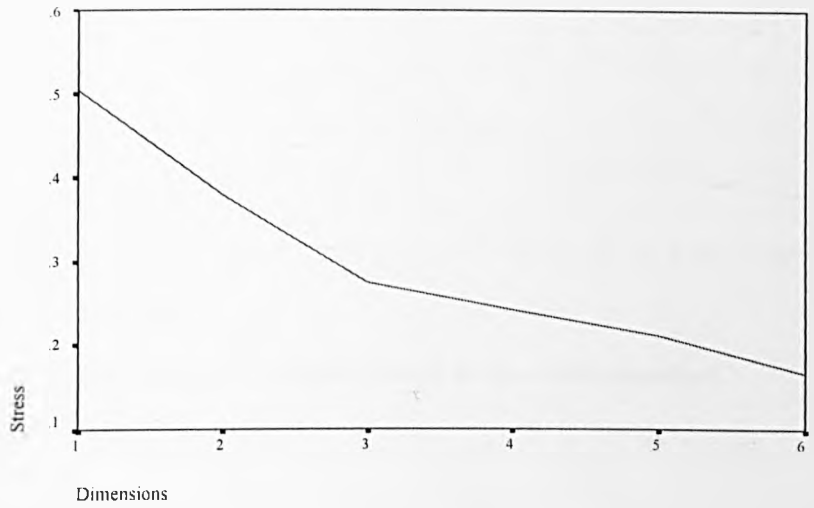

Figure E. 1 Stress x dimensionality-family-all participants

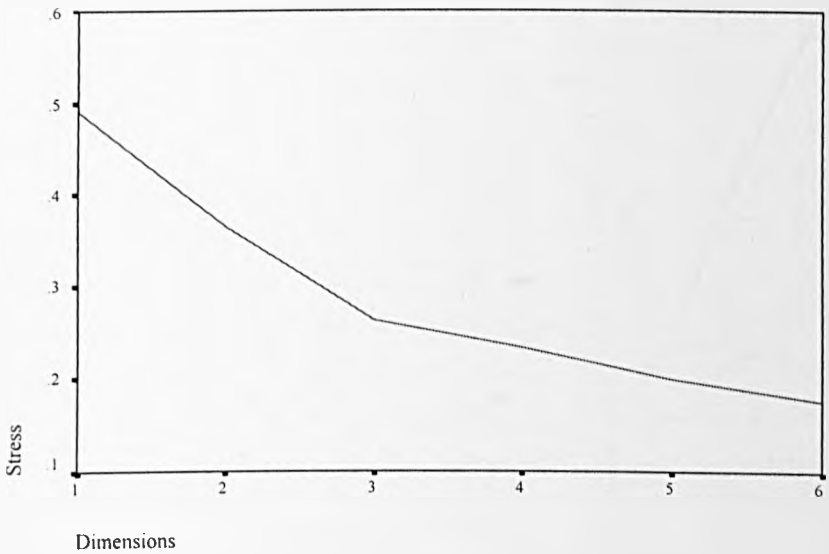

Figure E. 2 Stress x dimensionality-family-pet in the household

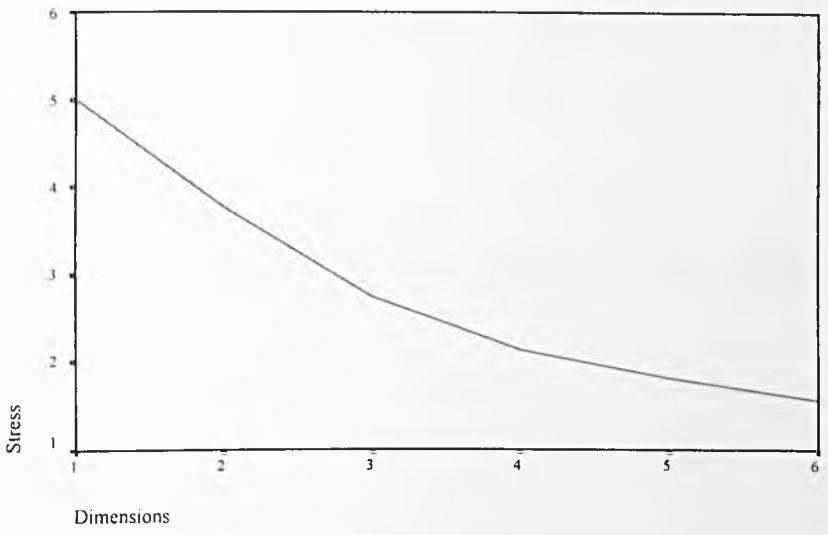

Figure E. 3 Stress x dimensionality-family-no pet in the household

APPENDIX E – OBTAINED SOLUTIONS FAMILY AND FRIEND

Individual Subjects Solutions (Family N=30)

SUBJECT NO	DIMENSION 1	DIMENSION 2	DIMENSION 3
1	.4226	.4432	.3100
2	.9089	.1841	.2221
3	.4459	.4938	.4692
4	.9629	.0758	.1283
5	.5345	.4331	.3862
6	.4070	.4343	.2611
7	.4222	.4565	.332
8	.7069	.3494	.2895
9	.4548	.5031	.3143
10	.8606	.1272	.1971
11	.4174	.4680	.2924
12	.8522	.1551	.2312
13	.7236	.2188	.3295
14	1.9839	.0614	.0553
15	1.5714	.4024	.4550
16	.2767	.3440	.2437
17	.8449	.1691	.3860
18	.5894	.5058	.4180
19	.8096	.2452	.1720
20	.6745	.4192	.3120
21	.9543	.1056	.1344
22	.5095	.4031	.3439
23	.5540	.4718	.3637
24	.5711	.3470	.2701
25	.8859	.1071	.2504
26	.9077	.1774	.2642
27	.3650	.3686	.5106
28	.4435	.4460	.6241
29	.2282	.2649	.2798
30	.9528	.0824	.0692

Individual Subjects Solutions (Friend N=30)

SUBJECT NO	DIMENSION 1	DIMENSION 2	DIMENSION 3
1	.7280	.1760	.1710
2	.7280	.1760	.1710
3	.6108	.2222	.1728
4	.8170	.2710	.3397
5	.2954	.2708	.2613
6	.9769	.0595	.0427
7	.2121	.2256	.2834
8	.6153	.3013	.3645
9	.9443	.1463	.0764
10	.4094	.4695	.3018
11	.5696	.3975	.1925
12	.6677	.2881	.3146
13	.5138	.3835	.3667
14	.4552	.3992	.3316
15	.7291	.3169	.2108
16	.0561	.0704	.0700
17	.2287	.2562	.2548
18	.7635	.4351	.1598
19	.9776	.0964	.0659
20	.7908	.2601	.1365
21	.7484	.2631	.1608
22	.9384	.0401	.0274
23	.8612	.2220	.1563
24	.7803	.2457	.1415
25	.3368	.3999	.2554
26	.5688	.2605	.3545
27	.2444	.2521	.2252
28	.3387	.3636	.2718
29	.2051	.2434	.2371
30	.3399	.3427	.3687
31	.6589	.2616	.3280
32	.8665	.2759	.1365