A Theoretical Basis for Health Benefits of Pet Ownership

Attachment Versus Psychological Support

Glyn M. Collis
June McNicholas

Abstract

A number of studies suggest an association between pet ownership and advantages for health, but the underlying processes are not clear. One hypothesis is that the relationship between person and pet could directly influence the owner’s health. This motivates exploration of issues concerning the nature and function(s) of these relationships. These relationships are most likely based on psychological mechanisms other than attachment or other motivationally driven mechanisms that underlie human-human relationships but not specifically attachment relationships. Despite its attraction as an intriguing issue that should yield to scientific analysis, the nature of person-pet relationships is still not well understood. The hypothesis that they mediate associations between pet ownership and advantages for physical health and psychological well-being gives a sharper focus to research on these relationships.

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Numerous reports in the last 20 years have suggested that pet ownership is associated with health advantages (e.g., Anderson, Reid, & Jennings, 1992; Friedmann, Katcher, Lynch, & Thomas, 1980; Mugford & M'Comisky, 1975; Serpell, 1991; Siegel, 1990). The result has been a widespread acceptance of a causal connection between pet ownership and health. Despite a few critical commentaries (Wright & Moore, 1982), the literature overall seems noncritical in its acceptance of the causal hypothesis.

It is important to replicate and extend studies supporting an association between pet ownership and health advantages, yet such studies should be complemented by investigations of the mechanisms underlying the associations. There are three broad classes of explanation for associations between pet ownership and health, the most obvious is that pets have a direct causal effect on human health. The alternatives are (a) that pet ownership has an indirect effect on health by facilitating person-to-person relations and (b) that other factors influence both pet ownership and health but that pet ownership has no causal effect on health. We further discuss the latter two alternatives in Chapter 11.

One hypothesis for a direct causal effect is that health advantages are a consequence of the relationship between the person and the pet. A second hypothesis is that there are direct effects at a physiological level, for example, the presence of a pet moderates cardiovascular responses such as blood pressure changes (Friedmann, 1995). Direct physiological effects could, but need not, occur within the context of a person-pet relationship (as opposed to a short-term acquaintance with the particular animal).

Effects of Person-Pet Relationships on Health: A Guiding Assumption

It is useful to define an assumption that is implicit in many references to social relationships in the literature on companion animals. This assumption is not original, but by clarifying an idea that underlies much contemporary thinking, it can be critically evaluated and alternatives can be clearly recognized. We phrase the assumption as follows:

It is unlikely that the human species has evolved or otherwise acquired a set of psychological processes whose primary function is to serve relationships with companion animals; it is much more likely that these processes are "borrowed" from those used in human-human relationships and used for human-animal relationships.

It is not anti-Darwinian or anti-ethological to prefer this position to the alternative view that Homo sapiens has evolved some distinct processes for interacting or relating to companion animals (cf. Herzog & Burghardt, 1987; Serpell, 1987). It is entirely consistent with evolutionary theory to envisage "old" structures or processes being applied in new contexts. New functions may provide an impetus for further evolutionary change, as when feathers were "discovered" to have useful aerodynamic properties, but further adaptation is not a necessary consequence of such a situation.

There are two significant corollaries to the assumption. First, concepts used in the study of human relationships, including attachment, social support, and many others, are considerably more than metaphors in helping to understand humans' relationships with companion animals; they can be explored and accepted or rejected as they stand. Second, discoveries made about human-companion animal relationships may reveal new insights into the nature of human-human relationships.

Categories and Functions of Social Relationships

One way to use the assumption to aid the inquiry into person-pet relationships is to ask whether a particular category of person-person relationships will help explain the characteristics of person-pet relationships. The classic categories of relationships are child-to-parent attachment relationships, parent-to-child caregiving relationships, child-to-child peer relationships, and adult-to-adult sexual relationships. It has been suggested that these have distinct psychobiological substrates (Harlow & Harlow, 1965). Other types of relationships could be added to this list, perhaps most important, sibling relationships and adult friendships. If person-pet relationships were to fit anywhere on this list, the literature on companion animals suggests attachment as the prime candidate, perhaps with parent-to-child caregiving as a second possibility.

An alternative to focusing on categories of relationship is to focus directly on the functional mechanisms by which relationships might promote advantages for health. A functional approach need not be constrained by descriptive categories of relationships. A natural way to follow this strategy is to examine the supportive functions of relationships. Social or
psychological support has emerged specifically as an explanation of variations in health and disease. Concepts of support also feature in the literature on companion animals (McNicholas & Collis, 1995).

Bonds and Attachments

In the literature on companion animals, pet-person relationships are most commonly characterized as bonds or attachments, but it is not always clear how these terms are used. In its narrow technical meaning, an attachment refers to the close relationship, based on feelings of security, of a young child to a parent ( Bowlby, 1969). A slightly broader technical use could encompass other relationships known to be derived from child-parent attachments or based on the same narrowly defined psychobiological mechanisms, particularly felt security (Ainsworth, 1989). What is meant by security in this context is important and is discussed in the next section. The concept of a bond, even in its technical use, is considerably broader than attachment. A bond is the affection and attraction felt by one individual for another “particular individual”—not for a group or a species (Bowlby, 1979). In this framework, the meaning of bond is broadly similar to what most people think of as a close relationship. It is unfortunate that the term bond is sometimes used broadly, as in “the human-animal bond.” More confusion has probably been caused by the lay use of attachment to denote almost any type of close relationship.

The concepts of attachment and bonding, as developed in ethology and psychology, are primarily concerned with child-parent relationships. One of the most striking features of child-parent relationships is the asymmetry between the thinking and language skills of the adult and the relative lack of sophistication of these skills in the child. It might therefore seem attractive to apply these concepts to person-pet relationships, which are also asymmetrical. The similarity, however, is more apparent than real. The classic formulation of attachment (Bowlby, 1969) is about psychological benefits accruing to the less cognitively sophisticated individual, the child, who is attached to the parent. In person-pet relationships, the asymmetry is the other way around. The cognitively sophisticated person is seen as attached to the less sophisticated animal, with psychological benefits accruing to the person.

A superficially similar theoretical framework was developed to cover the so-called bonding of a parent to the child (Klaus & Kennell, 1976). In this framework, there was a brief critical period for the formation of the bond, a process based on rapid learning quite unlike the gradual emergence of a child’s attachment to a parent. In most other respects, it is quite unlike child-to-parent attachment. Although the parent-child relationship is an important and perhaps archetypal example of a relationship based on caregiving (Ainsworth, 1989), many of the main conclusions from Klaus and Kennell’s work are now seen to be erroneous in many respects (Myers, 1984; Sluckin, Herbert, & Sluckin, 1983).

Attachment Theory

To examine the case that person-pet relationships are like attachments, it is necessary to look more deeply into attachment theory and to examine ways in which it has been extended into the domain of adult-adult human relationships where the role of the two individuals is more symmetrical, which is unlike child-to-parent attachment, parent-to-child caregiving relationships, or person-pet relationships.

Two principles were fundamental to Bowlby’s (1969) original ideas on the mechanisms of attachment. These principles have played a key role in subsequent research by Bowlby and others.

**Principle 1: Attachment as a Motivational System**

Child-to-parent attachment behavior was postulated to be controlled by a biologically based motivational system. A key feature of the attachment system was that presence of the attachment figure (typically the mother) enhanced felt security. A lack of felt security (felt insecurity), which might arise in a broad variety of circumstances, triggered the production of attachment behavior with the goal of reestablishing proximity, much the same way as feelings of hunger might be said to trigger feeding. The role of felt security/insecurity in this system was not assumed to depend on, or derive from, the child’s experiencing the removal of sources of insecurity, anxiety, or alarm by the attachment figure. Nor was the role dependent on the child’s understanding that the attachment figure could remove a source of threat. The attachment system was seen as a primary motive produced by evolutionary design with the function of ensuring the protection and safety of the child without the child having the cognitive capability to
comprehend the nature of danger, except in the most rudimentary way of feeling insecure (e.g., unfamiliar surroundings and in the absence of the mother).

It is not proximity seeking that defines the attachment motivational system. Sexual motivation also involves proximity seeking. The key elements are the role of felt insecurity as the motivational force behind proximity seeking and the development of the motivational system without specific experience (although specific experience is involved in selecting the attachment figure).

Bowlby (1969) distinguished the attachment system from a number of other affectional systems such as the parent-to-child caregiving system, the adult-to-adult sexual system, and the peer friendship system (Harlow & Harlow, 1965). Bowlby’s concept of an affectional system is based on the concept of motivational system in ethology (e.g., Hinde, 1966). The assumption that distinct motivational systems serve different types of relationships underpins the idea that there are natural categories of relationships. Most major attempts to characterize adult human relationships through attachment theory identify a key role for motivation based on felt security/insecurity (e.g., Ainsworth, 1989; Weiss, 1982; West & Sheldon-Keller, 1994).

**Principle 2: Internal Working Models**

Although Bowlby (1969) borrowed the concept of motivational system from ethology, he borrowed the concept of a mental model from cognitive psychology. Bowlby argued that on the basis of the first attachment, the young child begins to organize experiences and expectations of social interactions into internal working models of the self, of the attachment figure, and, in effect, of the attachment relationship. An internal working model is a system of cognitive representations that works as a knowledge base. Bowlby argued that working models of the attachment relationship form the basis of mental models of other affectional relationships that develop subsequently. In this way, cognitive representations of the first relationship could influence various relationships in adult life. There are different views, however, on the nature of this influence. The influence might be relatively minor, with early models subject to extensive modification by subsequent experiences (Bretherton, 1985, 1987). The influence might be rather profound, particularly in the way that feelings of security/insecurity feature in the model and influence social behavior and relationships of various types in adulthood (e.g., Main, Caplan, & Cassidy, 1985).

**The Scope of Attachment Theory**

The last decade has seen a marked upsurge of interest in characterizing adult relationships through attachment theory, particularly since Hazan & Shaver (1987) argued that many romantic relationships are essentially attachments (see also Sperling & Berman, 1994). The enthusiasm for the idea of adult attachments has highlighted the importance of carefully considering the boundaries of the concept of attachment. If the concept is made too general, it will lose explanatory power and end up explaining nothing. This concern seems to have led to a series of articles from Mary Ainsworth (especially 1989). A major attachment theorist who worked alongside Bowlby in the early years in the development of the theory, Ainsworth has been the most important single influence on its subsequent development. She has clarified the issue of what is an attachment relationship in the conceptual scheme depicted in Figure 6.1. Ainsworth suggests that a subset of adult human relationships are properly regarded as affectional bonds if based on a long-enduring tie in which the partner is important as a unique individual. The key psychological process underlying the tie is an internal working model of the relationship. The tie may be maintained during absences, but there is a desire to come together and pleasure in doing so. Because there are affectional aspects to the tie, separation will cause distress, and loss will cause grief.

Some, but not all, affectional bonds are attachments. An important criterion of an attachment is the reduction of felt insecurity in the presence of the partner, which is presumed to be a consequence of the activation of the motivational system. An alternative interpretation is that early in life, the operation of the attachment motivational system so influenced cognitive models of relationships that the style of responding to felt insecurity is a major dimension of individual differences in social relationships. Ainsworth explicitly indicates that a mother’s bond to her child is not properly called an attachment because felt security is typically not a major feature of this type of bond. In a recent article on parents’ cognitive working models, George (1996) describes distinct patterns of representations for caregiving and attachment.
Person-Pet Relationships as Attachments

It is unlikely that felt security is particularly important in most person-pet relationships. In evaluating this claim, it is important to distinguish between felt security in the rather nonspecific affective sense used to define the attachment motivational system and a more focused cognitive appraisal of a specific role (e.g., a large dog in acting as a deterrent or defender against mugging or burglary). The type of insecurity that plays a central role in Bowlby's theory is a primary motivation, which will initiate proximity seeking regardless of whether the child has had the opportunity to learn that the attachment figure could remove specific threats.

To date, attempts to quantify people's relationships with pets have not tapped feelings or attitudes that relate closely to attachment theory. As examples, the CENSHARE Pet Attachment Survey (Holcombe, Williams, & Richards, 1985), the Lexington Attachment to Pets Scale (Johnson, Garrity, & Stallones, 1991), and the Companion Animal Bonding Scale (Poresky, Hendrix, Mosier, & Samuelson, 1987) contain items that loosely reflect the desire for proximity with a pet (especially sleeping with or near the pet), but there is little else related to attachment theory. In contrast, most methods for assessing attachment in adult relationships lead to classifications or measurements based on security (Crowell & Treboux, 1995). Moreover, little attempt has been made to compare items that should reflect attachment-like relationships with items that reflect social relationships of other types. Although scales are routinely subjected to factor analysis to see whether different dimensions can be identified, inspection of the eigenvalues (i.e., percentage of variance explained by each factor) strongly suggests that these scales each represent only a single dimension. Although multidimensional structures are often reported, there seems to have been undue reliance on the default setting used by standard statistical packages that imply that eigenvalues greater than 1.0 indicate a distinct dimension, a criterion known to be misleading (Zwick & Velicer, 1986). The nature of the items suggests that the main dimension resembles a measure of generalized close and affectionate relationships rather than attachment.

Feelings of great sadness at the loss of a pet are often interpreted as grief, an interpretation that has been used to strengthen the concept that the person-pet relationship is like attachment (Archer & Winchester, 1993;
Rajaram, Garrity, Stallones, & Marx, 1993). Conceptually, in Ainsworth’s scheme, grief is a characteristic of affectional bonds in general, rather than attachment in particular. Empirically, responses to pet loss are varied, and even when marked, they are seldom as long-lasting, as intense, or as disruptive as those experienced following the loss of a close human relationship (McNicholas & Collis, 1995).

The attachment metaphor is not helpful in characterizing human-animal relationships that are presumed to borrow from a pool of motivational and cognitive components, strategies, and dispositions available in human-human relationships. Attachment mechanisms may have contributed to this pool but do not explain the implications of pet ownership. It is not particularly helpful to focus on attachment, rather than on another category of relationships. A promising alternative is to focus on what person-pet relationships do for people and how they might work to influence health.

Supportive Functions of Person-Pet Relationships

- The process-oriented concept of support is particularly attractive as a framework for understanding how person-pet relationships produce health advantages. This framework is not new to the field (Friedmann et al., 1980), but the ways in which it differs from other approaches have not been well studied. The concept of support emerged specifically as a framework for understanding the effects of social and psychological factors on health and well-being across the life span, contrasting with the roots of attachment theory in developmental psychology and psychopathology. Moreover, there need be no a priori assumptions about the motivational underpinnings or developmental histories of relationships that provide support. Many types of relationships can be supportive on the basis of what they do for people. It has been argued that theories of supportive and attachment relationships have much in common (Sarason, Pierce, & Sarason, 1990). Yet neither the theory nor the evidence for this is particularly strong. Considering the difficulties in accommodating person-pet relationships within the concept of attachment, that approach seems inappropriate in the present context.

- Social support is an omnibus term covering a variety of acts or interpersonal transactions in social relationships. An early conceptualization of social support was that of Cobb (1976), who described it as information leading to one or more of three outcomes: feelings of being cared for; the belief that one is loved, esteemed, and valued; and the sense of belonging to a reciprocal network. Cobb believed that social support provided protection from pathological states and accelerated recovery from illnesses by acting as a buffer in times of crisis. Although a number of multidimensional models of social support have been proposed by theorists and researchers, few have strayed far from Cobb’s original conceptualization, and their ideas about the different forms or components of social support appear to converge on a common set of dimensions. Most commonly cited are the following:

1. Emotional support: the ability to turn to others for comfort in times of stress, leading the person to feel cared for by others
2. Social integration or network support: the feeling of being a part of a group with common interests and concerns (this may range from close relationships such as within a family, to work relationships or casual friendships that enable social and recreational activities)
3. Esteem support: the bolstering of a person’s sense of competence and selfworth, value to others, respect, and self-respect (e.g., giving positive feedback regarding a person’s abilities or worth)
4. Tangible/practical/instrumental support: the giving of concrete assistance or resources (e.g., the provision of physical help with a task and lending money at a time of financial difficulty)
5. Informational support: the giving of advice or guidance
6. Opportunity to provide nurturance: the need to be needed

Companionship is seen as theoretically distinct from social support (Rook, 1990) in that it does not offer extrinsic support but provides intrinsic satisfactions such as shared pleasure in recreation, relaxation, and uncensored spontaneity. Companionship may be important in fostering positive mental health, whereas social support may be more important in buffering threats to mental health from stressors.

Major stressful life events have been shown repeatedly to increase the incidence of adverse physical and/or psychological responses, resulting in illness, depression, and so on. There is considerable evidence that social support may alleviate such reactions and be an important source of variability in how people respond to stress. Support may also accelerate recovery from illness, even serious medical conditions such as stroke (Glass, Matchar, Belyea, & Feussner, 1993), myocardial infarction (Fontana, Kerns, Rosenberg, & Colone, 1989; Kulik & Mahler, 1993), and cancer...
(Wortman, 1984). Absence of social support, feelings of isolation, and actual loneliness exacerbate existing stresses and predispose to further stresses.

At least two factors influence the effectiveness of support in reducing stress. The first is whether the act or information is perceived to be supportive by the recipient, regardless of how supportive or well-intentioned it is perceived to be by the provider or others outside the transaction. Similarly, provided that the recipient regards an act as supportive, it is unimportant whether the actor or others outside the transaction agree or not.

Second, to be effective, the type of support must match the specific needs of the recipient at the time (Cutrona & Russell, 1990). If someone really needs comfort (emotional support) or reassurance of his or her capabilities (esteem support) after failing an exam, it is of little use to offer advice on alternative careers (informational support) or a lift to the social security office (practical support). At some later stage, both of these may be regarded as supportive by the recipient, but not at the earlier stage when the recipient is still pained by experience. Support that is ill-matched to a need may be particularly damaging by undermining the recipient’s confidence in a relationship. Similarly, inconsistent support can be anxiety provoking. Yet it is common for burnout to occur in providers of social support, resulting in gradually diminishing support, or fluctuations in support, regardless of the actual need of the recipient.

Support in Person-Pet Relationships

Some types of social support feature strongly in person-pet relationships and are candidates for a causal role in the health advantages seen among pet owners. The term candidates is stressed because most of the evidence to date is descriptive and anecdotal. High-quality empirical research is required to establish whether concepts of support really have explanatory power when applied to person-pet relationships.

Descriptions of pet ownership often feature emotional and esteem support as elements of the relationship. It is plausible that these aspects of perceived support from a pet may have greater stability than similar elements of support from a human relationship. Pet owners are not human may be advantageous because there is no fear that the relationship will be damaged by displays of weakness, emotion, or by excessive demands.

The opportunity to provide nurturance was suggested as a form of support by Weiss (1974). Because it could be seen as increasing one’s sense of competence or worth, it might also be considered a form of esteem support. The opportunity to provide nurturance is particularly relevant for person-pet relationships. In certain circumstances, pets may provide instrumental support, (e.g., service animals such as guide dogs and assistance dogs). Network support may be provided or enhanced by pets through their role as social catalysts enhancing person-person contacts (McNicholas, Collis, Morley, & Lane, 1993; Messent, 1983). If this enhanced their owners’ network of human relationships and these human relationships conveyed health advantages for the owners, this would be a case of an indirect causal effect of pets on health (see Chapter 11), whereas other types of support from pets are more likely to produce direct effects.

It is established that sources and effectiveness of support may become discernible only at times of stress. If support is derived from pets, the benefits would be expected to become apparent only during stress, when such support may relieve stress or act as a buffer against adverse health effects (Cohen & Wills, 1985). It is therefore predictable that investigations of target populations undergoing some adverse life event should be most likely to detect effects of pet ownership. If pets provide support, their owners would be expected to experience fewer or less extreme reactions to the stressful event. Conversely, the support model predicts that advantages to health and well-being should be less likely to be detected in studies of subject populations not specifically experiencing stressful circumstances, especially studies of a short duration, which are unlikely to pick up many periods of stress. If companionship from pets is important, however, Rook’s (1990) theory would predict enhanced well-being even in pet owners who were not experiencing stressful events. To distinguish the consequences of different support processes and companionship processes, it is important to monitor the types of experiences and perceptions that owners have of their pets.

There are a number of hypotheses on how pets may function as providers of social support (McNicholas & Collis, 1995). Pets are perceived as always available, predictable in their responses, and nonjudgmental. They provide a sense of esteem in that pets are perceived as both caring about their owners, and needing them, regardless of the owner’s status as perceived by self or others. Pets can also give tactile comfort and recreational distraction from worries. Pets are less subject to provider burnout. Thus,
they may be a consistent source of support regardless of fluctuations in human support. No social skills are required to elicit attention from pets, whereas in human-human relationships, there is the issue of assessing how best to mobilize support. Because social competence in negotiating or regulating social support is less of an issue with pets, there may be a reduced likelihood of mismatches between required and received support or perceived shortfalls in received support. Pets may provide a refuge from the strains of human interactions, allowing a freedom from pretenses or barriers that may necessarily be erected between giver and recipient of support to mutually protect the relationship.

Thus, there is a compelling story to be told about how effective pets might be as sources of support. Unfortunately, the empirical evidence to support this story is lacking. To examine the hypothesis that pets convey advantages to human health and well-being via the provision of support, there needs to be a careful evaluation of how these components of support, separately or in combination, predict individual differences in health, well-being, or resilience in the face of adversity.

Social Support as an Explanation for Physiological Effects

The basic paradigm in this research is to measure blood pressure, heart rate, and similar variables to establish baseline levels and then to take similar measurements during the performance of a task known to produce stresslike changes in these physiological indexes. Such a procedure is taken as a laboratory model for responses to relatively minor stressors in everyday life. Factors that influence responses to stress in the laboratory might be expected to influence responses in real life—hence the ability to predict susceptibility to stress-related disease such as cardiovascular disease, arising from the cumulative effects of responses to everyday stressors (Steptoe, 1990). In the companion animal literature, the focus is on the role of an animal, usually a dog, in ameliorating cardiovascular responses to stress (Friedmann, 1995). An explicit link is often made with studies reporting that pet ownership is associated with advantages in cardiovascular health (Anderson et al., 1992; Friedmann et al., 1980). The paradigm is logical, however, only where it is possible to demonstrate the effects of a companion animal on the changes in physiological indexes between baseline and stress phases or, equivalently, a statistical interaction between condition (animal present or absent) and phase (baseline versus task). In some studies, statistical interactions are noticeable by their absence, and only main effects of condition are available for interpretation (e.g., Friedmann, Katcher, Thomas, Lynch, & Messent, 1983). This may be a consequence of baseline periods being too brief to provide stable estimates of true baseline levels of cardiovascular activity (Shapiro et al., 1996), or it may that the stress-reduction effect of the animal is either absent or too weak to be detected.

When the presence of a companion animal is shown to influence cardiovascular response to stress, what sort of processes might be operating? Is this an instance of social support in action? Are there alternative explanations? First, the animal might be acting as a social catalyst in smoothing the social encounter between the participants and experimenter, reducing the level of stress in the human-human interaction. This would be an indirect causal effect. Second, it has been repeatedly suggested that the mere presence of an animal could reduce stress responses as a direct effect (Friedmann, 1995). This possibility could be accommodated within the arousal theory of social facilitation (Allen, Blascovich, Tomaka, & Kelsey, 1991), but it is not particularly helpful to characterize such an effect as involving the provision of support.

Third, the key factor might be interaction with the animal. Stress-reducing effects of minimal interaction with a human friend in laboratory settings have been described as social support (Kamarck, Manuck, & Jennings, 1990), but there are a number of reasons why this does not seem to be the same type of process that is labeled social support in the health psychology and epidemiology literature. Social support is believed to be effective in a broader range of contexts than the prevention of cardiovascular disease. The time scale of effects in this experimental paradigm seems quite different from the classic interpretation of social support. The more powerful aspects of support, especially emotional and esteem support, are thought to depend on a supportive relationship based on a degree of mutual understanding, rather than just supportive communication in the current, stressful experience. At best, effects of positive communication from confederates previously unknown to participants (Sheffield & Carroll, 1996) need to be clearly distinguished from effects arising from expectations about the attitude of the others toward oneself based on a relationship established by a history of interaction. Success in unraveling these complex issues will require an analysis of cognitive representations of perceived
support. The study by Allen et al. (1991) implies that the presence of friends might increase stress responses in the immediate context of a laboratory stress task because they are perceived as evaluative. This is not incompatible, however, with a view of supportive relationships that suggests that during a longer time, support from friends should be particularly effective in ameliorating the effects of stress. Allen et al. interpreted the role of dogs in short-term laboratory studies as nonevaluative friends, but it is not clear how they were perceived by the participants.

References


Loneliness, Stress and Human-Animal Attachment Among Older Adults

Abstract

The purpose of this descriptive study was to examine human-animal bonding in quality of life of older adults. More specifically, the relationships among pet attachment and loneliness, loneliness and stress were evaluated in animal owners (N = 100) who were community programs for older adults in the United States. Measures included the Human-Animal Bonding Inventory, a Revised Philadelphia Geriatric Center Morale Scale factors for loneliness and stress, and a correlation matrix. The correlation between loneliness and stress was low (r = .30, p = .001); thus, loneliness increased stress. The correlation between attachment and loneliness (r = .30, p = .001) and between attachment and stress (r = .30, p = .001) was high. Furthermore, the variance explained by loneliness and stress increased, attachment increased the variance explained by loneliness and stress. In addition, dog ownership, stress, and the animal's age explained 31% of the variance in human-animal attachment. The correlation between loneliness and stress was higher for participants without a human-animal attachment. Animal ownership was a significant predictor of the variance in loneliness.

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