An attachment perspective on human–pet relationships: Conceptualization and assessment of pet attachment orientations

Sigal Zilcha-Mano [a,*], Mario Mikulincer [a], Phillip R. Shaver [b]

[a] School of Psychology, Interdisciplinary Center (IDC), Herzliya, Israel
[b] Department of Psychology, University of California, Davis, USA

ARTICLE INFO

ABSTRACT

In a series of studies we used attachment theory as a framework to examine human–pet relationships. We proposed that, as in interpersonal relationships, people differ in their degree of anxious or avoidant attachment to their pets, and that these individual differences influence pet-related cognitions, emotions, and behavior. We constructed a self-report scale, the Pet Attachment Questionnaire (PAQ), and examined its factorial structure, associations with attachment patterns in human relationships (Studies 1–2), relation to explicit and implicit expectations concerning a pet (3–4), and reactions to the loss of a pet (5). We found that individual differences in pet attachment do occur in the domains of attachment anxiety and avoidance, and these differences contribute uniquely to the prediction of expectations about the pet and emotional reactions to its death.

1. Introduction

Pets have long been considered to be some of human beings' best friends. However, as in other relationships that people form with humans and religious figures (e.g., God), human–pet relationships vary widely in closeness, warmth, commitment, emotional involvement, conflict, and other features. In the studies presented here, we used adult attachment theory (Bowlby, 1982, 1988; Hazan & Shaver, 1987; Mikulincer & Shaver, 2003, 2007) as a framework for examining individual differences in human–pet relationships. Specifically, we proposed that (a) people, as in close interpersonal relationships, differ in their attachments to pets along the dimensions of attachment anxiety and avoidance, and (b) these individual differences reflect internal working models of relationships with pets that are associated with pet-related expectations, emotions, and behavior. To explore this possibility, we constructed a self-report scale, the Pet Attachment Questionnaire (PAQ), and examined its factorial structure and its associations with mental representations of pets and reactions to the loss of a pet.

2. An attachment perspective on human–pet relationships

Originally, the concept of attachment was used to conceptualize child–parent relationships (e.g., Ainsworth, Blehar, Waters, & Wall, 1978). In such relationships the child occupies the role of needy, dependent relationship partner, and parents occupy the role of what Bowlby (1982) called "stronger and wiser" caregivers, or attachment figures. Bowlby (1988) claimed, however, that attachment theory and the concept of attachment are relevant to social cognitions and relational behavior across the life span. In fact, following Bowlby's (1982) lead, other scholars (e.g., Ainsworth, 1991; Hazan & Shaver, 1987; Hazan & Zeifman, 1994; Mikulincer & Shaver, 2007) argued that attachment theory can be applied to adolescent and adult relationships that fulfill four criteria: (a) proximity maintenance – preferring to be near an attachment figure, especially in times of stress or need; (b) using the attachment figure as a safe haven who relieves distress and provides comfort, encouragement, and support; (c) using the attachment figure as a secure base who increases one's sense of security, which in turn sustains exploration, risk taking, and self-development; and (d) experiencing separation distress when the attachment figure is temporarily or permanently unavailable. Research has shown that many close friendships and romantic relationships during late adolescence and adulthood satisfy these four criteria (e.g., Doherty & Feeney, 2004; Feeney, 2004; Fraley & Davis, 1997).

Although romantic partners often become adults' principal attachment figures (Hazan & Zeifman, 1994), there may also be context-specific attachment figures – actual or potential sources of comfort and support in specific milieus, such as therapists in therapeutic settings (Mallinckrodt, Gantt, & Coble, 1995) and leaders in organizational settings (Davidovitz, Mikulincer, Shaver, Izsak, & Popper, 2007). Moreover, groups, institutions, and symbolic personages (e.g., God) can be treated as safe havens and

* Corresponding author. Address: The School of Psychology, Interdisciplinary Center (IDC) Herzliya, P.O. Box 167, Herzliya 46150, Israel. Fax: +972 9 960284.
   E-mail address: zsigal@biu.013.net.il (S. Zilcha-Mano).

secure bases (Granqvist, Mikulincer, & Shaver, 2010; Kirkpatrick & Shaver, 1992; Rom & Mikulincer, 2003).

The present studies are based on the premise that pets can serve as attachment figures or, stated somewhat differently, that attachment bonds can be formed with pets. Levinson (1969) claimed that a pet is a natural object of attachment, being readily available, active and mobile, and affectionate. Having a relationship with a living creature other than another person allows for a wide range of behaviors and interactions (Karen, 1994).

A review of the literature on human–pet bonds indicates that they often meet the four prerequisites for an attachment relationship – proximity seeking, safe haven, secure base, and separation distress. Research, as well as informal observations and personal experiences, indicates that pet owners feel close to their pets and seek and enjoy this closeness (e.g., Enders-Slegers, 2000; Hall et al., 2004; Kurdek, 2008; Prato-Previde, Fallani, & Valsecchi, 2006). Moreover, they view pets as safe havens, providing their owners with affection, support, comfort, and relief in times of need (e.g., Allen, Balscovich, & Mendes, 2002; Geisler, 2004; Kurdek, 2008; Odendaal & Meintjes, 2003). Losing a pet is distressing and can cause a person to enter a period of grief and mourning (e.g., Hunt, Al-Awadi, & Johnson, 2008; Lagoni, Butler, & Hetts, 1994; Wrobel & Dye, 2003). Pets also serve as a secure base from which their owners can confidently pursue activities, take risks, and explore the world (e.g., Cusack, 1988; McNicholas & Collis, 1995).

Of course, an attachment figure is usually another human being who, unlike a pet, can provide advice and assistance and talk about worries and anxieties. In addition, an attachment figure is usually a stronger and wiser other and not a pet, which, like a child, needs its owner's attention and care if it is to survive. Moreover, human–pet relationships, unlike romantic relationships, have no sexual component. However, several characteristics of human–pet bonds lead people to use pets as a source of love, acceptance, and emotional support, which can help to restore emotional equanimity during times of need. Pet owners tend to feel that their pet loves and accepts them unconditionally (e.g., Levinson, 1969), and that their relationship with the pet is characterized by stability, consistency, tenderness, warmth, loyalty, authenticity, and lack of judgment or competition (e.g., Hirschman, 1994; Levinson, 1969; McNicholas & Collis, 1995). These characteristics, especially the feeling that one is unconditionally accepted and loved by a pet, may predispose pet owners to approach a pet for comfort and reassurance in times of need. This is likely to lead to the formation of an attachment to a particular pet.

3. Individual differences in human–pet relations: attachment orientations

In conceptualizing human–pet relationships as attachments, we focus on individual differences in what attachment researchers call "attachment style" or "attachment orientation" – the systematic pattern of relational expectations, emotions, and behaviors that results from a particular attachment history (Fraley & Shaver, 2000). Research, beginning with Ainsworth et al. (1978) and continuing through studies conducted by personality and social psychologists (reviewed by Mikulincer & Shaver, 2007), indicates that attachment orientations can be measured along two orthogonal dimensions, attachment-related *anxiety* and *avoidance* (Brennan, Clark, & Shaver, 1998).

A person's position on the attachment anxiety dimension indicates the degree to which he or she worries that a partner will not be available and supportive in times of need and strives to maximize proximity to such a partner. A person's position on the avoidance dimension indicates the extent to which he or she distrusts relationship partners' goodwill and strives to be self-reliant.

Scores on the two dimensions can be obtained from reliable and valid self-report scales (e.g., Brennan et al., 1998), and the scores are associated in theoretically expected ways with relationship quality, affect regulation strategies, and mental health (see Mikulincer & Shaver, 2007, for a review).

Mikulincer and Shaver (2003, 2007) proposed that individual differences in attachment anxiety and avoidance reflect both a person's sense of attachment security and the ways in which he or she deals with distress. People who score low on both dimensions possess mental representations of comforting attachment figures, which create a continuing sense of attachment security, positive self-regard, and reliance on constructive strategies of affect regulation. Those who score high on either attachment anxiety or avoidance possess internalized representations of frustrating or unavailable attachment figures and hence suffer from a continuing sense of attachment insecurity. These insecure individuals rely on what Cassidy and Kobak (1988) and Cassidy and Berlin (1994), following Main (1990), called *secondary attachment strategies* (in contrast with the primary strategy of seeking proximity to an attachment figure in times of need). These strategies involve either hyperactivating or deactivating the attachment system in an attempt to regulate distress. High scores on the attachment anxiety dimension are associated with hyperactivating strategies: energetic attempts to attain greater proximity, support, and love, combined with a lack of confidence that it will be provided. High scores on avoidant attachment are associated with deactivating strategies – inhibition of proximity-seeking tendencies, denial of attachment needs, maintenance of emotional and cognitive distance from others, and compulsive reliance on oneself as the only reliable source of protection.

According to attachment theory, differences in attachment orientations are evident in a person's mental representations of others (Bowlby, 1973; Shaver & Hazan, 1993; Shaver & Mikulincer, 2002), which Bowlby called *internal working models of others*. Numerous studies have shown that attachment anxiety and avoidance are related to negative views of human nature (e.g., Collins & Read, 1990; Hazan & Shaver, 1987). Moreover, people who score relatively high on measures of attachment anxiety and avoidance tend to describe relationship partners in less positive terms than used by secure individuals (e.g., Feeney & Noller, 1991; Levy, Blatt, & Shaver, 1998), to perceive partners as less supportive (e.g., Davis, Morris, & Kraus, 1998; Ognibene & Collins, 1998), and to feel less trusting (e.g., Collins & Read, 1990; Hazan & Shaver, 1987). In addition, people who score high on attachment anxiety or avoidance have more negative expectations about their partners' behavior (e.g., Baldwin, Fehr, Keedian, Seidel, & Thompson, 1993; Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996) and tend to explain partners' negative behavior more negatively than secure individuals do (e.g., Collins, 1996).

Attachment theory conceptualizes internal working models as hierarchically arranged (Sibley & Overall, 2008), running from, at bottom, episodic memories of interactions with particular relationship partners, through representations of domains of relationships (e.g., child–parent, romantic, friendship), to generic representations of attachment relationships (e.g., Collins & Read, 1994; Shaver, Collins, & Clark, 1996). Given this conceptualization, researchers (e.g., Klohnen, Weller, Luo, & Choe, 2005; La Guardia, Ryan, Couchman, & Deci, 2000; Pierce & Lydon, 2001) have studied individual differences in attachment anxiety and avoidance at the global or general level (across different relationships), within specific relational domains (such as relations with friends or relationships with romantic partners), and within a specific relationship (such as with mother or with one's current mate). These studies indicate that measures of general and relationship-specific attachment orientations are correlated but not identical. Moreover, research indicates that (a) people can possess multiple and even

incongruent within-relationship attachment orientations in different relationships (e.g., Baldwin et al., 1996), and (b) actual or imagined encounters with supportive or non-supportive others can activate congruent attachment orientations (e.g., Mikulincer, Hirschberger, Nachmias, & Gillath, 2001), even if they are incongruent with a person's general attachment orientation.

In a factor-analytic study, Overall, Fletcher, and Friesen (2003) provided evidence concerning the cognitive organization of attachment orientations. They asked people to complete self-report measures of attachment for three relationships within each of three domains – family, friendships, and romantic relationships. They then examined whether these measures were organized within (1) a single, global representation summarizing attachments across relationships and domains; (2) three independent representations for the domains of family, friendship, and romantic relationships; or (3) a hierarchy of specific, domain-related, and global representations. In confirmatory factor analyses, the hierarchical model fit the data best, indicating that ratings of attachment orientations for specific relationships are nested within, or organized under, relationship-domain representations, which in turn are nested within, or organized under, a global attachment orientation (see also Sibley & Overall, 2008).

4. The current study

Following this line of reasoning, we focus here on people's attachment orientations in the domain of human–pet relationships, realizing that these orientations are likely to be associated with attachment orientations in other relationship domains and across all domains, but will nevertheless be somewhat distinct. Our goals for the studies reported here were (a) to assess specific attachment orientations within the domain of human–pet relationships (*pet attachment orientations*) and (b) to examine whether these orientations predict individual differences in cognitions, emotions, and behaviors within human–pet relationships beyond the contributions of global attachment orientations.

Until now, most self-report measures of individual differences in attachment to a pet have been atheoretical, and most have focused on the strength of the attachment bond rather than the anxiety or avoidance associated with it (see Crawford, Worsham, & Swinehart, 2006, for a review of such scales). For example, one of the most frequently used scales – the Lexington Attachment to Pets Scale (Johnson, Garrity, & Stallones, 1992) – assesses the strength of a person's attachment to his or her pet without asking about the quality of this attachment. It is possible, however, that two people could be equally strongly attached to their pets but with one feeling very secure within the relationship and the other feeling anxious or distressed about the pet's love, loyalty, and availability in times of need. We wanted to develop a more theoretically grounded measure – one that could be compared directly with measures designed to study adolescent and adult attachments in human relationships. Such a measure should assess a person's location along the two dimensions of insecurity: attachment-related anxiety and attachment-related avoidance.

Human–pet relations provide a unique platform to examine the trait-like nature of attachment orientations. In human–human relationships, a person's attachment orientation within a specific relationship is jointly determined by the actor's attachment-related expectations, the partner's attachment-related expectations, and the quality of their dyadic interaction (Mikulincer & Shaver, 2007). Therefore, it is difficult to differentiate between the personality and relational components of these orientations. In human–pet relationships, however, this task may be easier because pets are more constant in their behavior compared to humans and are more likely to express non-judgmental,

unconditional love and acceptance toward their owners (e.g., Hirschman, 1994; Levinson, 1969). Therefore, attachment orientations toward a pet may, to a greater extent, be a function of the actor's personality and less a function of partner or interaction variables. This means that the study of individual differences in attachment to a pet may be less confounded by the partner's behavior and therefore an important source of information about the trait-like nature of attachment orientations.

We hypothesized that pet attachment orientations would have a structure similar to what has been found in human–human relationships. That is, they would be structured in terms of anxiety and avoidance dimensions (Studies 1 and 2). We also hypothesized that pet attachment orientations would be associated with global attachment orientations in human close relationships, but that the correlations between the homologous scales would be only moderate in strength, with pet attachment orientations being distinguishable from global attachment orientations (Studies 2–5). Finally, we hypothesized that pet attachment orientations would make unique contributions to a person's mental health (Study 2), mental representations of pets (Studies 3 and 4), and grief responses to the loss of a pet (Study 5) – beyond the explanatory power of a person's attachment orientation in human relationships.

5. Study 1

In Study 1 we sought to create a reliable and valid self-report scale to measure attachment anxiety and avoidance in relationships with pets (the Pet Attachment Questionnaire, PAQ). For this purpose, we considered items from scales designed to measure attachment to pets and from scales designed to measure attachment orientations in interpersonal relationships. In addition, new items were added following semi-structured interviews with a sample of pet owners. We hypothesized that the PAQ items would be organized by two orthogonal factors, which would correspond conceptually to the two dimensions of attachment anxiety and avoidance found in studies of interpersonal relationships.

5.1. Method

5.1.1. Participants

Participants in Study 1 were 302 Israeli pet owners (189 women and 111 men ranging in age from 13 to 68, *M* = 27.8, *SD* = 11.5). Their mean years of education was 13.43 (*SD* = 2.76). The participants were recruited in parks, animal food and equipment stores, universities, and malls in the central area of Israel. Seventy-eight percent of the participants were current pet owners and completed the scales while referring to their present pet. The remaining participants (22%) were past pet owners and completed the scales while referring to the past pet. No significant differences were found in any of the study variables between present and past pet owners. Most participants were dog owners (73.7%) or cat owners (17.3%). They all volunteered to participate in the study without a monetary reward.

5.1.2. Materials and procedure

Items for the PAQ were obtained from three sources. First, we borrowed items from self-report scales tapping attachment orientations in interpersonal relationships (e.g., the Experiences in Close Relationships scale, or ECR; Brennan et al., 1998; the Adult Attachment Scale, or AAS; Collins & Read, 1990). We chose items that seemed relevant to human–pet relationships and could be adapted to study attachment to pets (e.g., "If I can't get my pet to show interest in me, I get upset or angry," "I am nervous when my pet gets too close to me"). Second, we borrowed items from scales

measuring human–pet relationships (e.g., the Comfort from Companion Animal Scale by Zasloff, 1996; the Lexington Attachment to Pet Scale by Johnson et al., 1992). We chose items related to discomfort with closeness to and dependence on a pet (e.g., "My pet and I have a very close relationship," a reverse-keyed item) or worries about being unloved or rejected by a pet (e.g., "My pet always makes me feel loved," another reverse-keyed item). Third, we conducted semi-structured interviews with 33 pet owners who were asked to describe their relationships with their pets. The tape-recorded interviews were transcribed, and statements indicating anxiety or avoidance were transformed into scale items (e.g., "She is so precious to me; I don't know what I would do without her").

The item-generation process resulted in a pool of 50 items (28 from interpersonal attachment scales, five from human–pet relationship scales, and 17 from the semi-structured interviews). We asked 10 pet owners (not members of the Study 1 sample) to rate the relevance of each item to human–pet relationships, and some minor wording changes were introduced based on their ratings and comments. Half of the 50 items were intended to assess anxious attachment to a pet (e.g., "I'm often worried about what I'll do if something bad happens to my pet"), and the other half were intended to assess avoidant attachment to a pet (e.g., "I try to avoid getting too close to my pet").

We then asked the participants in Study 1 to read each of the 50 items, to think about their relationship with a particular present or past pet, and to rate the extent to which each item described their feelings and thoughts in this relationship. Ratings were made on a seven-point scale ranging from 1 (*not at all*) to 7 (*very much*). Participants who had more than one pet were asked to choose one pet and answer all of the items with regard to that particular pet.

5.2. Results and discussion

A series of exploratory principal components analyses were conducted to identify items that were the best indicators of the two attachment insecurity dimensions. We chose 26-items that had a high loading on one factor and a low loading on the other factor (13 for each factor), and subjected them to another factor analysis with varimax rotation. This analysis yielded two factors with eigenvalues greater than 1.0, which explained 41% of the item variance and corresponded to the two theoretical dimensions of attachment anxiety and avoidance (see Table 1 for factor loadings, percent of explained variance, and Cronbach alphas). We computed mean scores on each factor-based scale (with the items receiving equal weights, not factor weights). As intended, based on previous research on human attachment relationships, the two scores were not significantly correlated, $r(298) = .10$, indicating that attachment anxiety and avoidance in human–pet relationships are orthogonal.

There were no significant associations between pet attachment anxiety and avoidance, on the one hand, and participant age, gender, years of education, past versus current pet ownership, and duration of pet ownership, on the other. A significant difference in avoidant attachment was found between cat owners and dog owners, $F(1, 271) = 5.7$, $p < .01$, $eta^2 = .09$, with cat owners reporting more avoidant attachments ($M = 2.60$, $SD = 1.02$) than dog owners ($M = 2.27$, $SD = 0.79$). These findings are consistent with known species-typical differences in social behavior, with cats being more emotionally distant from their owners than dogs (e.g., Gosling & Bonnenburg, 1998; Mikloski, Pongracz, Lakatos, Topal, & Csanyi, 2005). According to Hart (2000), "Cats are known to behave more independently of human expectations than dogs, basically 'doing their own thing', whereas dogs may be highly tuned into the wishes of their human companions" (p. 93; see also Gosling, Sandy, & Potter, 2010). Hence, our findings may say something about both certain kinds of animals and their owners. First, people with an avoidant attachment orientation toward pets may be more likely to own a cat, because it fits with their preference for autonomy and lack of interdependence. Second, a cat's self-reliance and lack of interdependence may contribute to the formation of a more avoidant attachment to it. Further research is needed to examine in greater depth this association between pet attachment orientations and species-typical differences in social behavior.[1]

To evaluate the temporal stability of the PAQ scores, we recruited a new sample of 50 current pet owners, different from those who participated in Study 1, and asked them to complete the PAQ twice: at the beginning of the study and 6 months later. At both time points, Cronbach alphas were high for attachment anxiety and avoidance in human–pet relationships (ranging from .86 to .89), and the two scales were not significantly correlated, $rs < .06$. Pet attachment anxiety had a test–retest reliability coefficient of .75, and pet avoidant attachment had a test–retest reliability coefficient of .80. The new scales were therefore judged to have adequate internal consistency and test–retest reliability over a period of 6 months. In subsequent studies, we examined the convergent, discriminant, and construct validity of the PAQ scales.

6. Study 2

In Study 2 we examined associations between PAQ scores and attachment orientations in close human relationships. Based on previous findings showing that attachment orientations can be conceptualized in terms of a hierarchical network (e.g., Overall et al., 2003), we predicted that PAQ scores would be moderately associated with global attachment orientations in close relationships. However, based on studies assessing attachment to God (e.g., Kirkpatrick & Shaver, 1990, 1992), the association between pet attachment orientations and their analogs in human relationships was expected to take one of two forms. First, it might support a "matching" hypothesis, according to which attachment anxiety or avoidance in close human relationships is associated with attachment anxiety or avoidance toward pets. Second, it could support a "compensation" hypothesis, according to which a pet might be expected to satisfy an unmet need for security in human relationships. If the latter hypothesis is true, there should be an inverse correlation between PAQ scores and attachment insecurities in close relationships. We explored these two possibilities in Study 2.

We also examined associations between PAQ scores, personality traits, and measures of mental health. Previous studies have shown that attachment orientations in close relationships share some variance with McCrae and Costa's (1990) "big five" personality trait factors. In particular, attachment anxiety correlates with neuroticism, and avoidant attachment is inversely correlated with extraversion and agreeableness (e.g., Noftle & Shaver, 2006). We therefore predicted that PAQ scores would be associated in the same way with these personality traits. Previous studies have also found that attachment anxiety in close relationships is related to emotional problems (see Mikulincer & Shaver, 2007, for a review). Consequently, we expected similar emotional problems among people scoring relatively high on pet attachment anxiety. Moreover, we predicted that the PAQ anxiety score would be uniquely associated with poorer mental health beyond the latter's associations with global attachment anxiety and other personality traits (e.g., neuroticism).

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[1] No significant moderation effect was found for pet type (dog versus cat) in the associations reported in Studies 2–5.

Table 1
Factor analysis of PAQ items.

	Factor loadings	
	Factor 1: Avoidance	Factor 2: Anxiety
1. Being close to my pet is pleasant for me (reverse-scored)	**.60**	−.17
2. I'm often worried about what I'll do if something bad happens to my pet	.20	**.42**
3. I prefer not to be too close to my pet	**.76**	−.07
4. Sometimes I feel that I force my pet to show more commitment and desire to be close to me	−.07	**.55**
5. I prefer to keep some distance from my pet	**.73**	−.01
6. If I can't get my pet to show interest in me, I get upset or angry	.20	**.62**
7. Often my pet is a nuisance to me	**.65**	.12
8. Signs of affection from my pet bolster my self-worth	.26	**.61**
9. I feel distant from my pet	**.67**	.03
10. I often feel that my pet doesn't allow me to get as close as I would like	−.08	**.52**
11. I'm not very attached to my pet	**.62**	.15
12. I get angry when my pet doesn't want to be close to me as much as I would like it to	.11	**.64**
13. If necessary, I would be able to give away my pet without any difficulties	**.64**	−.02
14. I get frustrated when my pet is not around as much as I would like it to be	−.08	**.61**
15. I have no problem parting with my pet for a long duration	**.59**	.18
16. I need shows of affection from my pet to feel there is someone who accepts me as I am	−.07	**.62**
17. I get uncomfortable when my pet wants to be close to me	**.51**	.10
18. I feel frustrated if my pet doesn't seem to be available for me when I need it	.07	**.73**
19. I get nervous when my pet gets too close to me	**.58**	.15
20. Without acts of affection from my pet I feel worthless	.05	**.64**
21. I want to get close to my pet, but I keep pulling away	**.52**	−.04
22. I am worried about being left alone without my pet	.09	**.56**
23. I try to avoid getting too close to my pet	**.73**	.07
24. I need expressions of love from my pet to feel valuable	−.06	**.65**
25. When I'm away from my pet for a long period of time, I hardly think about it	**.66**	.01
26. I need a lot of reassurance from my pet that it loves me	−.08	**.69**
Cronbach alpha	.87	.86
Percent of explained variance in the item scores (%)	23	18

Notes: On-factor loadings are presented in bold font.

In Study 2, we also examined associations between scales tapping strength of attachment to a pet and PAQ scores. We predicted moderate correlations between these scales and the PAQ scales because higher pet attachment anxiety reflects hyper-activation of attachment to a pet, and higher pet avoidant attachment might defensively result in a weaker perceived bond with a pet. However, we also expected PAQ scores to tap unique components of the human–pet relationship beyond its mere strength. In particular, we expected measures of attachment strength not to explain associations between PAQ scores and global attachment orientations in human relationships, personality traits, or measures of mental health. Finally, we examined the extent to which PAQ scores overlap with a measure of social desirability response bias.

6.1. Method

6.1.1. Participants

Participants were 212 Israeli pet owners (146 women and 66 men ranging in age from 16 to 57; $M = 25.4$, $SD = 7.9$), who did not participate in Study 1. Participants' mean years of education was 13.83 ($SD = 2.64$). Participants were recruited to the study in the same manner as in Study 1. All of them had pets at the time of the study (82%) or had owned pets in the past (with 80% of the pets being dogs and 14% being cats). No significant differences were found in all the study variables between present and past pet owners. Participants volunteered to participate in the study without a tangible reward.

6.1.2. Materials and procedure

The 26-item PAQ (see Table 1) was administered to participants together with a randomly ordered battery of other questionnaires. The big-five personality traits were assessed with the Hebrew version of the 44-item Big Five Inventory (BFI; John, Donahue, &

Kentle, 1991). Each item was answered on a five-point scale ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). In the Study 2 sample, Cronbach alphas for the BFI scales ranged from .63 to .83.

Attachment orientations in close human relationships were assessed with the Hebrew version of the Experiences in Close Relationships scale (ECR; Brennan et al., 1998), a 36-item measure of attachment anxiety and avoidance (18 items per dimension). Participants rated the extent to which each item was descriptive of their feelings in close relationships on a seven-point scale ranging from 1 (*not at all*) to 7 (*very much*). Cronbach alphas for these scales were high (.92, .89).

Mental health was assessed with the Hebrew version of the 38-item Mental Health Inventory (MHI; Florian & Drori, 1990; Veit & Ware, 1983). The MHI includes two subscales: psychological well-being and psychological distress. Each item was answered with reference to the last month using a six-point scale ranging from 1 ("*strongly disagree*") to 6 ("*strongly agree*"). Cronbach alphas for the two scales were high (.94, .95).

Participants also completed three scales tapping the strength of their relationships with their pets. First, the Comfort from Companion Animal Scale (CCAS; Zasloff, 1996) consisted of 11 items that participants rated on a four-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). The alpha for this scale was .94. Second, the Lexington Attachment to Pet Scale (LAPS; Johnson et al., 1992) consisted of 23 items, each of which was rated on a four-point scale ranging from 0 (*strongly disagree*) to 3 (*strongly agree*). The alpha for this scale was .95. Third, the Companion Animal Bonding Scale (CABS; Poresky, Hendrix, Mosier, & Samuelson, 1987) consisted of eight items that were rated on a five-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The alpha was .84.

Finally, participants completed the Hebrew version of the 31-item Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1964), which uses a simple true–false answer format.

The alpha was .83. Higher scores indicate a stronger tendency to give socially desirable answers.

6.2. Results and discussion

6.2.1. Confirmatory factor analysis

We submitted the 26-item PAQ to a confirmatory factor analysis (CFA) based on single items, using the Linear Structural Relationships (LISREL) VII program (Joreskog & Sorbom, 1981). The hypothesized two-factor model fit the data well: CFI = .93, NNFI = .92, RMSEA = .048, with a nonsignificant chi-square goodness-of-fit test (χ^2 = 11.24, df = 298), implying that the 26 PAQ items were well organized by the anxiety and avoidance factors. Alphas were high for the pet attachment anxiety items (.91) and the pet avoidant attachment items (.89), and the two dimensions were not significantly correlated, $r(210)$ = .09.

6.2.2. Pet attachment and interpersonal attachment

Pearson correlations revealed that the PAQ anxiety score was moderately and positively associated with the ECR anxiety and avoidance scores (see Table 2). In addition, the PAQ avoidance score was positively associated with the ECR anxiety score but not with the ECR avoidance score (see Table 2). These findings fit a "matching" hypothesis better than a compensation hypothesis, because attachment insecurities in interpersonal relationships were positively associated with insecurities in human–pet relationships. Still, the moderate size of the correlations and the fact that pet and human avoidance were not significantly correlated suggest that attachment insecurity in the two kinds of relationships is not the same.

6.2.3. Pet attachment, personality traits, and mental health

As can be seen in Table 2, we found moderate correlations between PAQ scores and some of the big five traits. As expected, neuroticism was positively associated with pet attachment anxiety, whereas extraversion was inversely associated with pet avoidant attachment. Multiple regression analyses examining the contributions of the big five traits to PAQ scores revealed significant unique contributions of neuroticism to pet attachment anxiety, β = .16, p < .05, and extraversion to pet avoidant attachment, β = −.14, p < .05.

Also as predicted, pet attachment anxiety was inversely associated with psychological well-being and positively associated with psychological distress (see Table 2). Partial correlations revealed that these associations remained significant even after controlling

for either the ECR scores or the big-five personality traits (rs after the controls, −.34 and .41, ps < .01). That is, the relation between pet attachment anxiety and poor mental health is not explained by global personality traits or attachment insecurities in interpersonal relationships.

6.2.4. The PAQ and other human–pet relationship scales

In line with predictions, all of the scales that measured the strength of human–pet relationships were inversely correlated with the PAQ avoidance score. In addition, most of them were significantly and positively related to the PAQ anxiety score. However, these associations were only moderate in size, and the associations between the PAQ scores and the ECR attachment-insecurity scores, personality traits, and mental health scores (see Table 2) remained essentially the same when partial correlations were calculated controlling for each of the human–pet bond strength measures. This set of findings implies that attachment orientation and attachment strength are not the same.

6.2.5. PAQ and social desirability

Both PAQ scores were significantly and inversely correlated with social desirability (see Table 2). Although this finding may seem to imply that PAQ scores are subject to social desirability bias, the correlations are weak to moderate in size. In addition, partial correlations revealed that, even after controlling for social desirability, the associations reported in Table 2 between PAQ scores, on the one hand, and ECR avoidance and anxiety scores (rs > .17, ps < .05), mental health (rs of −.30 and .38, ps < .01), and personality traits (rs of −.13 and .15, ps < .05), on the other hand, were still significant.

6.2.6. Summary

The findings support the convergent and discriminant validity of the PAQ. First, the results distinguish between the "matching" and "compensation" hypotheses concerning relations between a person's different attachment relationships, clearly supporting the matching hypotheses rather than the compensation hypothesis. That is, a person's internal working models seem to be manifested in both human–human and human–pet relationships, although the matching is far from perfect. Anxiety in close human relationships is related not just to anxiety in pet relationships but also to avoidance, a finding we will consider in Section 10. Second, although some sensible associations were found between PAQ scores and neuroticism, extraversion, and social desirability, variations in pet attachment anxiety and avoidance are not merely reflections of these personality traits. Third, insecure attachment patterns in human–pet relationships were associated with poor mental health, and this association was not explained by personality traits, the strength of the human–pet relationship, social desirability, or even attachment insecurities in human relationships. That is, attachment insecurity in human–pet relationships is uniquely associated with poor mental health beyond its association with other well-known correlates of psychological distress, such as neuroticism and attachment anxiety in human relationships. Finally, the PAQ tapped unique aspects of the human–pet bond (e.g., worries about and preoccupation with the pet, emotional distance from the pet) that were not captured by measures of the strength of the human–pet bond.

Overall, findings from multiple regressions predicting PAQ scores from all the key variables assessed in Study 2 (i.e., ECR scores, personality traits, mental health, social desirability, and strength of the human–pet bond) revealed that the combination of all these variables explained only 21.6% of the variance of the PAQ avoidance scores and 33.9% of the variance of the PAQ anxiety score. That is, PAQ scores somewhat overlap with the existing

Table 2
Pearson correlations between PAQ scores and Study 2 variables.

Measure		PAQ anxiety	PAQ avoidance
BFI	Extroversion	−0.03	−0.14[*]
	Pleasantness	−0.11	0.08
	Conscientiousness	−0.08	−0.1
	Neuroticism	0.15[*]	0.02
	Openness	−0.04	−0.1
ECR	Avoidance	0.35[***]	0.08
	Anxiety	0.60[***]	0.19[**]
MHI	Well-being	−0.35[***]	−0.10
	Distress	0.44[***]	0.01
Scales tapping strength of relationship with pet	CABS	0.27[***]	−0.33[***]
	LAPS	0.12	−0.57[***]
	CCAS	0.18[**]	−0.48[***]
Social desirability		−0.30[***]	−0.19[**]

[*] p < .05.
[**] p < .01.
[***] p < .001.

relevant variables, but still have a unique portion of the variance that is not redundant with these variables.

7. Study 3

In Study 3 we examined the ability of the PAQ scores to predict working models of a pet (e.g., positive and negative expectations about pet behavior). For this purpose, we constructed a self-report scale examining pet owners' expectations regarding pet behavior in three attachment-relevant domains: dependence, trust, and closeness. The PAQ and the expectancy questionnaire are self-report scales focusing on similar aspects of the human–pet bond (dependence, closeness, trust). However, whereas the PAQ items directly tap pet owner's attitudes, feelings, and action tendencies toward their pet (e.g., "I prefer not to be too close to my pet", "Sometimes I feel that I force my pet to show more commitment and desire to be close to me"), the expectancy scale taps pet owner's expectations of a pet response (positive, negative) when they express wishes for dependence, closeness, and trust. Of course, one can theoretically assume that different patterns of expectations underlie pet owners' attachment anxiety and avoidance. However, this assumption needs to be empirically tested and validated. Indeed, previous studies have shown that people who score high on attachment anxiety or avoidance in close relationships are more likely to report more negative expectations and fewer positive expectations about their partners' behavior (e.g., Baldwin et al., 1993). We therefore predicted that higher scores on the PAQ anxiety and avoidance scales would be associated with more negative and less positive expectations concerning pet behavior. Moreover, we did not expect measures of attachment in close relationships or strength of one's bond with a pet to explain these associations.

7.1. Method

7.1.1. Participants

The sample consisted of 134 Israeli pet owners (93 women and 41 men ranging in age from 18 to 62, $M = 25.97$, $SD = 8.74$) who did not participate in Study 1 or Study 2. Participants were recruited in the same way as in Studies 1 and 2. Most of them owned dogs (70%) or cats (18%). All volunteered to participate in the study without a tangible reward.

7.1.2. Material and procedure

Participants received instructions identical to those of Study 2 and completed a randomly ordered battery of questionnaires: (a) attachment orientation in the human–pet relationship, assessed with the PAQ (with αs of .87 for pet attachment anxiety and .91 for pet avoidant attachment, and a nonsignificant correlation between the two scales, $r = .04$); (b) their attachment orientations in human relationships assessed with the ECR scale (for anxiety, $\alpha = .91$; for avoidance, $\alpha = .92$); (c) the strength of their bond with their pet based on the Companion Animal Bonding Scale ($\alpha = .75$) and the Comfort from Companion Animal Scale ($\alpha = .92$); and (d) their expectations of pet behavior using a scale constructed especially for this study.

The expectations questionnaire was constructed based on Baldwin et al.'s (1993) measure of positive and negative expectations concerning a human partner's behaviors in domains of dependence, closeness, and trust. The scales consisted of 18 "if-then" sentences, each presenting a scenario with the pet and ending with a single word naming a particular pet behavior. The scenarios were related to dependence, closeness, and trust (six items per domain). For each domain, three sentences ended with a positive pet behavior and three ended with a negative pet behavior. For example, the

item "If I trust my pet, then my pet will remain" assesses a positive expectation in the trust domain, and the item "If I trust my pet, then my pet will disappoint" assesses a negative expectation in the same domain. Participants read each item and rated the extent to which it described their own pet's behavior. Ratings were made on a seven-point scale ranging from 1 (*never*) to 7 (*always*). Cronbach αs were high for the nine negative expectation items and the nine positive expectation items (.92, .84). We therefore computed two scores for each participant by averaging their answers to positive and negative pet expectation items.

7.2. Results and discussion

PAQ scores were used in two multiple regression analyses, one to predict positive expectations, $R^2 = .13$, $F(2, 131) = 9.70$, $p < .001$, and the other to predict negative expectations, $R^2 = .30$, $F(2, 131) = 28.23$, $p < .001$. The PAQ avoidant attachment score was significantly and inversely related to positive expectations ($\beta = -.36$, $p < .001$): The higher the pet avoidance score, the lower the positive expectations for pet behavior. The PAQ attachment anxiety score was not significantly associated with positive expectations ($\beta = .01$). Both pet anxiety and avoidance were significantly associated with negative expectations ($\beta = .23$, $\beta = .39$, ps < .01): The higher the pet attachment anxiety or avoidance, the higher the negative expectations for pet behavior in attachment-related domains.

Additional regression analyses revealed that the associations reported above remained significant when ECR scores were entered as additional predictors in the regression analyses (the new βs were $-.33$, .40, and .18, ps < .05). The associations also remained significant when the two measures of human–pet bond strength were entered as additional predictors (resulting in βs of $-.23$, .39, and .33, ps < .05). Neither the ECR scores nor the indices of human–pet bond strength contributed significantly to the prediction of either positive or negative expectations regarding pet behavior.

Overall, the findings supported our predictions that pet attachment insecurities, as measured by the PAQ, would be associated with more negative and less positive expectations concerning a pet. And these associations were unique to pet attachment insecurities; they were not explained by attachment insecurities in close human relationships or the strength of human–pet relationship. However, the assessment of pet owner expectations using a self-report measure might be challenged based on possible response biases and shared method variance among the various self-report measures. In Study 4, therefore, we used an implicit measure of expectations, a lexical decision task.

8. Study 4

In Study 4, participants completed a lexical decision task (Meyer & Schvaneveldt, 1971), which is a well-known means of exploring a person's implicit working models (e.g., Baldwin et al., 1993). In this task, participants were presented with a string of letters on a computer screen and indicated as quickly as possible whether it was or was not a word. Reaction times (RTs) served as a measure of the accessibility of thoughts related to the target words: The shorter the RT, the greater the accessibility (e.g., Fischler & Bloom, 1985). Paralleling Baldwin et al.'s (1993) study, we used target words that named positive and negative pet behaviors, and these words were located at the ends of pet-relevant or pet-irrelevant sentences. That is, participants read sentences that were either relevant or irrelevant to human–pet relations. The last string of letters in each sentence was a positive pet behavior word, a negative pet behavior word, a neutral word, or a non-word (a

meaningless string of letters). Participants were asked to decide whether the target stimulus was a word or not, and their response time was recorded by the computer administering the task.

We predicted that participants would react faster to negative and positive behavior words when they were placed in a meaningful context (i.e., human–pet relationships), because processing the meaning of the sentence makes related words easier to retrieve from memory. We expected this effect to be stronger when the target word matched participants' expectations about their pet. That is, the higher a participant's pet attachment anxiety or avoidance, the faster he or she would respond to negative pet behavior words placed at the ends of pet-relevant sentences, and the slower he or she would respond to positive pet behavior words placed at the ends of pet-relevant sentences. Finally, we predicted that these associations would not be explained by attachment orientations in human relationships or the strength of the human–pet relationship.

8.1. Method

8.1.1. Participants

Ninety-three Israeli pet owners (61 women and 32 men ranging in age from 18 to 60, $M = 26.9$, $SD = 10.14$) were recruited in the same way as in Studies 1–3. Most of the participants owned dogs (72%) or cats (20.4%) and had done so, on average, for 4.87 years ($SD = 3.53$).

8.1.2. Materials and procedure

Each participant was run individually in a two-part experimental session. Participants first engaged in a lexical decision task, and then, after a 15-min break, they completed a randomly ordered battery of questionnaires.

For the lexical decision task, we created three pet-relevant Hebrew sentences that were taken from the scale described in Study 3. They referred to the domains of trust ("If I trust my pet, then it will…"), dependence ("If I need my pet, then it will…"), and closeness ("If I try to approach my pet, then it will…"). We also created three pet-irrelevant Hebrew sentences that had the same grammatical structure and the same number of Hebrew words as the pet-relevant sentences: "If the taxi drives away, then it will…," "If the new checkered t-shirt is worn, then it will…," "If the old painting is hanging on the wall, then it will…" Immediately after the presentation of a context sentence, there was a short pause, after which one of twelve possible strings of Hebrew letters appeared on the screen. There were three Hebrew words reflecting positive expectations (e.g., "remain"), three reflecting negative expectations (e.g., "disappoint"), three reflecting neutral themes (e.g., "write"), and nine non-word letter sequences created by replacing one letter in one of the Hebrew words (e.g., "qrite" replacing "write"). Participants were asked to decide as quickly as possible whether a letter string was or was not a Hebrew word by pressing one of two possible keys on a computer keyboard. Word length and grammatical structure were the same across all categories.

The lexical decision task consisted of 72 trials, in each of which a sentence (pet-relevant or not pet-irrelevant) ended with a positive expectation word, a negative expectation word, a neutral word, or a non-word. These eight combinations of context sentence-target stimuli were presented nine times, for a total of 72 trials. The trials were randomly ordered for each participant.

The lexical decision task was run on a Pentium IBM-PC programmed with Superlab software. Brightness and contrast were set somewhat low. The context sentences were displayed in pale blue lettering, and target letter strings were displayed in red lettering on a black background in the middle of the monitor. Participants worked at their own pace. They first completed nine

practice trials and then 72 experimental trials. The context sentences and target letter strings in the practice trials were different from those in the experimental trials.

Each trial began with an "X" in the middle of the screen for 500 ms. Then, using a rapid serial presentation technique (Forster, 1970), context sentences were displayed one word at a time on the screen at a rate of 600 ms per word. After a 1000 ms pause, the sentence was followed by one of the target stimuli. Participants were asked to judge as quickly as possible whether the target stimuli was a word or not by pressing "4" on the keyboard number pad if the string was a word or "6" if they thought it was not a word. Following the key-press, the target stimulus disappeared from the screen and the next trial began.

Following a 15-min break, all participants completed the following questionnaires: (a) the PAQ (with αs of .90 for pet attachment anxiety and .92 for pet avoidant attachment; the two scales were once again not significantly correlated, $r = .07$); (b) the ECR scales (with αs of .91 for attachment anxiety and .90 for avoidant attachment); and (c) the Companion Animal Bonding Scale ($\alpha = .76$) and Comfort from Companion Animal Scale ($\alpha = .91$).

8.2. Results and discussion

For each participant, RTs for correct responses were averaged according to type of target stimulus (neutral word, positive expectation word, negative expectation word, non-word) and context sentence (pet-relevant, pet-irrelevant). A two-way within-subjects analysis of variance was conducted, with context sentence and target stimulus as the independent variables and RT as the dependent variable. The analysis revealed a significant interaction, $F(3, 274) = 2.92$, $p < .05$, $eta^2 = .11$. As expected, Simple Main Effects tests for repeated measures revealed that RTs were shorter for negative expectation words and positive expectation words than for neutral words or non-words when the target stimulus was imbedded in a pet-relevant sentence, $F(3, 274) = 6.73$, $p < .01$, $eta^2 = .19$ (see means in Table 3). There were no significant differences in the case of pet-irrelevant sentences $F(3, 274) = 0.72$, $eta^2 = .01$.

To test our prediction that PAQ scores would be associated with predictable patterns of implicit expectations regarding pet behavior, we conducted multiple regression analyses examining the contribution of the two PAQ scores to predicting RTs for positive and negative behavior words in pet-relevant sentences, while controlling for RTs for positive or negative behaviors within pet-irrelevant contexts and RTs for neutral words within pet-relevant contexts. In this way, we controlled for participants' general tendencies to react quickly to a pet-relevant context or to positive or negative words (regardless of context). In line with our predictions, pet avoidant attachment was significantly associated with slower (longer) RTs for positive behavior words in pet-relevant sentences, $\beta = .29$, $p < .01$. Moreover, pet attachment anxiety was significantly

Table 3
Means and SDs (in ms) of RTs by target category and sentence context type.

Sentence context type	Target letter strings			
	Positive expectation	Negative expectation	Neutral word	Non-word
Pet-relevant				
M	841.10	824.72	933.02	957.41
SD	170.25	165.12	166.08	168.70
Pet-irrelevant				
M	839.27	849.37	920.70	934.62
SD	161.52	169.14	164.80	160.71
Total				
M	840.19	837.04	926.86	946.02
SD	165.50	167.15	165.11	164.70

ssociated with faster RTs for negative behavior words in pet-relevant sentences, $\beta = -.26$, $p < .01$. Additional regression analyses predicting RTs for positive and negative words in pet-irrelevant sentences or RTs for neutral words and non-words in both types of sentences yielded no significant effects of PAQ scores. In addition, the significant effects of pet attachment anxiety and avoidance remained significant when controlling for ECR (human attachment) scores (β's of .27 and $-.30$, $ps < .01$) or for the two indices of human–pet bond strength (β's of .30 and $-.26$, $ps < .01$). These analyses also revealed that ECR scores and indices of human–pet bond strength were not significantly related to RTs for positive and negative behavior words imbedded in pet-relevant sentences.

Overall, the findings of Study 4 replicated those of Study 3 and extended them to the realm of implicit, subconscious working models of a pet. As predicted, PAQ scores were associated with more negative and less positive implicit expectations regarding a pet. And once again, these associations were unique to pet attachment insecurities and were not explained by attachment insecurities in human relationships or by the strength of the human–pet bond.

9. Study 5

In Study 5 we examined whether and how individual differences in pet attachment orientations contribute to the process of grieving following the loss of a pet. In the interpersonal realm, previous studies have shown that attachment anxiety and avoidance shape a person's grief responses following the death of a relationship partner (e.g., Fraley & Bonanno, 2004; Stroebe, Schut, & Stroebe, 2005). We wanted to determine whether these associations also occur in the realm of human–pet relationships. For this purpose, we explored associations between PAQ scores and self-reported emotional, cognitive, and behavioral responses to the death of a pet. Based on studies of human losses, we predicted that pet attachment anxiety would be associated with heightened preoccupation with the dead pet, reduced exploratory behavior following the loss, and greater reliance on maladaptive coping strategies. We also predicted that pet avoidant attachment would be associated with greater reliance on distancing and withdrawal strategies for coping with the death of a pet.

9.1. Methods

9.1.1. Participants

The sample consisted of 137 Israeli pet owners who had lost a pet in the previous 5 years ($M = 2.44$ years, $SD = 1.6$). There were 85 women and 52 men with ages ranging from 17 to 71 ($M = 31$, $SD = 9.02$). Participants were recruited in the same way as in Studies 1–4 and volunteered to participate without a tangible reward. The duration of the relationship with the lost pet ranged from 2.4 to 19.5 years ($M = 8.6$, $SD = 5.17$). Participants lost their pets for various reasons: sickness (34.75%), traffic accidents (14.89%), euthanasia (29.79%), or old age (10.64%). Most of them had lost dogs (64.54%) or cats (26.95%).[2]

9.1.2. Materials and procedure

Participants received instructions identical to those of Study 2 and then completed a randomly ordered battery of three questionnaires: (a) the PAQ (the α for pet attachment anxiety was .84; for pet avoidant attachment it was .86); (b) the ECR (the α for attachment anxiety was .90; for avoidant attachment it was .89);

and (c) a new questionnaire assessing responses to the death of a pet.

The new self-report questionnaire was based on a scale that Davis, Shaver, and Vernon (2003) developed to assess reactions to separation from a romantic partner. Items relevant to human–pet relations were created by switching "romantic partner" to "pet" (e.g., the item "I couldn't stop thinking about my partner" was changed to "I couldn't stop thinking about my pet"). Irrelevant items (e.g., concerning sexual passion) were excluded from the new questionnaire, resulting in 52 items. Participants were asked to remember their emotions, thoughts, and behaviors during the first months following their pet's death and to rate the extent to which each item was self-descriptive. Ratings were made on a six-point scale, ranging from 1 (*does not reflect my situation at all*) to 6 (*reflects my situation very much*).

The new questionnaire included the following 13 subscales: (a) non-acceptance of the pet's death (four items, such as "I sometimes find myself looking for my pet while I walk in places we used to go together"), (b) anger and hostility toward the dead pet (three items, such as "I felt angry at my pet for leaving me"), (c) preoccupation with the dead pet (four items, such as "Following the death of my pet, I found it very hard to concentrate on other things because I was always thinking about it"), (d) reduced exploration and curiosity (five items, such as "Following the death of my pet, I felt less challenged and curious about doing new things"), (e) distress (four items, such as "Following the death of my pet I felt distressed"), (f) blaming oneself for the pet's death (four items, such as "I felt guilty about my pet's death"), (g) blaming others for the pet's death (four items, such as "I was angry at other people for not doing more to prevent the death of my pet"), (h) support seeking following the pet's death (four items, such as "I felt that I needed to talk with my friends and family about my dead pet"), (i) social isolation following the pet's death (four items, such as "Following the death of my pet, I preferred to spend more time by myself"), (j) ruminating about the dead pet (four items, such as "I had constant thoughts about my dead pet for more than a month"), (k) maladaptive coping behaviors, such as smoking and substance abuse (four items, such as "Following the death of my pet, I took more sedatives, sleep medication, or antidepressants"), (l) loss of identity and meaning following the pet's death (four items, such as "I felt that a part of me had died following the death of my pet"), and (m) resignation and acceptance of the pet's death (four items, such as "I accepted the fact that the only way my pet would still be part of my life was in my memory"). The Cronbach alphas for the subscales were acceptable (ranging from .70 to .93), so 13 scores were computed for each participant by averaging answers to the appropriate subscale items.

9.2. Results and discussion

A series of multiple regression analyses was conducted to examine the unique contribution of PAQ scores to the prediction of the various reactions to the death of a pet, beyond the contribution of ECR human attachment scores. Standardized regression coefficients are presented in Table 4. The ECR attachment anxiety scores were not significantly related to reactions to a pet's death. The ECR avoidant attachment score was significantly associated only with lower levels of support seeking and higher levels of social isolation, two phenomena having to do with other human beings (see Table 4). In contrast, pet attachment anxiety made a unique contribution to most of the pet-grief subscales. It was associated with less acceptance of the pet's death, greater anger toward the dead pet, greater preoccupation and more worries, reduced exploration, death-related distress, self- and other-blame for the pet's death, social isolation, rumination, maladaptive coping behaviors, and loss of identity and meaning following the pet's

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[2] No significant moderation effect was found for pet ownership length or reasons for pet loss.

Table 4
Pearson correlations examining associations of PAQ and ECR scores with various reactions to a pet's death.

Reactions to pet death: Subscales	PAQ avoidance	PAQ anxiety	ECR avoidance	ECR anxiety
Non-acceptance of the death	−0.30***	0.29***	0.06	0.1
Anger and frustration toward the pet	0.18*	0.34***	0.01	0.06
Preoccupation	−0.51***	0.30***	−0.07	0.06
Reduced exploration	−0.39***	0.29**	−0.01	−0.03
Rumination	−0.40***	0.25**	0.04	0.00
Self-blame	−0.24**	0.21*	−0.02	0.11
Blame others	−0.18*	0.21*	0.13	0.09
Seeking social support	−0.15*	0.11	−0.39***	0.06
Social isolation	−0.29***	0.27**	0.24**	−0.04
Maladaptive coping	−0.02	0.27**	0.15	0.06
Resignation and acceptance	0.15	−0.04	−0.00	−0.08
Loss of identity	−0.30***	0.31***	0.04	0.13
Distress	−0.33***	0.19*	0.03	0.10

* $p < .05$.
** $p < .01$.
*** $p < .001$.

death (see Table 4). In addition, pet avoidant attachment was associated with greater acceptance of the pet's death, slightly greater anger toward the dead pet, less preoccupation and fewer worries, less reduced exploration, less death-related distress, less self- and other-blame for the pet's death, less social isolation, less rumination, and less loss of identity and meaning following the death (see Table 4). The generally opposite directions of the findings for anxious and avoidant pet attachment (in all cases except anger at the pet) are interesting, because the two scales were not negatively correlated with each other, $r = .04$.

Overall, the findings indicate that people who score higher on pet attachment anxiety tend to hyperactive their reactions to the death of a pet, whereas people scoring higher on pet avoidant attachment tend to deactivate these grief reactions and remain relatively indifferent to their pet's death. These associations were unique to pet attachment orientations and were not explained by attachment orientations in human relationships.

10. General discussion

The main aim of this research was to expand attachment theory and research to human–pet relationships and to examine possible correspondences between attachment orientations in human–human relationships and attachment anxiety and avoidance in a relationship with a pet. We assume that pets can serve basic attachment functions and that people have different dispositions that affect the way they experience relationships with their pets.

Our studies show that, like attachment orientations in interpersonal relationships, pet attachment orientations are organized by two orthogonal dimensions: attachment anxiety and avoidance. However, one should take into account that the PAQ was constructed based on theoretical approaches and empirical studies emphasizing a two-dimensional organization of attachment orientations (e.g., Brennan et al., 1998; Mikulincer & Shaver, 2007). Therefore, our findings and conclusions are limited to this two-dimensional conceptualization of attachment orientations. That is, although our findings indicated that the PAQ's structure is compatible with a two-dimensional organization of pet attachment, further studies should explore whether there are other dimensions of pet attachment beyond anxiety and avoidance that can uniquely contribute to the explanation of motives, feelings, cognitions, and behaviors of pet owners toward their pet.

Pet attachment anxiety consists of intense and intrusive worries that something bad might happen to one's pet and that one might find oneself alone, a strong need for proximity to the pet, reassurance seeking from the pet in order to maintain self-worth, intense frustration when the relationship with the pet is not as close as one would like, and even anger when the pet prefers the proximity of others. Pet avoidant attachment consists of feelings of discomfort with physical and emotional closeness to a pet, striving to maintain emotional distance from the pet, avoiding intimacy with it, preventing the pet from intruding into one's personal space, and difficulties in depending on the pet and turning to it when distressed. The 26-item PAQ developed in Study 1 had high test–retest reliability over a period of 6 months. Its two-factor structure was supported by both exploratory and confirmatory factor analyses, and the statistical independence of the two insecurity dimensions was replicated across all five studies.

Study 2 examined the correspondence between PAQ scores and attachment orientations in human close relationships as well as the association between PAQ scores, personality traits, and measures of mental health. As expected, although PAQ scores were associated with attachment orientations in close relationships, the correlations were only moderate. Moreover, the findings supported a correspondence hypothesis according to which attachment anxiety or avoidance in close relationships was positively associated with attachment anxiety or avoidance toward pets. That is, people who are insecure in their human relationships tend also to be insecure in their human–pet relationships. These findings fit with those from previous studies showing that a person's internal working models tend to be transferred from one relationship partner to another and to be generalized to relationships with other kinds of person-like entities such as God (e.g., Brumbaugh & Fraley, 2006, 2007; Granqvist et al., 2010; Kirkpatrick & Shaver, 1992).

Study 2 also showed that whereas the ECR anxiety score was positively associated with the PAQ anxiety score, the ECR avoidance score and the PAQ avoidance score were not significantly associated. That is, avoidant attachment in close relationships was not directly reflected in avoidance toward a pet. Rather, our findings suggest that avoidance in close human relationships is associated with pet-related attachment anxiety. This cross-dimensional pattern of correspondence suggests that avoidant people, who are unlikely to express attachment-related worries and anxieties in close human relationships (Mikulincer & Shaver, 2007), tend to express these worries and anxieties in relationships with pets. This finding may have implications for therapeutic interventions involving pets and avoidant people, including children. The presence of a pet might help them to express fears and doubts that would otherwise remain hidden. Further studies should examine the cross-dimensional correspondence in the human and pet attachment domains.

The associations between PAQ scores and personality traits and mental health measures resemble those frequently found in studies of attachment orientations in human relationships. Pet attachment anxiety was associated with neuroticism and poorer mental health, and pet avoidant attachment was associated with lower extraversion scores. This pattern of findings further supports the correspondence hypothesis: Attachment orientations in human–pet relationships have the same personality and mental health correlates as attachment orientations in human relationships. However, this correspondence does not mean that the PAQ and the ECR tap identical constructs. In fact, pet attachment anxiety was significantly associated with poorer mental health even when ECR attachment anxiety was statistically controlled. Also important is the fact that the association between pet attachment anxiety and poorer mental health could not be explained by neuroticism, social desirability response bias, or the strength of the human–pet emotional bond, implying

that this association is unique to worries and anxieties within the human–pet bond.

Studies 3 and 4 indicated that people differing in pet attachment anxiety or avoidance had different patterns of expectations regarding their pets, and these differences were present at both explicit and implicit levels. Specifically, higher scores on pet attachment anxiety or avoidance were associated with less positive and more negative expectations about a pet's availability and responsiveness. That is, pet owners who feel insecurely attached to their pet tend to view the pet as having negative or troubling characteristics (e.g., being unreliable or unsupportive), to mistrust their pet's intentions, and to expect the pet not to be available, sensitive, and responsive to their needs. Such negative expectations have also been found in studies of human–human attachment patterns and have been traced to negative working models of relationship partners including parents, romantic partners, friends, and God (see Mikulincer & Shaver, 2007, for a review). Despite this similarity at a theoretical level, we found that explicit and implicit expectations regarding a pet were uniquely explained by PAQ scores, not by attachment orientations in human relationships. This result fits with previous findings highlighting the importance of specific within-relationship working models (e.g., Klohnen et al., 2005; La Guardia et al., 2000).

Study 5 revealed that people who differ in pet attachment anxiety or avoidance react to the death of a pet in ways that are consistent with attachment theory and with findings from previous studies of reactions to separation from, or loss of, a romantic partner (e.g., Davis et al., 2003; Wayment & Vierthaler, 2002). Whereas pet attachment anxiety was associated with hyperactivation of emotional and cognitive responses to the loss of a pet (e.g., elevations in distress, rumination, and loss of meaning), pet avoidant attachment was associated with deactivation of these responses. These findings imply, first, that pet attachment orientations and human attachment orientations tend to have similar influences on the grieving process, and second that a pet can be viewed as an attachment figure whose loss elicits grief and activates attachment-related individual differences in coping with loss. In this area, as with expectations, the within-relationship attachment orientations that people develop with a pet are more important than human attachment orientations in explaining reactions to the death of a pet. This is compatible with the notion that working models of attachment relationships are organized hierarchically rather than being the same across all relationships and kinds of relationships. Our findings suggest that pet-related working models are less important than human-related working models when predicting mental health, but they are more important than the human models when explaining individual differences in expectations concerning a pet's availability and in reactions to the death of a pet.

The present findings also distinguish between the PAQ and existing self-report scales that measure strength of attachment to a pet. Whereas the PAQ pet attachment anxiety score was associated with more positive and less negative expectations concerning a pet's availability and responsiveness, variations in the strength of the emotional bond to a pet did not explain the valence of these expectations. These findings fit with previous studies of human attachment relationships which have shown that scales assessing strength of attachment to a relationship partner fail to capture the complexity and dynamics of attachment-system functioning (see Mikulincer & Shaver, 2007, for a review).

What are the sources of individual differences in PAQ scores? Our findings imply that some aspects of attachment orientations in close relationships are duplicated in pet attachment orientations. However, since the associations between pet orientations and close relationship orientations were only moderate, there must be other factors that lead people to develop a particular

attachment orientation to a pet. First, the non-judgmental, unconditional love and acceptance that pet owners receive from their pets, which promotes a sense of attachment security, can moderate the extension of human-relational working models to the human–pet bond. Second, beyond receiving love and comfort from pets, owners serve as parental, caregiving figures for their pets. As a result, interactions with pets are likely to activate their owners' caregiving behavioral systems (Bowlby, 1982; Mikulincer & Shaver, 2007), and individual differences in caregiving (e.g., sensitive caregiving, controlling caregiving, compulsive caregiving) may contribute to the formation of a specific pet attachment orientation. Third, even pet attachment orientations, which tend to reflect owners' projection of their own personalities, can be influenced by current or past partner's (i.e., pet's) effects. For example, pet attachment orientations can be affected by the quality of relationships with previous pets, typical social behaviors of the current pet, the way relationships with past pets ended (death, giving the pets away) and the ensuing mourning process (see Study 5). Future studies are needed to explore more deeply the factors that affect the development of individual differences in attachment to pets.

Our findings have implications for attachment theory and research. First, the study of pet attachment orientations and the development of the PAQ provide a foundation for future studies of the trait-like nature of attachment working models. Second, our findings can contribute to understanding the extension or generalization of attachment working models to nonhuman attachment figures and the ways in which the quality of relationships with these figures affect interpersonal cognitions and behaviors. Third, our findings are relevant to understanding individual differences in the effectiveness of attachment-based therapeutic interventions that use pets as sources of a safe haven and a secure base (animal-assisted therapy). In addition, the study of pet attachment orientations may be useful for personality researchers interested in understanding how personality traits are projected into relationships in which partner effects are less dominant or less complex, and in understanding how to use these relationships as vehicles for personality assessment.

Although we are gratified by the diversity and coherence of the results of the present studies, they represent only initial steps in the systematic analysis of attachment to pets. Future studies should examine whether and how pets serve safe haven and secure base functions and how PAQ scores are related to ways of using pets as attachment figures. Further research is needed to examine the alternative matching and compensation hypotheses in relation to fluctuations in the sense of attachment security due to interactions with a human partner and with a pet. For example, it would be interesting to determine whether pet owners seek proximity to their pets following human criticism, disapproval, or rejection and the extent to which a pet can compensate for feelings of insecurity elicited by experiences with humans. In addition, research should consider motives for pet ownership from an attachment perspective, the ways in which an attachment bond is formed when one acquires a pet, and whether these motives and bond-formation processes are affected by a person's pre-existing human or pet attachment orientations.

It would also be interesting to assess pets' attachment orientations toward their owners using behavioral observations and a standardized coding system (e.g., Topal et al., 2005). A human–pet relationship is, to a considerable extent, a two-way street involving mutual interdependence, and if a pet is acquired when young, its owner plays an important role in socializing it and structuring its behavior. Some of this training process may be similar to the process by which parents influence their children's attachment patterns, explicitly and implicitly establishing their children's ways of asking for things, begging or not begging, seeking physical proximity and touch, and so on. These processes have not yet been

examined in human–pet relationships from the perspective of attachment theory. Although there is much still to be learned, we have shown here that attachment theory is useful in mapping normative and individual difference aspects of human–pet relationships.

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