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Pets as safe havens and secure bases: The moderating role of pet attachment orientations

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ABSTRACT

We examined the extent to which a pet functions as an attachment figure. In Study 1, 165 pet owners performed a goal exploration task, assessing the number of life goals generated and confidence in goal attainment. In Study 2, 120 pet owners performed a distress-eliciting task while assessing blood pressure. In both studies, participants were divided into three conditions: pet physical presence, pet cognitive presence, and no pet presence. As compared to no pet presence, physical or cognitive pet presence increased the number of life goals generated and self-confidence in goal attainment and reduced blood pressure during the distress-eliciting task. The findings confirm the ability of a pet to provide a safe-haven and a secure-base and the moderating role of attachment insecurities.

1. Introduction

Attachment theory (Bowlby, 1973, 1980, 1982) is an empirically supported framework for explaining how close relationships contribute to emotion regulation, mental health, and psychological growth. Research has shown that relationship partners often serve as attachment figures who provide a sense of safe haven in times of need and a secure base for exploration, which in turn facilitates distress reduction and goal pursuit (e.g., Feeney, 2004; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001). In the two studies reported here, we examine the extent to which pets (i.e., dogs and cats) can serve as attachment figures that facilitate distress reduction and exploration. Zilcha-Mano, Mikulincer, and Shaver (2011a) conceptualized the human–pet relationship as an attachment bond and found that attachment orientations toward pets are useful constructs for understanding how pet owners relate to their pets. If the human–pet relationship is an attachment bond, then proximity to a pet should be beneficial during a distress-eliciting task (by providing a safe haven) or an exploration task (by providing a secure base), just as proximity to human attachment figures does. In addition, individual variations in pet attachment orientations may moderate these effects. The present studies were designed to test these ideas.

1.1. An attachment perspective on human–pet relationships

According to attachment theory (Bowlby, 1973, 1980, 1982), social interactions with protective others (“attachment figures”) are internalized in the form of mental representations of self and relationship partners (“internal working models of self and others”), which affect psychological functioning and mental health (Mikulincer & Shaver, 2007). Interactions with attachment figures who are available and supportive in times of need foster the development of a sense of attachment security and internal working models that are positive and optimistic (Bowlby, 1973). When attachment figures are rejecting or unavailable in times of need, the sense of attachment security is undermined, negative working models are formed, and people tend to form insecure attachment orientations that can be conceptualized in terms of two orthogonal dimensions, attachment-related *anxiety* and *avoidance* (Brennan, Clark, & Shaver, 1998).

A person’s location on the anxiety dimension indicates the degree to which he or she worries that an attachment figure will not be available in times of need and adopts “hyperactivating” attachment strategies – energetic, insistent attempts to obtain care, support, and love from relationship partners – as a means of regulating distress (Mikulincer & Shaver, 2007). A person’s position on the avoidance dimension indicates the extent to which he or she distrusts relationship partners’ goodwill, strives to maintain behavioral independence and emotional distance from partners, and relies on deactivating strategies, such as suppression of attachment-related thoughts and emotions (Mikulincer & Shaver, 2007). People who score low on both dimensions are said to be secure with respect to attachment.

Originally, the concept of attachment orientations was used to conceptualize child-parent relationships (e.g., Ainsworth, Blehar, Waters, & Wall, 1978). Bowlby (1988) claimed, however, that attachment theory is relevant to other relationships across the life

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span. In fact, following Bowlby's (1982) lead, other scholars (e.g., Hazan & Shaver, 1987; Hazan & Zeifman, 1994) argued that attachment theory can be applied to adolescent and adult relationships that meet four criteria: (a) *proximity maintenance* – preferring to be near an attachment figure, especially in times of need; (b) using the attachment figure as a *safe haven* who relieves distress and provides comfort and support; (c) using the attachment figure as a *secure base* who sustains exploration, risk taking, and self-development; and (d) experiencing *separation distress* when the attachment figure is unavailable. Research has shown that many close friendships and romantic relationships during late adolescence and adulthood satisfy these four criteria (e.g., Fraley & Davis, 1997).

Although romantic partners often become adults' principal attachment figures (Hazan & Zeifman, 1994), there may also be actual or potential sources of support in specific milieus, such as therapists in therapeutic settings (Mallinckrodt, Gantt, & Coble, 1995) and leaders in organizations (Davidovitz, Mikulincer, Shaver, Izsak, & Popper, 2007). Moreover, recent studies have shown that groups and symbolic personages (e.g., God) can sometimes be treated as attachment figures (Granqvist, Mikulincer, & Shaver, 2010; Rom & Mikulincer, 2003).

Following this line of thinking, Zilcha-Mano et al. (2011a) argued that the human–pet bond can be viewed as an attachment relationship and that pets often meet the four prerequisites for an attachment figure. Studies show that pet owners feel emotionally close to their pets and seek and enjoy this closeness (e.g., Kurdek, 2009). Moreover, pet owners often feel that their pets constitute a source of support, comfort, and relief in times of need (e.g., Allen, Balscovich, & Mendes, 2002; McConnell, Brown, Shoda, Stayton, & Colleen, 2011). Losing a pet triggers feelings of distress and often initiates a grieving process (e.g., Hunt, Al-Awadi, & Johnson, 2008; Kwong & Bartholomew, 2011). Pets also provide a secure base from which their owners can more confidently explore the world (e.g., Kurdek, 2008).

Zilcha-Mano et al. (2011a) constructed a self-report scale tapping individual differences in attachment orientations toward a pet (Pet Attachment Questionnaire, or PAQ), which includes two subscales to measure the two major dimensions of attachment insecurity in human-pet relationships. One subscale, pet attachment avoidance, taps the extent to which people feel discomfort with physical and emotional closeness with their own pets and strive to maintain emotional distance from them. The second subscale, pet attachment anxiety, assesses the extent to which people have intense and intrusive worries that something bad might happen to their pet, a strong desire for closeness to the pet, and serious doubts about their (the pet owners') own value in their pets' eyes.

The two PAQ subscales were differentially related in theory-consistent ways with measures of other relevant psychological constructs (Zilcha-Mano et al., 2011a). Specifically, anxious attachment to a pet was positively associated with psychological distress, whereas avoidant attachment to a pet was negatively related to extraversion. In addition, Zilcha-Mano et al. (2011a) found a moderate correspondence between people's attachment orientations in human–pet relationships and their attachment orientations in human–human relationships: The higher their scores on measures of attachment insecurities (anxiety and/or avoidance) in human–human relationships, the higher their scores on the PAQ insecurity scales.

Using the PAQ, Zilcha-Mano et al. (2011a) also found theoretically predicted links between pet attachment orientations and cognitions, emotions, and behaviors in human–pet relationships. Individuals who reported higher levels of pet attachment anxiety or avoidance held more negative expectations regarding their pet at both explicit (self-report) and implicit (reaction time in a cognitive task) levels. In addition, individuals reporting higher levels of pet avoidant attachment also expressed less distress following the death of a pet. In contrast, individuals reporting higher pet attachment anxiety were more likely to exhibit chronic, unresolved grief after the pet death. All of these findings were uniquely explained by pet attachment orientations, and not by attachment orientations in human relationships, global personality traits, or existing self-report measures of emotional strength of attachment to pets, highlighting the importance of specific within-relationship working models (e.g., Klohnen, Weller, Luo, & Choe, 2005).

1.2. Secure base and safe haven functions of human–pet relationships

Following up this line of research, a recent study began to document the benefits pet owners can derive from their relationship with a pet (McConnell et al., 2011). As compared to non-owners, pet owners fared better on several well-being measures mainly when their pet fulfilled important social needs. Together with previous findings regarding pets' capacity to provide comfort and relief in times of need, McConnell et al.'s (2011) findings support our conceptualization of a pet as an attachment figure in the mind of its owner. However, McConnell et al.'s research did not provide any information about the role of pet owners' attachment orientations toward their pets in moderating a pet's ability to act as a security provider. In fact, from an attachment perspective, a pet, like other human attachment figures, might fail to provide a safe haven and secure base to its owner if he or she is not securely attached to it. Therefore, we designed two experimental studies examining (a) the extent to which pets are able to function as a secure base and safe haven for their owners, and (b) the extent to which an owner's pet attachment orientation moderates a pet's ability to fulfill these two attachment functions.

A *safe haven* is the kind of support that meets a person's needs for comfort, reassurance, assistance, and protection in times of danger or distress (Bowlby, 1988). A large body of research indicates that people tend to seek safe-haven support in times of need and that receiving this kind of support, or feeling confident that it will be available when needed, helps individuals cope more effectively with stressful life events and has long-term beneficial effects on physical and mental health (see Pierce, Sarason, & Sarason volume, 1996, for extensive reviews).

Although the need for safe-haven support is assumed to be universal, individuals differing in attachment orientations differ greatly in seeking this type of support and feeling supported by others in times of need (see Mikulincer & Shaver, 2007, for a review). For example, individuals scoring higher on avoidant or anxious attachment tend to be more reluctant to seek safe-haven support from parents, close friends, romantic partners, or other kinds of attachment figures (e.g., teachers) than more secure individuals (e.g., Berant, Mikulincer, & Florian, 2001; DeFronzo, Panzarella, & Butler, 2001). In addition, insecure people are less likely than their secure counterparts to benefit from supportive interactions when coping with stress, and even from mere proximity to a close relationship partner (e.g., McGowan, 2002; Mikulincer & Florian, 1997). Moreover, insecurely attached people tend to perceive and remember a partner's helpful behavior as less supportive than secure people (e.g., Collins & Feeney, 2004). Overall, the research conducted so far supports the hypothesis that insecurely attached people are less likely to perceive their relationship partners as a source of safe haven support and tend to dismiss or misinterpret a partner's actual provision of comfort and support in times of need.

With regard to the human–pet bond, several studies have found that physical or cognitive proximity to a pet can be a source of comfort and support in times of need and can alleviate stress and distress (see Walsh, 2009, for a review). For example, Allen et al. (2002) have shown that, as compared to the presence of a friend or spouse, the physical presence of a dog results in lower blood

pressure and heart rate reactivity during a demanding task. Although these findings are promising, the available evidence is somewhat inconsistent (e.g., Virues-Ortega & Buela-Casal, 2006) and no study has examined the extent to which individual differences in pet attachment orientations moderate the stress-buffering effect of proximity to a pet. We believe this is likely to be a critical factor in explaining variability in the capacity of a pet to serve as a safe haven. As in human–human relationships, we hypothesize that owners of dogs or cats who are insecurely attached (either anxiously or avoidantly) to their pet are less likely to seek support from their pet in times of need, benefit from proximity to their pet when coping with stress, and perceive and remember their pet's presence as supportive and comforting. Therefore, the presence of a pet should have a stronger stress-buffering effect on securely attached pet owners than on insecurely attached ones.

Secure base support is the type of support that meets another person's needs for exploration, autonomy, and growth when exploration is safe and desirable. According to Bowlby (1988), a secure base allows a relationship partner to "make sorties into the outside world" (p. 11) with confidence that he or she can return for assistance and comfort should obstacles arise. With this sense of being protected when needed, a person can take sensible risks, engage in challenging activities, and pursue new goals (Feeney, 2004; Feeney & Thrush, 2010). Moreover, an attachment figure's non-intrusive emotional support for one's aspirations leads to stronger feelings of self-efficacy and higher self-confidence in one's ability to attain important goals (e.g., Feeney & Thrush, 2010). Indeed, there is accumulating evidence that the provision of a secure base has beneficial effects on recipients' mental health and social adjustment (e.g., Deci, La Guardia, Moller, Scheiner, & Ryan, 2006; Feeney, 2004; Feeney & Thrush, 2010).

To date, there is no systematic study examining attachment-related differences in the extent to which people seek secure-base support, feel supported by others during exploration, or benefit for receiving secure-base support. The single relevant hint we have has been provided by Feeney and Thrush (2010), who found that people scoring higher in either attachment anxiety or avoidance had spouses who were less emotionally available and less encouraging (as coded by external judges) during exploration of future plans and goals. Different post hoc interpretations of these findings can be suggested. For example, a person's attachment insecurities may have resulted in less secure-base support from his or her relationship partner. Alternatively, it is also plausible that a person who receives less secure-base support from his or her relationship partner might become less securely attached.

With regard to the human–pet bond, there is no good experimental study examining the extent to which pet owners benefit from actual or symbolic proximity to their pet during exploration. Moreover, there is no evidence that individual differences in pet attachment orientations moderate the ability of a pet to serve as a secure base for exploration. The present research is designed to address these issues. Based on existing correlational findings (e.g., Kurdek, 2008), we hypothesized that owners of dogs or cats would benefit from physical or symbolic proximity to their pet during exploration. We also hypothesized that pet owners who were less securely attached to their pets would benefit less from proximity than more secure pet owners. As in human–human relationships, insecurely attached pet owners may be less satisfied with the support they received from a pet (in the case of anxiously attached people who demand extreme closeness and encouragement for being independent) or be more reluctant to accept such a support (in the case of avoidant attachment people who prefer emotional distance and self-reliance). In both cases, insecure people may be less able than their more secure counterparts to engage in relaxed exploration and enjoy pet presence and the secure-base support it can provide.

2. Study 1

Study 1 examines the extent to which a pet (dog, cat) acts as a secure base for exploration and the moderating role played by pet attachment orientations in explaining the extent to which pet owners benefit from physical or symbolic proximity to their pets during exploration. Specifically, owners of dogs or cats completed the PAQ, a measure tapping pet attachment orientations, performed an exploration activity (thinking about future goals), and were randomly divided into three conditions during the activity according to the presence of their pet: physical presence (the pet was in the room and participants were asked to think about their pet), cognitive presence (the pet was not in the room but participants were asked to think about their pet), and no pet presence (the pet was not in the room and participants were not asked to think about their pet). The dependent variables were the number of goals participants generated and the confidence they reported in achieving these goals in the future. Our predictions were as follows:

1. Participants in the pet physical presence or pet cognitive presence will generate more goals and feel more confident in attaining these goals than participants in the no pet presence condition, implying that proximity to a pet has beneficial effects during exploration.
2. These beneficial effects of physical or cognitive proximity to a pet during exploration will be less evident when participants score higher on attachment anxiety or avoidance to their pet.

2.1. Method

2.1.1. Participants

The sample in Study 1 consisted of 165 Israeli owners of dogs or cats (90 women and 75 men, ranging in age from 18 to 68, $M = 32.3$, $SD = 11.7$) who volunteered to participate in the study without compensation. Participants' mean years of education was 13.09 ($SD = 1.70$). Participants were recruited in parks, animal food and equipment stores, universities, malls, and streets of cities in the central area of Israel. All participants were current pet owners (82.7% were dog owners and 17.3% were cat owners).[1]

2.1.2. Materials and procedure

The study was conducted in participants' homes in order to provide an ecologically appropriate and comfortable stress-free familiar environment for both participants and their pets. For each participant, the experimenter and the participant selected a quiet room judged as appropriate to conduct the experiment. Usually, this was a living room or family room. According to prearranged instructions, no other individuals were present at home during the study except for the experimenter, the participant, and his or her pet.

All participants received general instructions stating that they would complete various measures tapping relationships with pets, close human relationships, and personal goals. Half of the participants were randomly selected to first complete the self-report measures and then to perform the goal-generation task. The remaining participants first performed the goal-generation task and then completed the self-report measures.[2]

[1] In both studies, no significant difference was found between men and women or between dog and cat owners in the study variables and the correlations between age and all the variables were not significant. In addition, statistical analyses revealed that sex, cat/dog ownership, and age did not significantly moderate the findings reported in the two studies.

[2] No significant difference was found on any measures between the two groups that completed the tasks and measures in different orders. In addition, the inclusion of the order factor in other statistical analyses did not alter the reported findings and did not result in significant interactions with other individual-difference variables.

Table 1
Means, SDs, Cronbach alphas, and Pearson correlations for all variables of Study 1.

	1	2	3	4	5	6
Mean	2.44	1.99	3.23	3.04	5.35	5.79
SD	0.91	0.77	1.09	0.98	2.41	0.87
Cronbach alphas	.86	.82	.87	.85		.89
1. PAQ anxiety						
2. PAQ avoidance	.03					
3. ECR anxiety	.36**	.19*				
4. ECR avoidance	.03	.13	.06			
5. Number of goals generated	.05	.05	.07	−.13		
6. Appraisal of goal achievement	.02	−.14	−.10	−.28**	.18*	

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

While the self-report measures were being completed, the pet was placed in another room and participants completed the measures with the experimenter present in the study room. Specifically, they completed two measures of attachment orientations towards pets and attachment orientations in close human relationships. The order of these two measures was randomized across participants.

Attachment orientations in relationships with pets were assessed with the 26-item Pet Attachment Questionnaire (PAQ; Zilcha-Mano et al., 2011a). Participants were asked to think about their relationship with their current pet and to rate the extent to which each item described their feelings in that relationship. Ratings were made on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*). Thirteen items tapped pet attachment anxiety (e.g., "I'm often worried about what I'll do if something bad happens to my pet," "I often feel that my pet doesn't allow me to get as close as I would like," "I get frustrated when my pet is not around as much as I would like it to be") and 13 tapped pet avoidant attachment (e.g., "I prefer not to be too close to my pet," "Often my pet is a nuisance to me," "I get uncomfortable when my pet wants to be close to me"). The reliability and validity of the scale have been demonstrated by Zilcha-Mano et al. (2011a). In the current sample, Cronbach alphas were high for both the pet anxiety items and the pet avoidance items (see Table 1), and a factor analysis with varimax rotation revealed two main factors explaining 54% of the variance and corresponding to the anxiety and avoidance subscales. We therefore computed two total scores for each participant by averaging items from each subscale. Higher scores reflected higher attachment anxiety or avoidance towards a pet. These two scores were not significantly correlated (see Table 1), confirming the intended independence of the two pet attachment dimensions.

Attachment orientations in close human relationships were assessed with the Hebrew version of the Experiences in Close Relationships inventory (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 human relationships on a 7-point scale ranging from 1 (*not at all*) to 7 (*very much*). Cronbach alphas were high for anxiety and avoidance subscales (see Table 1). Two total scores were computed by averaging items from each subscale. Higher scores reflected higher attachment anxiety or avoidance in close human relationships. Pearson correlations indicated that attachment anxiety in close human relationships had significant associations with both pet attachment anxiety and pet attachment avoidance (see Table 1). Avoidant attachment in the ECR was not significantly associated with pet attachment insecurities (see Table 1).

Between the self-report measures and the goal-generation task, we inserted a filler 5-min anagram task and a 15-min rest period in order to minimize influences of the first part of the study on the second part. To avoid unnecessary stress, participants were also told that we would not record the number of anagrams they solved.

Before the goal-generation task, participants were randomly divided into three experimental conditions. A third of the participants ($n = 55$) were asked to bring their pet into the study room and to write a brief description of their pet and their relationship with it. Then, they performed the goal-generation task while their pet was physically present in the room (*pet physical presence* condition).[3] Another third of the participants ($n = 55$) performed the same task while their pet was in another room, but they were also asked to write a brief description of their pet and their relationship with it in order to activate mental representations of their pet (*pet cognitive presence* condition). The remaining participants ($n = 55$) performed the goal-generation task while their pet was in another room and were asked to write a brief description of a person they knew superficially, was not close to them, and did not influence their lives (identical to McGowan's, 2002, instructions), and their relationship with this person (*control* condition). No significant differences between these three groups were found in socio-demographic variables (gender, age, education, pet type) or the self-report measures.

Immediately following this manipulation, all of the participants performed Feeney's (2004) goal generation task. In this task, they were asked to list their personal goals for the future (i.e., goals that were personally relevant to them, such as developing a new hobby or switching jobs). Participants were instructed to list as many or as few goals as they actually had (see mean and SD in Table 1). They were then asked to rate the perceived likelihood of achieving each goal on a 7-point scale ranging from 1 (*not at all likely to achieve that goal*) to 7 (*almost certain that I'll achieve that goal*). For each participant, we computed the number of generated goals and the average rated likelihood of achieving the goals.

2.2. Results and discussion

Data from the goal-generation task were analyzed in two steps. In the first step, we conducted one-way analyses of variance (ANOVAs) examining differences between the three experimental conditions (pet physical presence, pet cognitive presence, control) in number of generated goals and appraised likelihood of achieving the goals. These analyses revealed significant differences in the two measures, $F(2,162) = 9.05$, $p < .01$, $eta^2 = .10$, for number of generated goals, and $F(2,162) = 5.02$, $p < .01$, $eta^2 = .06$, for appraised likelihood of achieving the goals. Scheffé post hoc tests revealed that participants in the pet physical presence and pet cognitive presence conditions generated more personal goals and were more confident in achieving these goals than participants in the control condition (see means and *SD*s in Table 2). No significant difference was found between the pet physical presence condition and the pet cognitive presence condition.

In the second analytical step, we conducted hierarchical regressions examining the extent to which pet attachment orientations moderated the observed effects of the physical or cognitive presence of a pet on number of goal generated and appraised likelihood of achieving the goals. In the first step of these regressions, we introduced pet presence (a dummy variable comparing pet physical or cognitive presence conditions, 1, to the control condition, −1) and pet attachment anxiety and avoidance (in *Z*-scores) as predictors. In addition, we introduced attachment anxiety and avoidance in close human relationships as covariates in order to examine the unique contributions of pet attachment orientations.

[3] In both studies, participants in the pet physical presence condition were not allowed to touch the pet during task completion. Beyond this, no additional constraint was put on the pet's movement or location.

Table 2
Means and SDs of number of goals generated and appraised likelihood of achieving goals in each experimental condition of Study 1.

	Physical pet presence	Cognitive pet presence	Control
Number of goals generated			
M	6.21a	5.49a	4.36b
SD	2.87	2.11	1.80
Appraised likelihood of achieving goals			
M	5.96a	5.91a	5.49b
SD	0.80	0.77	0.97

Notes: Means with different letters were significant at alpha level of $p < .05$.

In the second step, we included the interactions between pet presence and each pet attachment orientation as additional predictors. In this step, we also included interactions between pet presence and each attachment orientation dimension in close human relationships in order to control for their effects and examine the unique moderating effects of pet attachment orientations. The predicted variables in these regressions were number of generated goals and appraised likelihood of achieving the goals.[4]

For number of generated goals, the regression revealed the already reported significant main effect for pet presence, $\beta = .30$, $p < .01$, and a significant interaction between pet presence and pet attachment avoidance, $\beta = -.16$, $p < .05$. The other main effects and the interactions were not significant. Simple slope tests examining the nature of the significant interaction revealed that, as compared to the control condition, pet presence (either physical or cognitive) led to the generation of more goals among participants scoring low (-1 *SD*) on pet attachment avoidance, $\beta = .46$, $p < .01$, but not among those scoring high (+1 *SD*), $\beta = .14$. Moreover, pet attachment avoidance was associated with the generation of less goals in the pet presence condition, $\beta = -.24$, $p < .05$, but not in the control condition, $\beta = .08$ (see Fig. 1a).

The regression for the appraised likelihood of achieving goals also revealed the already reported significant main effect of pet presence, $\beta = .21$, $p < .01$ as well as significant interactions for pet presence $\times$ pet attachment avoidance, $\beta = -.24$, $p < .01$, and pet presence $\times$ pet attachment anxiety, $\beta = -.19$, $p < .05$. Simple slope tests revealed that, as compared to the control condition, pet presence (either physical or cognitive) led to more confidence in goal achievement among participants scoring low (-1 *SD*) on pet attachment avoidance, $\beta = .45$, $p < .01$, or pet attachment anxiety, $\beta = .40$, $p < .01$. When pet attachment anxiety or avoidance were relatively high (+1 *SD*), the effect of pet presence was not significant, βs of $-.03$ and .02, respectively. Moreover, pet attachment avoidance was associated with less confidence in goal achievement in the pet presence condition, $\beta = -.30$, $p < .01$, but not in the control condition, $\beta = .16$ (see Fig. 1b). Pet attachment anxiety was also associated with less confidence in goal achievement in the pet presence condition, $\beta = -.31$, $p < .01$, but not in the control condition, $\beta = .06$ (see Fig. 2).

Overall, pets did seem to serve a secure base function: A pet's physical or cognitive presence allowed owners to engage in a richer exploration of their goals and plans (heightened goal generation) and to feel more confident about achieving these goals in the future (heightened feelings of competence). However, this secure base function was observed only among owners who were relatively securely attached to their pet. Avoidant attachment to a pet reduced the positive effects of pet presence on goal generation. In addition, elevations in attachment insecurities to a pet, either of the anxious or the avoidant form, reduced the positive effects that pet presence had on felt competence. Importantly, these effects were unique to pet attachment orientations and could not be explained by attachment orientations in close human relationships.

[4] In both studies, additional regression analyses with a dummy variable comparing pet physical presence and pet cognitive presence as a predictor revealed no significant main effects or interactions with pet attachment orientations in any of the dependent variables. Additional regression analyses also revealed that the interaction between anxious and avoidant attachment and the three-way interaction of these two scores with pet presence were not significant.

3. Study 2

Study 2 examines the extent to which a pet (dog, cat) acts as a safe haven and the moderating role played by pet attachment orientations in explaining the extent to which physical or symbolic proximity to a pet has a soothing effect in times of need. Specifically, owners of dogs or cats completed the PAQ, performed a distressing activity (an extremely difficult cognitive task), were randomly divided into the three conditions described in Study 1 (pet physical presence, pet cognitive presence, no pet presence) during the activity, and had their blood pressure measured before and during the task. The dependent variable was physiological reactivity (blood pressure elevation) to the distressing activity. Our predictions were as follows:

1. Participants in the pet physical presence or pet cognitive presence condition will exhibit lower blood pressure elevation during the distressing task than participants in the no pet presence condition, implying that proximity to a pet has a stress-buffering effect.
2. This stress-buffering effect of physical or cognitive proximity to a pet will be less evident when participants score higher on attachment anxiety or avoidance to their pet.

3.1. Method

3.1.1. Participants

Another sample of 120 Israeli owners of dogs or cats (61 women and 59 men ranging in age from 18 to 67, $M = 30.4$, $SD = 10.8$) volunteered to participate in Study 2 without compensation. Participants' mean years of education was 14.21 ($SD = 2.29$). Participants were recruited in the same manner as in Study 1. All participants were current pet owners (76.5% were dog owners and 23.5% were cat owners). All were healthy and normotensive (blood pressure < 140/90) and none of them took any medication that could affect blood pressure.

3.1.2. Materials and procedure

The setting of the study (participants' homes) and the general instructions were similar to those described in Study 1. In addition, participants had been instructed in a previous phone conversation not to eat or drink anything but water in the hour before the experiment, not to drink caffeine during the 2 h before the experiment, and to turn off potentially distracting electronic devices during the study. Women were asked not to participate during their period, because menstruation has been shown to affect cardiovascular measures (Uchino et al., 1996).

Immediately after receiving the general instructions, all participants were connected to a portable physiological recording device that measured systolic and diastolic blood pressure, and they were instructed to sit quietly and rest for approximately 5 min while the equipment was calibrated and adjusted. Blood pressure was measured with an automatically inflating and deflating cuff placed around the participant's left arm. This procedure was similar to that used by Allen et al. (2002).

Participants were randomly divided into the three experimental conditions described in Study 1: pet physical presence condition ($n = 40$), pet cognitive presence condition ($n = 40$), and control

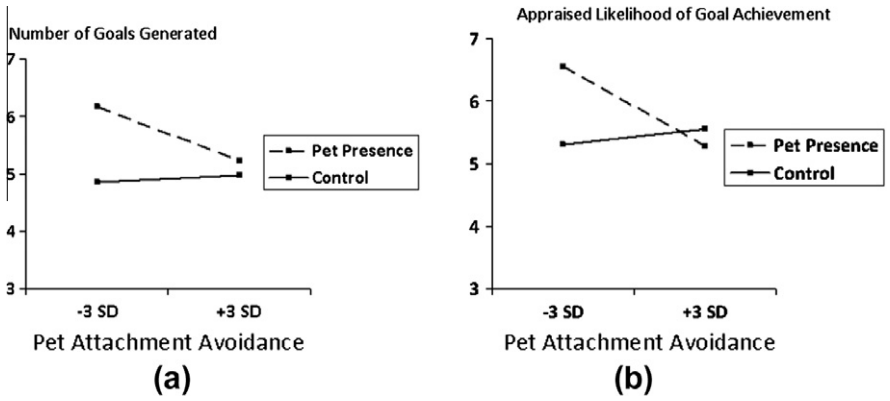

Fig. 1. Interactions between pet presence and pet attachment avoidance on number of generated goals (a) and appraised likelihood of achieving goals (b).

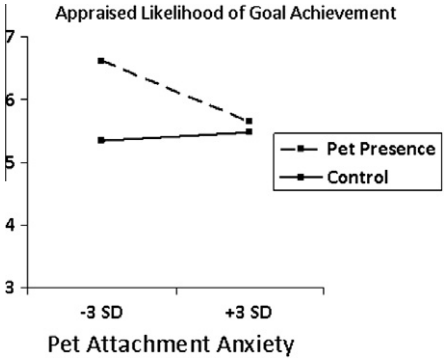

Fig. 2. Interaction between pet presence and pet attachment anxiety on appraised likelihood of achieving goals (Study 1).

condition ($n = 40$). The instructions and manipulations were identical to those described in Study 1. No significant differences between these three groups were found in socio-demographic variables (gender, age, education, pet type) or individual-differences measures.

All participants were asked to sit quietly for a 5-min rest period while baseline physiological readings were taken. Following this rest period, they performed a distress eliciting, extremely difficult version of the Remote Associates Test (RAT, Mednick, 1962). This version included 25 triads composed of three words. Participants were asked to generate a word that formed a compound with the other three words (e.g., "common" is the correct response to "sense, courtesy, place"). For the present study, we chose triads of extremely high difficulty in order to elicit feelings of failure, frustration, and distress. The experimenter showed each triad for 15 s, and participants were given 1 min to provide an answer. Blood pressure was recorded three times: during the last minute of the rest period and during the first minute and third minutes of task performance.

Immediately after performing the task, all participants completed a 6-item scale tapping the extent to which the RAT was appraised as challenging and threatening. Three items assessed the degree to which participants felt the task was a challenge for them (e.g., "The task I have just completed aroused my curiosity"). Three items tapped the extent to which participants appraised the task as a threat (e.g., "The task I have just completed stressed me out"). Participants were asked to think about the task they completed and to rate the extent to which each item was self-descriptive on a 7-point scale ranging from 1 ("*not at all*") to 7 ("*very much*"). Cronbach alphas were acceptable for the challenge and threat items (see Table 3). Two total scores were computed for each participant by averaging items in each subscale.

Participants were then given a 15-min break. They were disconnected from the physiological recording equipment, and participants in the pet physical presence condition were asked to move the pet to another room. During the break period, participants were free to move around the house and most of them chose to drink or eat something or to perform routine tasks. Following this break, all participants completed two self-report measures: (a) the PAQ, assessing attachment orientations to pets, and (b) the ECR scale measuring attachment orientations in close human relationships (see Study 1). The order of the two measures was randomized across participants. In Study 2, Cronbach alphas were high for all

Table 3
Means, SDs, Cronbach alphas, and Pearson correlations for all variables of Study 2.

	1	2	3	4	5	6	7	8
Mean	2.70	1.90	3.43	3.17	75.39	121.13	3.72	4.54
SD	1.07	0.78	1.15	1.01	8.18	12.84	1.37	1.50
Cronbach alphas	.89	.87	.91	.92			.76	.79
1. PAQ anxiety								
2. PAQ avoidance	−.07							
3. ECR anxiety	.51**	−.04						
4. ECR avoidance	.04	.38**	.03					
5. Diastolic blood pressure	.10	.13	.13	.09				
6. Systolic blood pressure	−.01	.17	.01	.07	.57**			
7. Threat appraisal	.03	.03	.19*	−.01	.06	.21*		
8. Challenge appraisal	.07	−.18*	.15	−.27**	−.07	.12	.25**	

Notes: Blood pressure scores are within-person mean scores across the task.
* $p < .05$.
** $p < .01$.

the four subscales (see Table 3). In each scale, avoidance and anxiety dimensions were not significantly associated (see Table 3). In addition, attachment anxiety in close human relationships had significant associations with pet attachment anxiety, and avoidant attachment in close human relationships was significantly associated with pet avoidant attachment (see Table 3). Other correlations between pet attachment and attachment in close human relationships were not significant (see Table 3).

3.2. Results and discussion

3.2.1. Physiological data

Physiological data were analyzed in two steps. In the first step, we conducted one-way analyses of covariance (ANCOVAs) examining differences between the three experimental conditions (pet physical presence, pet cognitive presence, control) in blood pressure (diastolic, systolic) taken during the task while controlling blood pressure taken before the task (baseline) as a covariate. That is, we examined the effects of pet presence on blood pressure during a stressful task beyond variations in baseline blood pressure. For the analyses, we averaged the two measures collected during task performance (during the first minute and the third minute). Preliminary analyses did not reveal any significant differences between these two measures, and findings were similar when analyses were performed on each of these measures. In addition, one-way ANOVAs revealed no significant effect of experimental condition on baseline measures of diastolic and systolic blood pressure, Fs < 1.

The ANCOVAs revealed significant main effects for experimental condition on diastolic blood pressure, $F(2,116) = 3.04$, $p < .05$, $eta^2 = .08$, and systolic blood pressure, $F(2,116) = 5.63$, $p < .01$, $eta^2 = .12$. As can be seen in Table 4, participants in the pet physical presence and pet cognitive presence conditions showed lower diastolic and systolic blood pressure during task performance (after controlling for baseline blood pressure) than participants in the control condition. That is, the physical or cognitive presence of a pet led to lowered blood pressure during task performance.

In the second analytical step, we conducted hierarchical regressions examining the extent to which pet attachment orientations moderated the observed effects of the physical or cognitive presence of a pet on physiological responses during task performance. In the first step of these regressions, we introduced pet presence (the same dummy variable described in Study 1) and pet attachment anxiety and avoidance (in Z-score form) as predictors. In addition, we introduced the relevant physiological measure during the baseline period as a covariate in order to examine the contribution of pet attachment orientations to changes in physiological responses during task performance beyond the baseline measure. We also introduced attachment anxiety and avoidance in close human relationships as covariates to examine the unique contributions of pet attachment orientations. In the second step, we included the interactions between pet presence and each pet attachment orientation dimension as additional predictors. In this step, we also included interactions between pet presence and each attachment orientation dimension in close human relationships in order to control for their effects and examine the unique moderating effects of pet attachment orientations. The predicted variables were diastolic and systolic blood pressure during task performance.[5]

The regression analysis revealed the already reported significant main effect of pet presence on physiological responses to task performance (relative to the baseline period), $\beta = -.18$, $p < .05$, for diastolic blood pressure, and $\beta = -16$, $p < .05$, for systolic blood pressure. In addition, a significant interaction between pet presence and pet attachment avoidance was found for both diastolic blood pressure, $\beta = .32$, $p < .01$, and systolic blood pressure, $\beta = .14$, $p < .05$. No other effects were significant. Simple slope tests revealed that, as compared to the control condition, pet presence (either physical or cognitive) buffered the elevation of diastolic and systolic blood pressure during task performance only when pet avoidant attachment was low (-1 SD), $\beta = -.50$, $p < .01$, for diastolic blood pressure, and $\beta = -.30$, $p < .01$, for systolic blood pressure. No significant pet presence effect was found when pet avoidant attachment was high (+1 SD), βs of .12 and $-.02$. Moreover, pet attachment avoidance was associated with higher diastolic blood pressure in the pet presence condition, $\beta = .29$, $p < .01$, but with lower blood pressure in the control condition, $\beta = -.35$, $p < .01$ (see Fig. 3a). Pet attachment avoidance was also associated with higher systolic blood pressure in the pet presence condition, $\beta = .23$, $p < .05$ (see Fig. 3b). In the control condition, pet attachment avoidance was not significantly associated with systolic blood pressure, $\beta = -.05$ (see Fig. 3b).

3.2.2. Threat and challenge appraisals

A significant effect of experimental condition was found on threat appraisal, $F(2,117) = 5.16$, $p < .01$, $eta^2 = .08$. Scheffé post hoc tests revealed that participants in the pet physical presence and pet cognitive presence conditions were less likely to appraise the task as a threat (Ms of 3.30 and 3.61) than participants in the control condition ($M = 4.24$). No significant difference was found between the pet physical presence condition and the pet cognitive presence condition. The ANOVA performed on challenge appraisals revealed no significant condition effect.

To examine the effects of pet attachment orientations on threat and challenge appraisals, we conducted hierarchical regressions similar to those described in Study 1. Beyond the already significant main effect of pet presence on threat appraisal, $\beta = -.24$, $p < .01$, no other significant effects and interactions were significant. That is, pet attachment orientations failed to moderate the effects of pet presence on threat appraisals.

Table 4
Adjusted means and SDs of physiological measures during task performance (controlling for baseline measures) according to condition and time of measurement.

	Physical pet presence	Cognitive pet presence	Control
Diastolic blood pressure			
Adjusted M	74.20a	74.67a	77.35b
SD	6.90	6.97	10.24
Systolic blood pressure			
Adjusted M	120.88a	118.52a	124.01b
SD	11.39	13.28	13.72

Notes: Means with different letters were significant at alpha level of $p < .05$.

4. General discussion

Our findings provide further support for our attachment perspective on human–pet relationships. First of all, the findings clearly show that a pet can serve the two main regulatory functions of an attachment figure: providing a safe haven and a secure base. Second, individual differences in attachment orientations toward a pet, as measured by the PAQ, moderated a pet's ability to provide a safe haven and a secure base in the same way that attachment orientations in human–human relationships moderate the ability of a relationship partner to soothe a person in times of need and support his or her autonomy bids. Overall, the findings indicate that attachment theory is a valid framework for understanding human–pet relationships as well as individual differences in the

[5] Similar regression analyses conducted on physiological measures during the baseline period did not reveal any significant contribution of pet attachment orientations.

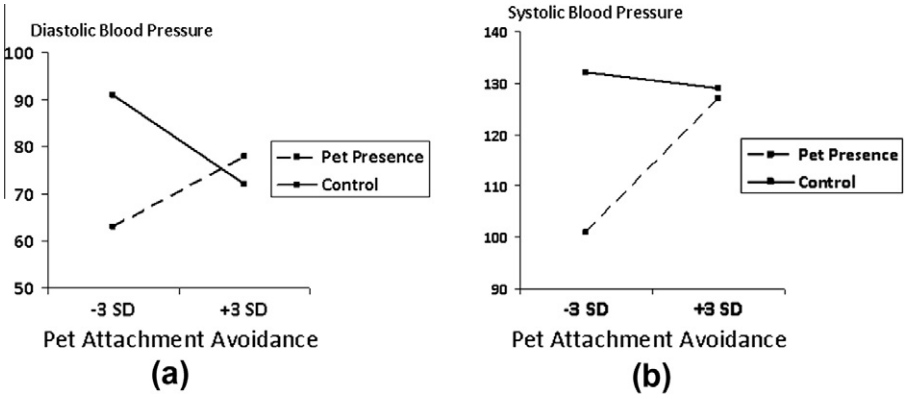

Fig. 3. Interactions between pet presence and pet attachment avoidance on diastolic blood pressure (a) and systolic blood pressure (b).

way people relate to their pets and their ability to profit from this relationship.

Consistent with our hypotheses, the present studies indicate that pets provide their owners with a secure base for exploration and growth and a safe haven in times of need. Using different methodologies, our findings consistently showed that the physical or cognitive presence of a pet provided to owners feelings of competence and a secure base from which they could entertain ambitions and experience a greater sense of self-efficacy. Furthermore, pet presence (whether physical or cognitive) provided owners with a safe haven, as expressed in both lower appraisals of threat and weaker cardiovascular reactions (i.e., blood pressure) during a distress-eliciting activity. These findings are consistent with previous findings in adult attachment research showing that physical or symbolic proximity to a supportive relationship partner can soothe a person in distress (e.g., McGowan, 2002) and encourage exploration of future goals and plans (e.g., Feeney & Thrush, 2010). That is, the observed positive effects of proximity to a pet on distress regulation and exploration resemble those produced by proximity to a human protective figure, thereby supporting our basic idea that a pet can act as an attachment figure.

The findings also indicate that individual differences in pet attachment orientations, as measured with the PAQ, moderate pet owner's ability to use their pet as a secure base and a safe haven. Across both studies, attachment insecurities seemed to counteract the beneficial regulatory effects of the physical or cognitive presence of a pet. Specifically, attachment avoidance toward a pet was associated with failure of a pet to provide either a safe haven or a secure base. For people scoring relatively high on avoidant attachment, the physical or cognitive presence of a pet (as compared to no pet presence) failed to produce a richer exploration of personal goals, to increase confidence in goal achievement, or to reduce signs of physiological arousal during a distressing task (blood pressure elevation). With regard to attachment anxiety, its detrimental effects were narrower. For people scoring relatively high on anxious attachment to a pet, the physical or cognitive presence of a pet failed to increase confidence in goal achievement. However, anxious attachment did not inhibit the benefits of pet presence for exploration of personal goals and distress reduction. That is, attachment avoidance with respect to a pet seems to be more relevant than attachment anxiety in interfering with the used of a pet as a source of attachment security.

The detrimental effects of avoidant attachment may reflect the negative views avoidant people have of their attachment figures and their reluctance to rely on these figures for regulating distress and pursuing personal goals (Mikulincer & Shaver, 2007). Avoidant attachment in human–human relationships is associated with negative views of relationship partners (e.g., Feeney & Noller, 1991), negative expectations about partners' behavior (e.g., Baldwin, Fehr, Keedian, Seidel, & Thompson, 1993), and negative attributions concerning partners' undesirable behavior (e.g., Collins, 1996). Accordingly, Zilcha-Mano et al. (2011a) found that pet owners who scored high on avoidant attachment to their pet tended 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 and responsive to their needs.

All of these cognitive and motivational tendencies may lead people scoring high on pet avoidant attachment to distrust their pets' intentions and take distance from their pets during goal pursuit or distress reduction, thereby forfeiting the regulatory benefits of proximity to a pet. In addition, these negative attitudes might lead a pet to distance itself from its avoidant owner and to inhibit actual proximity bids and overt expressions of affection, care, and love, thereby further exacerbating owner's distrust and pet's failure to provide a sense of attachment security. That is, pet avoidant attachment, like avoidant attachment in human–human relationships, can create an amplifying spiral of distrust and emotional distance that inhibits the formation of a secure attachment bond. Of course, this is a post hoc explanation, because we did not collect data about actual pet behavior or owner-pet interactions during the goal exploration and distress-eliciting tasks. Further studies should complement the current findings by adding behavioral observations of both owner and pet behaviors (see studies by Collins & Feeney, 2000; Feeney, 2004; and Simpson, Rholes, & Nelligan, 1992, for similar designs used in the study of human–human relationships). One could examine the extent to which owners differing in pet avoidant attachment actually seek safe-haven or secure-base support from their pet and the extent to which their pet actually acts as a sensitive and responsive caregiver.

With regard to pet attachment anxiety, our findings imply that both people scoring high or low on this dimension benefit from pet proximity. In our view, the fact that highly anxious owners still benefit from pet proximity reflects their intense attitudinal and motivational ambivalence toward their attachment figures (Mikulincer, Shaver, Bar-On, & Ein-Dor, 2010). Although people scoring high on attachment anxiety have a history of frustrating interactions with attachment figures, they nevertheless believe that if they intensify their proximity-seeking efforts, they may compel an attachment figure to pay attention and provide adequate support (Mikulincer & Shaver, 2007). As a result, they do not form a simple negative view of others, because such a view would imply that proximity seeking is hopeless. Rather, they form more ambivalent, conflicting appraisals of others' great potential value and insufficient actual care. In human–human relationships, anxious individuals tend to simultaneously hold both positive and negative attitudes toward attachment figures and toward

maintaining proximity to these figures (e.g., Mikulincer et al., 2010). This kind of ambivalence was also documented by Zilcha-Mano et al. (2011a) with regard to human–pet attachment: Whereas owners scoring high on pet attachment anxiety held negative views of their pet, they reported a strong attachment to their pet and exhibited strong grief reactions to its loss.

This ambivalence might explain our current finding that, despite being overwhelmed by doubts about their pet's love and care, people scoring high on pet attachment anxiety still benefited from the presence of their pet during goal exploration and distress-eliciting tasks. Moreover, it is plausible that their intense needs for closeness and hope for their pet's support encouraged the pet's actual expressions of affection and love, which in turn allowed anxious owners to explore more goals and to soothe their distress. However, these positive effects of pet presence disappeared when assessing owners' confidence in attaining personal goals. In this case, only people scoring low on attachment anxiety benefited from pet proximity. We do not have a confident ad hoc explanation of this finding. However, since self-confidence in goal attainment is part of one's self-representations and attachment anxiety is associated with negative views of the self (see Mikulincer & Shaver, 2007, for an extensive review), we can speculate that pet proximity might fail to increase anxiously attached owners' positive models of self. However, this post hoc speculation needs to be examined more systematically in future studies.

Across the two studies, the observed effects of pet attachment orientations could not be explained by attachment orientations in human relationships (as measured with the ECR). Moreover, the within-relationship attachment orientations that people develop with a pet are more important than human attachment orientations in explaining reactions to pet presence during a goal generation task or a distress-eliciting task. This result is compatible with the notion that working models of attachment relationships are organized hierarchically rather than being the same across all relationships and all kinds of relationships (Overall, Fletcher, & Friesen, 2003). It also fits with previous findings highlighting the importance of specific within-relationship working models (e.g., Klohnen et al., 2005).

It is important to note that one can argue that it is the mere presence of an animal that produces the observed effects rather than attachment towards one's own pet. That is, interaction with a friendly animal, even if it is not one's own pet, might have led to the same results. Although this possibility cannot be ruled out, it does not fit results from the current and previous studies. First, pet attachment orientations moderated the effects of animal presence, implying that it is attachment toward one's own pet that underlies the observed effects. Second, DeMello (1999) asked participants to perform a stressful task in the presence of a friendly animal that did not belong to them and did not found any buffering effect of animal presence during the task. Thus, it seems likely that secure attachment towards one's own pet plays an important role in explaining the ability of a pet to provide support and comfort.

Other theoretical perspectives, beyond attachment theory, can also provide relevant insights about the psychological effects of pet's presence. For example, according to the broaden-and-build theory of positive emotions (Fredrickson & Cohn, 2008), pet's presence may evoke positive emotions in owners, which, in turn, help them in dealing with stress and exploring their personal goals. Pet's presence can also serve an "invisible support" function (Bolger, Zuckerman, & Kessler, 2000), which does not compromise owner's sense of autonomy and agency and does not elicit feelings of indebtedness. These complementary perspectives as well as other possible mechanisms should be further examined in future studies.

The present studies highlight the fact that proximity to a pet can empower its owner to explore goals and to regulate distress even if the goals and stresses are unrelated to the relationship with the pet. These findings are important in expanding the construct of "attachment figure" beyond the realm of human relationships with partners who can provide advice and assistance and talk about worries and anxieties. Moreover, it seems that the notion of stronger and wiser caregiver as a definitional criterion for an attachment figure cannot be applied to a pet, because a pet, like a child, needs its owner's attention and care to survive. In our view, other characteristics of human–pet relationships (such as warmth and reliability) can encourage owners to use pets as sources of love, acceptance, and support. Pet owners tend to feel that their pets love and accept them unconditionally (e.g., Levinson, 1969), and that their relationship with a pet is characterized by stability, tenderness, warmth, loyalty, authenticity, and lack of judgment (e.g., Kurdek, 2008; Zilcha-Mano, Mikulincer, & Shaver, 2011b). These characteristics, especially the feeling that one is unconditionally accepted by a pet, may predispose pet owners to approach a pet for comfort and reassurance in times of need and benefit from pet proximity.

More research is needed to further increase our understanding of a pet's ability to serve as an attachment figure. For example, future field studies might examine individual differences in people's capacity to profit from their relationship with their pet during difficult life situations. Additionally, longitudinal studies might shed light on the process of bond formation to a pet and how a pet gradually becomes an attachment figure. Future studies can also examine the effects of pet's personality characteristics on its ability to provide a safe haven and secure base (Gosling, Kwan, & John, 2003) as well as the effects of other species of pets rather than dogs and cats (e.g., parrot, ferret). 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. Although there is still much to be learned, we have shown here that pets may serve as a safe haven and secure base for their owners, and that attachment theory is useful in mapping individual differences in the use of a pet as an attachment figure.

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