



# The Benefits of Giving as well as Receiving Need Support in Human–Pet Relations

Yaniv Kanat-Maymon<sup>1</sup> · Shira Wolfson<sup>1</sup> · Rinat Cohen<sup>1</sup> · Guy Roth<sup>2</sup>

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## Abstract

Dog owners often ascribe human qualities to their dogs and, as such, view them as close others and a source of need support that fosters psychological well-being—this is called the pet effect. In this work, we went beyond the effect of what owners receive from their dogs and examined the benefits of giving need support. Applying self-determination theory’s conceptualization of basic psychological needs for autonomy, relatedness, and competence, we designed a 21-daily diary study ( $n = 104$ ). Results showed giving need support to a dog contributed to owners’ well-being, lessened their psychological distress, and led to greater closeness to the dog, beyond the contribution of receiving need support. Similar to previous research, we observed benefits for receiving need support. In addition, well-being and closeness increased the tendency to care for a dog. These results support the notion that giving daily need support to a close other, a dog in this case, is beneficial to psychological wellness.

**Keywords** Self-determination theory · Basic psychological need · Pet effect · Well-being · Psychological distress

## 1 Introduction

Pet ownership is common among humans. According to the American Pet Products Association (APPA 2017), 68% of American households, or 84.6 million households, own a pet, and more than 80% of owners believe pets are beneficial for their health and psychological well-being. The idea that living with an animal can improve human health, longevity, and psychological well-being, called the “pet effect” (Allen 2003), has been empirically substantiated (e.g. Amiot and Bastian 2015). For instance, in a 12-year prospective national

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✉ Yaniv Kanat-Maymon  
ykanat@idc.ac.il

<sup>1</sup> Interdisciplinary Center, Baruch Ivcher School of Psychology, P.O. Box 167, 46150 Herzliya, Israel

<sup>2</sup> Department of Education, Ben-Gurion University of the Negev, Beersheba, Israel

research study with more than three million participants, dog ownership was associated with lower risk of cardiovascular disease and lower mortality in the general population (Mubanga et al. 2017). Other studies have found pets provide comfort after social rejection (McConnell et al. 2011), reduce psychological stress (Zilcha-Mano et al. 2012), and act as resources for psychological needs satisfaction (Kanat-Maymon et al. 2016a). However, not all research agrees (e.g., Herzog 2011). In a review of 30 studies, Friedmann and Son (2009) found that in one third of these studies, the presence of a pet either was not significantly or was even negatively linked to the owner's psychological well-being and health.

In an attempt to understand why owning a pet appears beneficial for some but not others, several scholars have suggested that human–pet relations are more likely to have an ameliorative effect on owners' well-being when pets are perceived as supporting and satisfying important psychological human needs (Kanat-Maymon et al. 2016a, b; Kurdek 2008; McConnell et al. 2011). However, research in positive psychology has also indicated the potential benefits of *providing* not just receiving support (Inagaki and Orehek 2017; Lyubomirsky et al. 2005). For example, individuals giving support experience greater well-being and have better social relationships (Brown et al. 2003; Dunn et al. 2008; Deci et al. 2006; Weinstein and Ryan 2010).

In our study, we built on this line of research by suggesting that the positive psychological implications of pet ownership, dog ownership in particular, may be at least partially attributed to owners' provision of need support. That is, owners' psychological wellness is a function of supporting their pets' needs, not just a function of what they receive from those pets. Given that pet owners often ascribe human qualities to their pets and perceive them as meaningful close others (Amiot and Bastian 2015; Brown et al. 2016; McConnell et al. 2016), providing support to a dog may have consequences similar to those of providing support to a close human. Therefore, we looked at owners' need support of their dogs in the context of the three basic psychological needs identified by self-determination theory: autonomy, competence, and relatedness (Ryan and Deci 2017).

We conducted a daily diary study to determine the extent to which giving and receiving need support predicted daily well-being, psychological distress, and closeness to a pet dog. The study included only dog owners, as dogs are the most common companion pet (APPA 2017) and are often perceived as possessing human-like qualities (McConnell et al. 2016).

## 1.1 Anthropomorphism

One explanation for the pet effect is that pets can be a source of psychological support in a manner similar to close human others (McConnell et al. 2011). In literature reviews, Amiot and Bastian (2015) and McConnell et al. (2016) reported pet owners tend to anthropomorphize their pets; that is, they ascribe human characteristics, including emotions (e.g., my dog loves me) and cognitions (e.g., my dog understands me), to these animals. Seeing pets as human-like may foster the perception of pets as close others, facilitating pet-human interactions that mirror human–human ones (Amiot and Bastian 2015; McConnell et al. 2016). Indeed, polls of pet owners (Associated Press 2009, 2010) found 50% view their pet “as much a part of the family as any other person in the household,” and 35% have included a pet in a family portrait. A recent US national survey (APPA 2017) reported 53% of dogs sleep in their owner's bed, and 78% of owners buy presents for their dogs.

If dogs are perceived as close others, they may satisfy some of their owners' psychological needs and provide well-being, just like another person would. In fact, experimental research has shown that anthropomorphism can alleviate the consequences of social

rejection (Brown et al. 2016). To tap the core human psychological needs that pets can satisfy to foster wellness, Kanat-Maymon et al. (2016a, b) have suggested using self-determination theory's (SDT) conceptualization of basic psychological needs (Ryan and Deci 2017).

## 1.2 Self-Determination Theory and Basic Psychological Needs

According to SDT, well-being and social relations flourish to the extent that three basic psychological needs are fulfilled: autonomy, competence, and relatedness (Deci and Ryan 2000; Ryan and Deci 2017). The need for autonomy refers to the need to experience volition and to endorse one's own actions. The need for competence involves a desire to feel capable and accomplished, and the need for relatedness reflects the proclivity to feel connected to and understood by others. A wealth of experimental, cross-sectional, and daily diary studies across varied life contexts support the SDT proposition that well-being and the quality of interpersonal relations are enhanced when these psychological needs are fulfilled; if any is unsupported, wellness and functioning are undermined (Cohen et al. 2020; Kanat-Maymon et al. 2015; Patrick et al. 2007; Reis et al. 2000).

It is important to note that from the SDT perspective, the three basic psychological needs are not independent and conflicted but interrelated and complementary (Deci and Ryan 2000). For instance, autonomy does not involve independence or detachment from others. Rather, it involves a sense of volition; thus, fulfillment of one's need for autonomy does not preclude feeling connected with others. Given that the basic needs are interrelated and complementary, behaviors supporting one need often satisfy the other needs as well. When a person takes an interest in his or her partner's preferences and perspectives (autonomy support), the recipient, on top of feeling more autonomy, is likely to feel more cared for (relatedness) and more valuable (competence). Much research has found that the basic needs are positively correlated and are generally complementary in their contribution to well-being and relationship quality (Deci et al. 2006; Patrick et al. 2007; Reis et al. 2000). Accordingly, many SDT researchers have conceptualized the experience of receiving need support as a summary variable representing all three basic need satisfactions (Ryan and Deci 2017).

## 1.3 Pets as a Source of Need Support

According to SDT, need fulfilment is extracted from certain social contexts (Ryan and Deci 2017). Thus, the people with whom one interacts, such as parents, peers, and romantic partners, can be a source of need support. If owners perceive their pets as close others, then these pets are likely to be an additional source of need support and consequently can contribute to well-being and closeness (McConnell et al. 2016; Kanat-Maymon et al. 2016a, b). Although little research has applied the SDT conceptualization of basic psychological needs to human–pet relations, some work supports its utility. For instance, the need for autonomy can be fulfilled by experiencing the unconditional regard and nonjudgmental acceptance of a close other (Kanat-Maymon et al. 2016a, b). Thus, dogs may facilitate autonomy need satisfaction because of their capacity to be nonjudgmental and uncritical (Archer 1997). Dogs may also have the capacity for competence need support. An experimental study with pet owners found a pet's physical or cognitive presence increased self-confidence in goal attainment (Zilcha-Mano et al. 2012). Finally, some evidence suggests pets can satisfy relatedness needs; McConnell et al. (2011) showed dogs can be an

important source of social support because owners consider them close others. By the same token, Payne et al. (2015) argued that by proximity seeking, dogs create emotional bonds with owners, while Brown et al. (2016) showed dogs can alleviate the consequences of social rejection.

A more direct demonstration of the applicability of SDT needs to human–pet relations is a study by Kanat-Maymon et al. (2016a, b), especially their finding that SDT need support from a dog or cat is linked with psychological well-being. Notably, this association was found over and above the contribution of need support by a close human. Another demonstration of the utility of SDT comes from Kurdek’s (2008) analysis of attachment theory. In this study, perceiving a dog as need supporting was linked with the features characterizing secure attachment (secure base, safe haven, proximity maintenance, and separation distress). Overall, the research suggests pets can be a beneficial and unique source of need support that may contribute to well-being.

### 1.4 Benefits of Giving Need Support

On both theoretical and empirical grounds, it seems reasonable to expect that receiving need support from a dog will enhance a person’s psychological well-being and strengthen his or her closeness to the dog. However, to what extent providing need support to the dog can be viewed as beneficial remains unanswered. An implicit assumption guiding most research on providing support and caregiving is that the individual receiving care is the one who benefits while the person providing it incurs some cost (Adelman et al. 2014). However, Deci et al. (2006) have suggested that because basic psychological needs are fundamental for psychological wellness, *giving* need support to a close other is a source of overall need fulfilment in its own right. Research grounded in positive psychology has also highlighted the potential benefits of serving as a care provider (Inagaki et al. 2016; Fredrickson 2001; Wood et al. 2010). By extension, then, if owners perceive their dogs as close others, it is reasonable to assume that being attuned to what are seen as the dog’s important psychological needs can be need fulfilling for owners, and this, in turn, may be reflected in their enhanced well-being, reduced distress, and increased closeness. Thus, although research has not examined the benefits of providing support for all three basic needs to a pet, some support can be extracted from indirect but related sources.

The need for relatedness involves caring for others, as well as feeling cared for. Hence, caring for a dog may fulfil an owner’s relatedness need. Relatedness need support for a dog can be expressed through care behaviors aimed to provide an environment that not only ensures proper living conditions (e.g., food, water, shelter, medical care) but, more importantly, also communicates warmth and concern. For instance, in one study, humans showed an increase in bonding hormones, such as oxytocin and prolactin, when gently stroking a dog or talking lightly to a dog (Odendaal and Meintjes 2003) suggesting that providing relatedness support can fulfil an individual’s relatedness need.

Autonomy need support may take place when an owner is volitionally attuned to the dog’s “personality” (i.e., perspective taking) and fosters activities the dog enjoys. Providing an environment that enables an individual to act authentically, according to his or her inherent preferences is at the heart of providing autonomy support. Deci et al. (2006), for example, showed that providing autonomy support to a close friend resulted in greater need satisfaction and better overall well-being for the autonomy provider.

Care taking can also provide opportunities to experience competence and effectiveness. When an owner successfully teaches a dog behavioral regulation, such as acclimatizing to

home surroundings, the owner's competence need may be met. Indeed, research in animal assistant therapy has shown that training an animal can elevate the caretaker's sense of competence (Bizub et al. 2003; Pedersen et al. 2011).

Although there is a theoretical rationale, and empirical findings support the notion that providing need support to a pet is likely to benefit owners' well-being and relationship quality with their dog, two caveats must be examined. First, in close relationships, individuals are both providers and recipients of need support. Therefore, the effect on well-being of providing need support may mask the effect of receiving need support because of reciprocity norms. Reciprocity, as rooted in the social exchange paradigm, refers to the normative obligation of people to support others to the degree to which they have received support (Gouldner 1960). Research on human–pet interactions has demonstrated that owners perceive their dogs as human-like (Amiot and Bastian 2015), and reciprocity in human–dog interactions is more evident than it is with other animals (Muldoon et al. 2019). Therefore, it is reasonable to argue that the association between giving need support to a dog and wellness is spurious, as it may reflect the effect of receiving need support from the dog. That is, an owner who feels his or her basic needs are supported by the dog (receiving) is likely to experience greater well-being and closeness and, at the same time, because of the norm of reciprocity, is likely to provide greater need support in exchange. This means it is necessary to account for receiving need support when attempting to claim the unique beneficial effect of giving need support.

Second, although some research documents the benefits of giving need support for well-being and closeness, the research generally uses cross-sectional designs which indicate an association, not necessarily causation (Deci et al. 2006). Hence, while need supporting may cause owners to be happier and more attached to their pets, it is equally possible that the causal relations point in the other direction—owners who are healthier and more attached to their dogs to begin with are more likely to be motivated and have the mental and physical resources required to be need supporting. After all, to provide need support to another entity, human or pet, the individual must be attuned to the recipient's needs for autonomy, competence, and relatedness and act in accordance. This requires resources, and when resources are seriously depleted, providing support can be an extra burden that may not contribute to wellness and closeness (Gosnell and Gable 2017; Herzog 2011). For example, one study found individuals suffering from chronic fatigue syndrome who got a pet were just as tired and depressed as those who did not (Wells 2009). It has also been suggested that pets may exacerbate depressive symptoms because of the various responsibilities and emotional attachments related to pet ownership (Gilbey et al. 2007; Needell and Mehta-Naik 2016). Therefore, any attempt to establish the beneficial effect of need supporting must account for the potential effects of wellness and closeness on the provision of this support.

## 1.5 The Present Study

In light of recent positive psychology research and building on the process of anthropomorphism, we used the SDT conceptualization of basic psychological needs to hypothesize that giving need support to pet dogs would be linked to owners' greater well-being, reduced psychological distress, and increased closeness to their pets. While previous research has documented the unique benefits of receiving need support from one's pets to psychological wellness (Kanat-Maymon et al. 2016a, b; McConnell et al. 2016), the role of giving need

support remains unclear. A clearer understanding may yield a theoretical framework able to explain the hitherto mixed findings on the pet effect (Friedmann and Son 2009).

We conducted a 21-day diary study with dog owners. A daily diary methodology is a recommended way to overcome some limitations of retrospective reports. For instance, it allows researchers to obtain more accurate evidence of the daily and temporary experiences of people in a natural context than summaries of retrospections (Bolger et al. 2003). Further, daily diaries facilitate the collection of many repeated measurements over time. In this particular instance, the design enabled a more rigorous examination of the effect of giving need support on owners' psychological well-being, distress, and closeness in the moment and as they unfolded across time (Bolger et al. 2003; Kanat-Maymon et al. 2017).

## 2 Method

### 2.1 Participants and Procedure

Participants were 104 pet dog owners who responded to an online questionnaire for 21 consecutive days in exchange for approximately \$20 (Midgam Project Website: <http://www.midgam.com/info.asp>). To determine appropriate sample size and ensure at least 80% power, we conducted power analysis for a random coefficient multilevel model using the PinT V2.1 computer program (Bosker et al. 2003). Power analysis for a sample of 104 participants and 21 time periods, assuming a moderate effect size (.30 in a correlation metric) and  $p < .05$ , yielded a power of 99%. Participants' ages ranged from 16 to 74 ( $M = 39.45$ ,  $SD = 11.05$ ), with 76% females. All participants had owned a dog for one to 15 years ( $M = 6.31$ ,  $SD = 4.95$ ). Approximately 64% had an academic education, and 74% had average economic status.

Participants were asked to submit diary entries for 21 consecutive days using an online survey platform and to complete the entry by midnight each night. Participants who did not do so were allowed to submit their entry up to noon the following day. When participants forgot to submit their entries, a research assistant contacted them via email and text message to remind them to submit the entry by noon. Participants completed 2129 out of 2184 possible entries (97.5%) over the 21-day period.

### 2.2 Measures

We used measures with a single item or a few items to minimize participant attrition (Bolger et al. 2003). All daily items were rated on a 7-point scale ranging from 1 (do not agree at all) to 7 (strongly agree). All daily measures began with the notation "consider TODAY only."

#### 2.2.1 Daily Receiving of Need Support

The daily receipt of need support was measured with three items taken from the 9-item Pet Need Satisfaction scale (Kanat-Maymon et al. 2016a, b). Items were selected according to their theoretical representation of the basic needs, and their loading on the receiving need support factor was assessed in a pilot study of 204 dog owners. One item measured relatedness need satisfaction ("I feel that my dog really cares for and loves me"), one measured competence need satisfaction ("When I interacted with my dog, it made me feel

competent”), and one measured autonomy need satisfaction (“When I interacted with my dog, it made me feel free to be who I really am”). Correlations between the daily receiving needs support ranged from  $r = .53, p < .001$ , to  $r = .66, p < .001$ , and Cronbach’s  $\alpha$  was .82.

### 2.2.2 Daily Giving of Need Support

Owners’ giving of daily need support was measured using an adjusted version of the 3-item daily receiving need support scale described above, with items rephrased to tap giving need support. One item measured relatedness need support (“When I interacted with my dog, I tried to show it that I really care for it”), one measured competence need support (“When I interacted with my dog, I tried to let it feel competent”), and one measured autonomy need support (“When I interacted with my dog, I tried to let it feel free to be its true self”). Correlations between the daily giving of needs support ranged from  $r = .63, p < .001$ , to  $r = .70, p < .001$ , and Cronbach’s  $\alpha$  was .85.

### 2.2.3 Daily Well-Being

Daily well-being was measured using two items, one assessing daily life satisfaction (“Overall I feel satisfied with my life”; Lucas and Donnellan 2012) and the other assessing daily happiness (“I feel happy”; Abdel-Khalek 2006). The two items were highly correlated ( $r = .78, p < .001$ ) and were therefore aggregated into a single well-being score. Cronbach’s  $\alpha$  was .91.

### 2.2.4 Psychological Distress

Daily psychological distress was measured using the Daily Index-5 scale (Dyer et al. 2014), designed to assess affective distress in a psychiatric sample. For our research, we included only three items tapping overall daily distress more suitable for a non-psychiatric sample (“I have felt useless”, “I have felt depressed”, and “I have felt worthless”). Items tapping severe distress were excluded (e.g., “I have thoughts about killing myself”). Cronbach’s  $\alpha$  was .86.

### 2.2.5 Closeness to Dog

Felt closeness was measured using an adapted version of the Daily Relationship Quality Scale (Young et al. 2013). The original scale has three items (closeness, satisfaction, commitment) assessing romantic relationships. We used two items tapping closeness to the dog (“I felt very close to my dog”) and satisfaction derived from the relationship with the dog (“I was satisfied with the relationship with my dog”). We excluded the commitment item as it is less suitable for a human–pet relationship. Cronbach’s  $\alpha$  was .91.

### 2.2.6 Demographic Information

Demographic information included owners’ gender (male, female), age in years, marital status (single, married, divorced/widow), number of children, years of dog ownership, economic status (on a 5-point Likert scale ranging from well below average to well above average), and level of education (less than high school, high school, bachelor’s, master’s, or PhD).

## 2.3 Measurement Model

We conducted confirmatory factor analysis (CFA) to test the convergence of items into factors. The measurement model included five latent factors pertaining to giving need support, receiving need support, well-being, psychological distress, and relationship quality. Results indicated an adequate fit to the data,  $\chi^2(67) = 989.32$ ,  $p < .001$ , NFI = .95, CFI = .96, TLI = .93, RMSEA = .07. Indicators' loadings onto their respective factors were all strong and statistically significant, ranging from .69 to .93 (see supplementary material for detailed items' loadings).

## 2.4 Analytical Strategy

To examine the hypothesized associations between the daily giving of need support and daily well-being, distress, and closeness, we employed multilevel modeling (MLM; Klein and Kozlowski 2000) using the IBM SPSS Mixed routine. We fit two-level models with daily measures nested within each person. The MLM equations included three sets of control variables. First, to control for time-related artifacts, the elapsed time in days was included as a linear trend (Bolger and Laurenceau 2013). Second, to account for a potential reciprocity effect, which implies that giving need support merely represents a variance of receiving need support, we controlled for time-variants of receiving need support. Third, to account for reverse causation and to rule out daily auto-regression, in predicting the dependent variable (DV), we controlled for the previous day's DV. For example, in predicting today's well-being, yesterday's well-being was partialled out. Thus, the effect of giving need support was interpreted as the extent to which daily fluctuations in giving need support at each time point were predictive of the change in the DV from yesterday to today. These lagged effects are considered approximations of causal effects in non-experimental designs (Cohen et al. 2003). To ease the interpretation of Level 1 coefficients, all the within-person predictors were person-mean centered. The time trend was centered on the middle of the time span (i.e., 11<sup>th</sup> day). For the Level 1 equations, intercepts and slopes were treated as random effects. The generic daily level (i.e., within-person) equation was:

$$\text{Outcome}_{ii} = \pi_{0i} + \pi_{1i} \times \text{Giving need support}_{ti} + \pi_{2i} \times \text{Receiving need support}_{ti} \\ + \pi_{3i} \times \text{Yesterday's Outcome}_{ti} + \pi_{4i} \times \text{Time}_{ti} + e_{ii}$$

Each  $\pi$  coefficient in the daily-level equation (Level 1) had a corresponding component in the person-level model (Level 2), such that  $b$  represented the average slope for that predictor across persons. The corresponding Level 2 equations for each Level 1 effect were:

$$\begin{aligned} \pi_{0i} &= b_{00} + r_{0i} \\ \pi_{1i} &= b_{10} + r_{1i} \\ \pi_{2i} &= b_{20} + r_{2i} \\ \pi_{3i} &= b_{30} + r_{3i} \\ \pi_{4i} &= b_{40} + r_{4i} \end{aligned}$$

where  $b_{00}$  refers to the mean of the daily outcome variables across all participants and all days,  $b_{10}$  and  $b_{20}$  are the mean slopes of daily giving and receiving need support across participants respectively,  $b_{30}$  refers to the mean slope of yesterday's outcome,  $b_{40}$  refers to



the time slope, and  $r0i$ ,  $r1i$ ,  $r2i$ ,  $r3i$ , and  $r4i$  represent the error terms for the intercept and the slopes.

### 3 Results

#### 3.1 Preliminary Analyses

As a first step, we decomposed the variance of the research variables into within-person and between-person components and calculated the Intraclass Correlation (ICC) in unconditional models (i.e. intercept only model). ICCs greater than .10 imply data non-independence, and this requires the use of an MLM approach to test hypotheses (Klein and Kozlowski 2000). ICCs for the dependent variables were .56 for well-being, .58 for psychological distress, and .52 for closeness. For giving and receiving need support, the ICC values were .62 and .69, respectively. This indicates substantial variability at both the within- and between-person levels.

Table 1 presents the descriptive statistics and the correlations among the research variables at the daily level. As expected, owners' giving of need support was positively associated with well-being and closeness and negatively associated with psychological distress. Daily giving and receipt of need support were moderately correlated, suggesting owners were able to distinguish between what they gave and what they got in interactions with their dog.

#### 3.2 Primary Analyses

Table 2 presents the results of the two-level MLM equations. Three sets of analyses were conducted, one for each dependent variable. Each set of equations included the predictor of interest, giving need support, as well as receiving need support, lagged DV, and elapsed time.

Results revealed owners' daily giving of need support significantly predicted daily changes in well-being, psychological distress, and relationship quality. Specifically, fluctuations in daily giving of need support were positively related to daily changes in owners' well-being. In the same vein, daily giving of need support was inversely associated with psychological distress. In other words, owners experienced a decrease in distress on days when they provided more need support. Daily giving of need support positively predicted closeness, indicating that fluctuations in giving need support were linked with an increase in time-variant closeness. Importantly, these findings were obtained after controlling for owners' receiving of need support and the lagged DV. Therefore, in line with the main hypothesis, the daily giving of need support to a dog appeared to make a unique beneficial contribution to wellness and closeness.

#### 3.3 Secondary Analyses

Additional findings were notable but not surprising. First, as presented in Table 2, we found the daily receiving of need support predicted an increase in daily well-being and closeness and a decrease in psychological distress. That is, receiving need support appeared to have a unique beneficial effect for owners.

**Table 1** Descriptive statistics and correlations among the research variables

	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Giving need support	4.21	.80										
2. Receiving need support	4.12	.83	.41**									
3. Well-being	3.78	.97	.25**	.33**								
4. Psychological distress	1.64	.89	-.18**	-.21**	-.45**							
5. Closeness	3.96	.99	.55**	.39**	.25**	-.17**						
6. Ownership in years	6.31	4.95	-.09**	-.04	.14**	-.04*	-.09**					
7. Age	39.45	11.05	-.01	-.06**	-.03	-.23**	.00	.10**				
8. Economic status	2.85	.97	.20**	.21**	.05*	.21**	.20**	.06**	-.15**			
9. Gender (female)	-	-	.14**	.23**	.12**	.11**	.15**	-.03	-.18**	.27**		
10. Education (academic)	-	-	.01	-.06*	-.06**	.03	-.03	.13**	.04	-.06**	-.06*	
11. Family status (children)	-	-	.04	-.04	.04	-.24**	-.01	.16**	.50**	-.18**	-.05*	.07**

Economic status; 1 = poor to 5 = very high; Gender: 0 = male, 1 = female; Education: 0 = high school, 1 = academic; and Family status: 0 = no children, 1 = having children

\* $p < .05$ ; \*\* $p < .01$

**Table 2** Owners' giving and receiving need support as predictors of well-being, psychological distress, and closeness: Multilevel random coefficient model

	Well-being			Psychological distress			Closeness					
	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Within person level												
Intercept	3.80	.07	52.05	<.001	1.63	.07	23.94	<.001	3.98	.07	55.52	<.001
Giving need support	.14	.04	3.27	.002	-.10	.04	2.59	.012	.70	.05	14.46	<.001
Receiving need support	.45	.06	7.69	<.001	-.22	.05	4.33	<.001	.35	.05	7.69	<.001
DV (previous day)	.08	.02	3.54	.001	.08	.03	2.85	.006	-.02	.02	.96	.340
Time (in days)	.01	.00	1.79	.074	-.01	.00	1.90	.058	-.00	.00	.09	.932
Variance components												
Within person ( $\sigma^2$ )	.29				.25				.22			
Between person ( $\tau$ )	.53				.46				.50			
R <sup>2</sup> within person	.29				.24				.53			

Second, to test the reverse hypothesis, i.e., that need supporting is a function of well-being, distress, and closeness, we used the MLM approach to predict daily changes in giving need support based on daily well-being, distress, and closeness. Lagged giving of need support and elapsed time were included as additional covariates. Results indicated that on days when owners felt a greater sense of well-being ( $B = .054$ ,  $SE = .027$ ,  $p = .012$ ) and greater closeness ( $B = .383$ ,  $SE = .027$ ,  $p < .001$ ), they tended to be more need supportive of their dogs. Fluctuations in psychological distress were not associated with day-to-day changes in giving need support ( $B = -.020$ ,  $SE = .022$ ,  $p = .380$ ).

Third, to account for the potential effect of demographic variables, we tested the hypotheses while accounting for years of dog ownership, participants' age, gender, education, economic status, and whether they had children. We found economic status was inversely related with distress and positively related with closeness. More importantly, the main results for the effects of giving and receiving need support remained similar even with the inclusion of the demographic variables (see supplementary material for detailed results).

## 4 Discussion

The study examined the extent to which giving basic psychological need support to a dog was linked with owners' increased psychological well-being, reduced psychological distress, and increased closeness to the dog. Using a daily diary methodology, we found owners who were attuned to giving need support experienced greater well-being, suffered less psychological distress, and felt closer to their dogs. Notably, these effects were obtained over and above the effects of receiving need support, suggesting giving need support is a unique source of need fulfilment in and of itself.

These findings resonate with the growing body of research in positive psychology pointing to the psychological benefits of providing support to others (Inagaki and Orehek 2017; Lyubomirsky et al. 2005) and with self-determination theory's understanding of the basic psychological needs (Deci et al. 2006; Weinstein and Ryan 2010). Providing need support for a close other can be a source of need satisfaction in its own right and foster well-being, buffer distress, and build closeness. Previous studies within the SDT framework have shown some support for this notion in peer relations (Deci et al. 2006) and between romantic partners (Patrick et al. 2007). Similarly, research in animal assisted therapy suggests caring for and supporting an animal leads to the improved physical and emotional well-being of people who are ill (Fine 2010). Even among those who are not ill, taking care of a pet benefits mental and psychological health (Friedmann and Son 2009).

Our research is unique in bridging research on basic psychological needs with work on human–pet relations and, as such, it has the potential to enrich our understanding of the pet effect. Most research on human–pet relations revolves around the need for relatedness (McConnell et al. 2011), with researchers showing that providing warm and loving care for a pet is associated with relatedness satisfaction (Kurdek 2008; Orendaal and Meintjes 2003). However, as SDT argues, autonomy and competence are equally important needs. Inagaki and Orehek (2017) and Weinstein and Ryan (2010) have suggested autonomy is a boundary condition for the benefits of providing support. In their view, the benefits of giving support depend on whether acts of support are volitional. If providing support is not freely chosen, care giving for a pet or close other can be a burden (Adelman et al. 2014; Herzog 2011). Competence can also be increased by care giving. For instance, research

in animal assistant therapy has shown that training an animal can elevate children's and adults' self-efficacy (Bizub et al. 2003; Pedersen et al. 2011).

It is important to note that it is far from clear whether dogs actually possess the need for autonomy, competence, and relatedness, and this understanding rests on anthropomorphism. Pet owners are known to ascribe human-like characteristics to their pets (Amiot and Bastian 2015; Brown et al. 2016; McConnell et al. 2016). Because the needs for autonomy, competence, and relatedness are considered fundamental to human psychological wellness, owners may project these needs onto their dogs and thus come to view them as possessing these needs. If dogs are perceived as having basic psychological needs, trying to support these needs can be beneficial to the care provider in the same manner as supporting the needs of close humans is beneficial. Despite our finding of this type of link, we cannot say for sure if all owners benefit equally. For example, research on pet anthropomorphism indicates that, to some extent, anthropomorphism is more common in people who feel socially isolated (e.g., Epley et al. 2008), and ameliorative pet effects have mostly been observed in those especially prone to engage in anthropomorphism (Brown et al. 2016). Can individual differences in anthropomorphism or social rejection explain the relations between giving need support and well-being? Can those who anthropomorphize more benefit more from providing need support? Further research is needed to answer these questions.

Over and above the effect of giving need support on well-being and closeness, we had two main findings. First, among our participants, the daily receiving of need support predicted increased daily well-being, less distress, and a better relationship with the dog. This finding is in line with previous research documenting the positive consequences of experiencing need fulfillment in human–pet relations (Kanat-Maymon et al. 2016a, b; Kurdek 2008). Interestingly, giving and receiving need support were positively correlated; this can be interpreted as an indication of reciprocity. That is, pet owners may be more supportive in response to perceptions of receiving need support. However, for our participants, giving and receiving need support made unique contributions to well-being and closeness, suggesting reciprocity is not the whole story; giving need support cannot be reduced to a response to receiving need support. Similar to Deci and colleagues' finding (2006), ours suggests that giving and receiving need support are both important sources for well-being and closeness and can be extended to human–pet relations.

Second, we found that on days when owners felt more well-being and were more attached to their dogs, they also tended to be more need supportive. Arguably, owners who are psychologically healthier and feel closer to their dogs are better able to provide need support. Indeed, critics of the pet effect have suggested people with poor psychological health tend to perceive caring for a pet as a burden and extract few, if any, well-being benefits (e.g., Herzog 2011). By the same token, people who are more attached to their dogs are more motivated to provide need support. However, the fact that in our study, well-being and closeness to dogs were antecedents of giving need support does not rule out the potentially beneficial effect of need support. In fact, we predicted daily well-being, distress, and closeness from the daily giving of need support while accounting for well-being, distress, and closeness on the previous day. Together, these findings suggest giving need support may increase owners' wellness and closeness, while, at the same time, well-being and closeness may foster giving need support.

It is important to acknowledge that alternative explanations are possible. For instance, given that an owner's social interaction with a dog is typically positive and pleasant, the amount of time spent with the dog on a given day could account for the shared variance. In other words, days on which the owner spends more time with the dog may increase the giving and receiving need support behaviors and thus increase well-being and closeness and reduce distress.

Yet it is difficult to disentangle the effects of time and support giving, as giving support may motivate owners to spend more time with their dogs. Further research is needed on this issue.

Overall, this research supports the utility of a basic needs perspective to explain the pet effect. Merely owning a pet is not necessarily beneficial; rather, the amount of giving and receiving of need support may be an important determinant of the benefits of pet ownership. This echoes critics of the pet effect who say pet ownership is not always psychologically beneficial (e.g., Friedmann and Son 2009; Herzog 2011). For instance, having a dog for the purpose of intimidating burglars may have little to do with basic needs satisfaction and thus is less likely to have an impact on psychological wellness, whereas having a dog for companionship purposes is likely to involve both giving and receiving need support and will have well-being benefits. Future research should investigate how the different reasons for pet ownership are related to needs satisfaction.

#### 4.1 Limitations and Future Research

A number of limitations should be considered when interpreting our results. First, we used self-report measures for both the predictor and outcome variables, making the results susceptible to common method bias (Podsakoff et al. 2003). Future research should employ more objective measures of need support. Second, to test the hypotheses and the alternative models, we used separate analyses with reversing path arrows, whereby in each model, we controlled for the outcome variable on the previous day. Although this analytical strategy strengthened causation, alternative analytical strategies could be applied to achieve the same end. For example, cross-lagged panel designs in structural equation modeling would better account for bivariate change and could test multiple directional paths simultaneously (Hamaker et al. 2015; Thoemmes 2015). In any event, the addition of other experimental designs would contribute to the understanding of the causal effect of providing need support on well-being and closeness in human–pet relations. Third, participants were mostly women, limiting the generalizability of the findings. Fourth, the research was limited to dog owners. It is unclear whether giving or receiving need support is important in relations with pets who do not act in a human-like way, for instance, birds or lizards. Finally, the unique effects of each need were not tested separately. Although previous research has indicated that each has a unique effect on well-being (Reis et al. 2000), the relatedness need is particularly important in social relationships (Patrick et al. 2007). Further work is required to capture the distinctive aspects of each need within a human–pet relationship.

## 5 Conclusion

Our study suggests the beneficial consequences of giving and receiving basic psychological need support on pet owners' well-being and the quality of their relationships with their pets. The findings emphasize the utility of applying the SDT perspective of psychological needs to research on well-being and relationship quality in studies of human–pet relations.

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