

# Attachment insecurity hinders cardiac patients' ability to receive partners' care: A longitudinal dyadic study

Journal of Social and  
Personal Relationships  
2020, Vol. 37(5) 1494–1512  
© The Author(s) 2020  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/0265407519900998  
journals.sagepub.com/home/spr



Sivan George-Levi<sup>1,2</sup> , Shira Peleg<sup>3</sup>, Noa Vilchinsky<sup>2</sup>,  
Eshkol Rafaeli<sup>2</sup>, Abid Khaskiaa<sup>4</sup>, Morris Mosseri<sup>4</sup>,  
and Hanoch Hod<sup>5</sup>

## Abstract

**Objectives:** The fact that spousal support is not always beneficial for the recipient continues to intrigue researchers in the dyadic support field. One possible explanation for this phenomenon may be individual differences in attachment orientations, which might promote or, conversely, hinder the ability to capitalize on one's partner's support. We therefore assessed the interactive contribution of cardiac patients' attachment orientations (anxious and avoidant) and partners' caregiving styles (sensitive and compulsive) to patients' anxiety symptoms 6 months after a first acute coronary syndrome (ACS).

**Design and methods:** A longitudinal design was employed among 114 couples coping with one partner's ACS. During hospitalization, patients completed the Experiences in Close Relationships scale, tapping attachment orientation, and 6 months later, the anxiety scale of the Brief Symptom Inventory. Partners completed the Adult Caregiving Questionnaire during patients' hospitalization.

**Results:** Regression analyses showed that partners' caregiving styles moderated the positive association between patients' anxious attachment and anxiety symptoms. This

<sup>1</sup> Peres Academic Center, Israel

<sup>2</sup> Bar-Ilan University, Israel

<sup>3</sup> Tel-Aviv University, Israel

<sup>4</sup> Meir Medical Center, Israel (affiliated to Tel Aviv University Medical School, Israel)

<sup>5</sup> Sheba Medical Center, Israel

## Corresponding author:

Sivan George-Levi, Department of Behavioral Science, Peres Academic Center, Rehovot, Israel.  
Email: sivan.george@gmail.com

association was stronger when partners were characterized with high levels of compulsive caregiving, but also, and surprisingly, when partners were characterized with high levels of sensitive caregiving. No significant effects were found for highly avoidant patients.

**Conclusions:** The findings suggest that patients' personalities play a crucial role in determining the consequences of partners' caregiving styles. Integrating the personality perspective into the dyadic paradigm may allow a more comprehensive understanding of the circumstances under which partners' care reduces patients' distress.

### **Keywords**

Acute coronary syndrome, anxiety symptoms, attachment orientations, caregiving styles, couples

### **Introduction**

Partners most often serve as the main source of support for adults coping with illness (Knoll et al., 2018; Smith & Baucom, 2017), and many studies have detected the positive contribution of partners' care to patients' outcomes (DiMatteo, 2004; Martire & Helgeson, 2017; Thoits, 2011). Nevertheless, there has been an increase in findings suggesting that spousal support is not always beneficial for the recipient, creating something of an enigma in the field of social support research (Bolger & Amarel, 2007; Gable et al., 2012; Gleason et al., 2008; Howland & Simpson, 2010).

Pow et al. (2018) claim that these inconsistencies may result from the fact that many studies focus only on the patients' perceived care and overlook reports from care providers. Studies which applied a dyadic approach and investigated both partners' perceptions of care were better able to pinpoint under which circumstances partners' support might be either beneficial or detrimental for patients' outcomes (George-Levi et al., 2016; Vilchinsky et al., 2011).

While observing support transactions from a dyadic perspective, one should also take into account that each side of the dyad's responses is colored to a great degree by their distinctive personal characteristics (Markey & Markey, 2014; Pietromonaco et al., 2013). These individual differences may hinder or facilitate one's ability to accept as well as to provide care (Pietromonaco & Collins, 2017; Revenson et al., 2016).

Following Pietromonaco and Collins (2017), in the current study, we suggest that the integration between the personality perspective and the dyadic paradigm may allow for a more comprehensive understanding of the circumstances under which partners' care may affect patients' distress. Based on the attachment theory of personality, which highlights individual differences in the capacity to receive care, the current study assessed how female partners' personal caregiving styles moderated the associations among male cardiac patients' attachment orientations and improvement in anxiety symptoms over time.

### ***Attachment orientations and receiving of care***

According to attachment theory (Bowlby, 1982, Mikulincer & Shaver, 2012), one's developmental experiences with caregiving figures during childhood shape to a great

extent the way in which people perceive the care provided by significant others and capitalize on it for regulating their emotions throughout their lives (Bowlby, 1982). When the attachment to the early main caregiver is not optimal, one of two attachment orientations may develop: either anxious or avoidant (Brennan et al., 1998). An anxious attachment (ANX) orientation is characterized by excessive care seeking, a desire for intimacy, and fear of rejection and loss. An avoidant attachment (AVO) orientation refers to behaviors that limit intimacy and maintain psychological and emotional distance from significant others (Bowlby, 1982, Mikulincer & Shaver, 2012). By contrast, when people are successful at achieving closeness and feel securely attached, they acquire tools for down-regulating distress and maintaining emotional balance in the face of stressful situations (Bowlby, 1982; Simpson & Rholes, 2010).

Medical situations tend to strongly activate the attachment system, as these situations include a physical threat as well as potential attachment-related stressors, such as abandonment anxiety (Hunter & Maunder, 2001). In times of stress, highly anxiously attached individuals desire excessive closeness, and they worry that their partners will not be sufficiently responsive; thus, they tend to cope by persistently signaling their distress. Highly avoidant-attached individuals, on the other hand, tend to cope by minimizing distress and retreating from others in times of stress (Kidd et al., 2016; Meredith et al., 2006; Mikulincer & Shaver, 2009).

### *Provider's caregiving style*

According to Bowlby (1982), the caregiving system is a biobehavioral system that parallels the attachment system. It includes an innate ability to identify the needs of others and the capacity to provide them with security and support (Bowlby, 1982; Collins & Ford, 2010). Caregiving styles differ among individuals and, according to Bowlby (1982), can be classified into two inherent styles: *sensitive* caregiving (SENS, which consists of the ability to be attuned, responsive, and in harmony with another's support-seeking behavior) and *compulsive* caregiving (COMP, which consists of the tendency to provide intrusive, poorly timed, and forced care). COMP reflects extreme over-involvement with the recipient's problems in order to maintain or increase proximity to the recipient. This style is considered a form of "bad concern" (Tolmacz, 2010, pp. 93–107), and it characterizes less attentive and highly self-focused caregivers.

Whereas studies have detected positive effects of the SENS style on recipients' relationship satisfaction and well-being (see e.g., in Collins & Ford, 2010), research on the compulsive style has yielded mixed results. For example, in our former study (George-Levi et al., 2017), we detected that whereas COMP was indeed detrimental to the recipients in the context of daily living, it was found to be beneficial for patients in the context of cardiac illness. In a study targeting recipients' attachment styles, it was found that patients high on AVO tended to report receiving more COMP from their partners, compared to patients low on AVO. On the other hand, patients high on ANX tended to report on receiving less COMP from their partners compared to patients low on ANX (Braun et al., 2012). The authors suggested that these findings indicated what Bartholomew and Allison termed the "pursuit-withdrawal" dynamic among partners (Bartholomew & Allison, 2006, pp. 102–127), which means that the tendency of one

partner to distance them from the other may boost the other partner's attempts to maintain closeness and vice versa. Thus, people's attachment orientations may determine how they conceive the support provided to them, a perception that, down the road, may contribute to their outcomes. Therefore, in order to better understand the circumstances under which the caregiver's style (sensitive or compulsive) is beneficial for the recipient, it is essential to investigate the personality of the recipient.

### *The interplay between recipient's attachment orientation and provider's caregiving style*

Several studies have examined the ability of individuals with different attachment orientations to benefit from their partners' support efforts (Collins & Feeney, 2004; Girme et al., 2015; Meuwly et al., 2012; Simpson et al., 2007; Stanton & Campbell, 2014; Vilchinsky et al., 2010). Overall, it was found that the more insecurely attached a person is, the less they benefit from their partner's support actions (Girme et al., 2015; Rhoades et al., 1999; Stanton & Campbell, 2014; Simpson et al., 1992).

However, these studies also reveal inconsistent patterns in this area. For example, some research suggests that very high levels of practical support can effectively soothe even highly avoidant recipients (Girme et al., 2015; Simpson et al., 1992, 2007). In another study, Vilchinsky et al. (2010) detected that highly anxiously attached cardiac patients, rather than patients low on ANX, benefited from their spouses' active-engagement kind of support, in terms of reduced anxiety over time. These inconsistencies again indicate the importance of assessing not only the patient's capacity for receiving care but also the provider's distinctive style of giving care.

### *The current study*

Our main goal was to examine the contribution of the *interaction* between female partners' caregiving styles and male cardiac patients' attachment orientations to the improvement in patients' anxiety symptoms, 6-month post-hospitalization, in the context of a newly diagnosed acute cardiac event.

Cardiovascular diseases (CVDs) are one of the leading causes of death in most industrial countries (Benjamin et al., 2018). The acute clinical manifestation (i.e., acute coronary syndrome [ACS]) of CVDs includes myocardial infarction (MI) and severe unstable angina (UA); both can lead to chronic disability and even death (Falvo, 2014). Experiencing a cardiac event is a stressful and frightening experience, and it is common to feel anxiety following an ACS (Tully et al., 2016). Anxiety among ACS patients is an important single predictor of patients' outcomes and is associated with an increased risk for recurrence of the cardiac event and an even higher risk for mortality (Holt et al., 2013; Scherrer et al., 2012). This effect is possibly the consequence of the contribution of anxiety to low adherence to medical recommendations, such as participating in a rehabilitation program and/or engaging in health-promoting behaviors (Reges et al., 2014; Vilchinsky et al., 2018). Therefore, it seems crucial to reveal the circumstances under which anxiety symptoms might improve or deteriorate following the onset of an ACS.

Given that a first ACS among women tends to occur more often as women get older and are more likely to be widowed (Garcia et al., 2016; Regitz-Zagrosek & Kararigas, 2017) and are therefore less likely to be engaged in a long-term relationship, the current study focused on male patients diagnosed with a first ACS and their female caregivers.

Based on the aforementioned review, it was hypothesized that patients characterized with high versus low levels of insecure attachment orientation (anxious or avoidant) would have less improvement in anxiety symptoms 6-month post-hospitalization. Due to the tendency of highly anxiously attached individuals toward hyper-activation of their emotional system, we assumed that the negative association between ANX and improvement in anxiety symptoms would be high.

Yet we expected this association to be weaker when partners' SENS style was high compared to low and stronger when partners' COMP style was high compared to low. Given that individuals high on AVO do not tend to disclose their distress and are inclined toward extreme self-reliance, we assumed that the negative association between AVO and improvement in anxiety symptoms would be moderate. We also assumed that partners' caregiving style would only modestly attenuate this association.

## Method

### *Participants and procedure*

The current study was part of a large-scale longitudinal prospective research project investigating personal and dyadic adjustment to heart disease. Data were collected between May 2011 and August 2012 from the cardiac care unit of Sheba Medical Center, the largest medical center in Israel, and of Meir Medical Center, located in a more marginal region of Israel. The inclusion and exclusion criteria were described in detail by George-Levi et al. (2016). In short, the target population included all married or cohabiting men diagnosed with their first ACS and their partners. Patients over 75 years of age, patients with a diagnosis other than ACS (i.e., other than MI or UA), patients who had comorbid conditions (e.g., psychiatric illness, neoplasia), and patients who could not be interviewed in Hebrew were excluded. Of the 223 eligible patients, 66 refused to participate in the study (29.6%), and 26 had partners who refused to participate in the study (11.66%). The sample thus consisted of 131 couples (58.7% recruitment rate).

Baseline characteristics of couples are presented in Table 1. The sample was described at length in George-Levi et al. (2016). Overall, participants were highly educated, in their 50s, married for approximately 30 years, and the majority of them reported a moderate economic status. The overall degree of patients' illness severity was found to be moderate. No significant association was found between the degree of illness severity and patients' anxiety symptoms ( $r = -.09, p = .55$ ).

The study protocol was approved by the Sheba Medical Center and Meir Medical Center medical centers' institutional review boards. All eligible patients were approached within 24 hr post-catheterization by a member of the research team and asked to participate in this study. Patients who consented were given the study questionnaires and were instructed to complete them independently or with the help of a research assistant if they wished. After 6 months, a research assistant recontacted participants by phone and

**Table 1.** Baseline characteristics of the couples in the study ( $N = 131$ ).

	Patients M (SD)	Partners M (SD)
Age (years)	56.17 (8.15)	52.72 (8.49)
Education (years)	14.00 (3.30)	14.63 (3.22)
Relationship length (years)	27.82 (12.16)	—
Number of children	2.96 (1.32)	—
	Patients (%)	Partners (%)
Perceived economic status		
Very good	17.6	9.9
Moderate	79.4	82.4
Bad	3.1	7.6
Illness severity		
Echo score:		
Normal–moderate	65.6	—
Severe–extremely severe	34.4	—
Angio score:		
Normal–moderate	78.6	—
Severe–extremely severe	21.4	—

set up an appointment with them (usually at their homes but in a few cases, per participant requests, at the hospital facility during regular checkups) for the completion of follow-up assessments. Twelve couples refused to continue with the study at follow-up, two couples had separated by the time the follow-up interview took place, two couples were coping with a newly diagnosed life-threatening illness which prevented them from participating in the follow-up interview, and one partner had died before completing the follow-up questionnaire. Overall, therefore, 114 couples completed the study questionnaires at both time points (13% attrition rate). Couples who completed all study questionnaires both at hospitalization and at follow-up received a gift certificate in the amount of US\$55.

**Measures.** All measures described below were administered to participants during hospitalization ( $T_1$ ). In addition, the anxiety questionnaire was also administered at 6-months post-discharge ( $T_2$ ). All measures were administered in Hebrew.

**Patients' anxiety symptoms.** Anxiety symptoms were measured using the Brief Symptom Inventory (Derogatis & Melisaratos, 1983). Each participant was asked to rate the degree to which he experienced each symptom (e.g., "feeling stressed") from the time of the ACS onset, on a scale ranging from 1 (*not at all*) to 4 (*very much*). Scores were averaged so that higher scores represented higher levels of anxiety. We used the 6-item validated Hebrew translation of the subscale of anxiety symptoms (Gilbar & Ben-Zur, 2002). Cronbach's  $\alpha$  for this measure in the current study was .82.

**Patients' attachment orientations.** Attachment orientations were measured using the Hebrew version of the Experiences in Close Relationships scale (ECR-Revised; Brennan et al., 1998). The ECR is a self-report scale measuring the dimensions of anxious and

AVO. Participants rated the extent to which each item of the questionnaire was descriptive of their feelings in close relationships on a 7-point scale, ranging from 1 (*not at all*) to 7 (*very much*). Eighteen items addressed ANX (e.g., “I worry about being abandoned”) and 18 addressed AVO (e.g., “I prefer not to show my partner how I feel deep down”). Scores were computed for each of the subscales by averaging the responses on the relevant items. Cronbach’s  $\alpha$ s among men were .85 and .84 for ANX and AVO, respectively.

**Partners’ caregiving styles.** Participants’ caregiving styles were measured using the Hebrew version of the Adult Caregiving questionnaire (Kunce & Shaver, 1994). Based on Feeney (1996), we computed two factors: sensitive (24 items) and compulsive (7 items) caregiving styles. Each participant rated her own orientation on a scale ranging from 1 (*not at all like me*) to 7 (*very much like me*). An example of a SENS item is, “I am very attentive to my partner’s nonverbal signals for help and support,” and of a COMP item: “I tend to get over-involved in my partner’s problems and difficulties.” Two separate scores (a COMP style and a SENS style) were calculated by averaging the responses on the relevant items. Cronbach’s  $\alpha$ s were .85 and .72 for the SENS and COMP styles, respectively.

**Sociodemographic data.** Participants were asked to complete a short demographic questionnaire including age, duration (in years) of relationship, number of children, years of education, and perceived socioeconomic status (SES) as measured on a scale of 1 (*very poor*) to 5 (*excellent*).

**Illness severity.** The severity of the patient’s illness was estimated by two senior cardiologists using two sets of criteria: an echocardiogram score, which assesses cardiac damage, and an angiogram score (status of obstructed arteries), which assesses the risk of future damage. Both scores were measured on a scale ranging from 1 (*normal*) to 5 (*extremely severe*).

**Statistical analyses.** Due to the fact that Little’s test for missing completely at random (MCAR; Little, 1998) was nonsignificant, indicating that all of the missing values in the current sample were missing at random, a multiple imputation analysis was applied in order to deal with missing data. This technique uses a regression-based procedure to generate multiple copies of the data set, each of which contains different estimates of the missing values (Baraldi & Enders, 2010). In the current analysis, we applied the SPSS.20 MI procedure, and 10 copies of the data set were generated. After creating these complete data sets, we estimated the models based on each filled-in data set and subsequently used Rubin’s (1987) formulas to combine the parameter estimates and standard errors into a single set of results. This procedure allows for the use of the full sample and provides unbiased parameter estimates as long as the imputation is done at random (MCAR). There were no significant differences in sociodemographic variables between dropouts and continuers.

Descriptive statistics were used to describe the demographic details of the sample and the study’s measures. Bivariate Pearson correlations were applied in order to assess the associations among the sociodemographic variables and the study’s variables, and no

such associations were found. In order to assess the interactive effects of patients' attachment orientations and partners' caregiving styles in predicting the change in patients' anxiety symptoms at the 6-month follow-up, the data were analyzed using a two-step hierarchical regression, with the score of patients' change in anxiety symptoms (i.e., patients' anxiety symptoms at  $T_1$  and patients' anxiety symptoms at  $T_2$ ) as the predicted variable. We chose to operationalize change as  $T_1 - T_2$  for reasons of interpretation, so that higher numbers would indicate greater improvement. Step 1 consisted of patients' anxiety symptoms during hospitalization ( $T_1$ ). Step 2 consisted of partners' caregiving styles (compulsive and sensitive) and patients' attachment orientations (anxious and avoidant). The four hypothesized two-way interactions among partners' caregiving styles and patients' attachment orientations were entered in Step 3, which consisted of the product of the unstandardized centered scores of each relevant variable ( $AVO \times SENS$ ;  $AVO \times COMP$ ;  $ANX \times SENS$ ;  $ANX \times COMP$ ). The variables were centered in order to overcome multicollinearity with the interaction terms (Aiken et al., 1991). In order to test the simple slopes of the interactions, we used the PROCESS macro for SPSS (Model 1; Hayes, 2013).

A power analysis was conducted to determine the appropriate sample size for testing the study's hypotheses using GPower 3.1.9.2 (Faul et al., 2009). The minimum sample size needed to detect a moderate effect size (.15; where effect size is based on the  $R^2: R^2 / (1 - R^2)$ ) in the regression analyses, with a power of 80% and  $\alpha = .05$  was 109 dyads.

## Results

### *Characteristics of the study sample*

Bivariate correlations between sociodemographic variables (age, duration of relationship, number of children, years of education, and SES) and anxiety symptoms, which were measured at  $T_2$ , were nonsignificant. In addition, no significant correlations were found between illness severity and anxiety symptoms ( $r = -.06, p = .53$ ;  $r = -.09, p = .36$ ) for severity according to catheterization and echocardiogram, respectively.

Table 2 presents the means and standard deviations (SDs) of the study's variables as well as the bivariate correlations between them and patients'  $T_1$  and  $T_2$  anxiety symptoms. As can be seen, patients reported overall low levels of anxiety, and the only two significant correlations detected were between patients' ANX as measured at  $T_1$  and their anxiety symptoms at  $T_1$  and  $T_2$ .

### *Predicting improvement in anxiety symptoms via patients' attachment orientations and partners' caregiving styles*

A linear hierarchical regression analysis was conducted in order to assess the direct and interactive contribution of patients' attachment orientations and partners' caregiving styles to patients' improvement in anxiety symptoms 6 months after hospitalization ( $T_1$  anxiety symptoms -  $T_2$  anxiety symptoms). Patients' anxiety symptoms during hospitalization ( $T_1$ ) were entered in Step 1; patients' attachment orientations (anxious and avoidant) and partners' caregiving styles (sensitive and compulsive) were entered in Step



**Table 2.** Means, SDs, and bivariate correlations of all variables tested ( $N = 114$ ).

	<i>M</i>	<i>SD</i>	Range	Patients' $T_1$ anxiety symptoms	Patients' $T_2$ anxiety symptoms
Patients' $T_1$ anxiety symptoms	1.69	0.70	1-4	1.00	0.51**
Patients' $T_2$ anxiety symptoms	1.47	0.54	1-4	0.51**	1.00
Partners' SENS	5.63	0.77	1-7	0.16	0.18
Partners' COMP	3.75	1.21	1-7	-0.13	0.10
Patients' ANX	2.41	0.97	1-7	0.25**	0.31**
Patients' AVO	3.12	0.96	1-7	0.03	-0.08

Note: ANX = anxious attachment; AVO = avoidant attachment; SENS = sensitive caregiving; COMP = compulsive caregiving; SD = standard deviation.

\*\* $p < .001$ .

2. The four two-way interactions between each attachment orientation and each caregiving style were entered in Step 3 (i.e., AVO  $\times$  SENS; AVO  $\times$  COMP; ANX  $\times$  SENS; ANX  $\times$  COMP).

Results indicated that, overall, the model explained 58.6% of the variance of the change in patients' anxiety symptoms,  $F(9,104) = 16.35, p < .001$ . Table 3 presents the regression coefficients of the three steps, as entered into the model, and their confidence intervals. As can be seen, the higher patients' anxiety symptoms were during hospitalization, the higher the change toward lower levels of anxiety (i.e., symptom improvement) was 6 months later. In addition, a significant main effect of patients' ANX was found, such that higher levels of patients' ANX were associated with lower levels of improvement in patients' anxiety symptoms 6 months after hospitalization. Most interesting, the interaction between partners' SENS and patients' ANX, as well as between partners' COMP and patients' ANX, was found to be significant.

An examination of the interaction between patients' ANX and partners' COMP indicated that patients' ANX was negatively associated with improvement in their anxiety symptoms 6 months after hospitalization. This finding was significant when the partners' COMP levels were one SD above the mean of COMP ( $b = -.26, p < .001$ ), but not when partners' COMP levels were 1 SD below the mean ( $b = -.44, p = .53$ ). In other words, less improvement in anxiety symptoms over time was detected among more anxiously attached patients, when their partners provided them with high (vs. low) levels of COMP (see Figure 1).

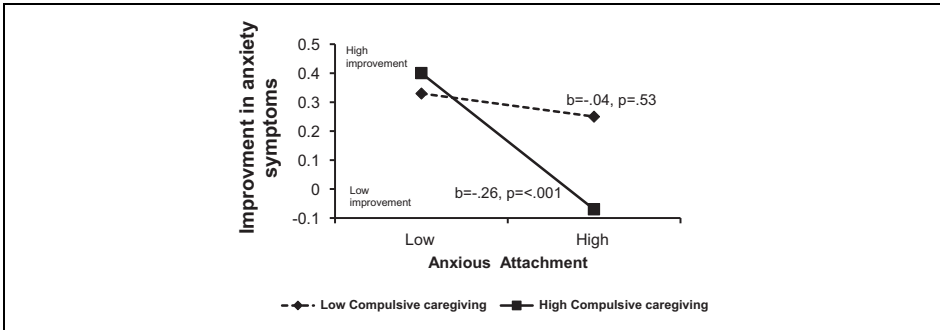
Similar results were detected when we examined SENS style as the moderator. The interaction between patients' ANX and partners' SENS indicated that patients' ANX was negatively associated with improvement in their anxiety symptoms 6 months after hospitalization. This association, however, was significant only when SENS levels were 1 SD above the mean ( $b = -.25, p < .001$ ), but not when SENS levels were 1 SD below the mean ( $b = -.08, p = .24$ ; see Figure 2). In other words, less improvement in anxiety symptoms over time was detected among more anxiously attached patients, when their partners provided them with high (vs. low) levels of SENS.

Overall, the interactions showed that the more anxiously attached patients were, the less improvement detected in their anxiety symptoms over time was. This trend was

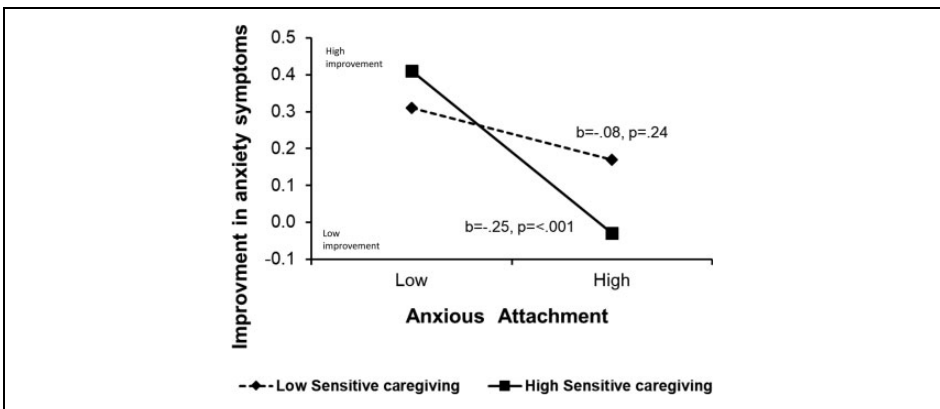
**Table 3.** Hierarchical regression analysis for predicting patients' improvement in anxiety symptoms from T<sub>1</sub> to T<sub>2</sub> via patients' attachment orientations and partners' caregiving styles (N = 114).

	95%CI			95%CI			95%CI		
	B	β	U	L	U	L	U	L	U
Anxiety symptoms at T1									
Patients' ANX	.65***	.73	.78	.53	.78	.66***	.74	.54	.79
Patients' AVO	-.12*	-.16	-.02	-.22	-.02	-.14**	-.19	-.24	-.04
Partners' SENS	.06	.09	1.5	-.02	1.5	.04	.06	-.4	.13
Partners' COMP						-.11*	-.14	-.22	.00
Patients' AVO × Partners' SENS						-.08*	-.14	-.15	.00
Patients' AVO × Partners' COMP									.02
Patients' ANX × Partners' SENS									.02
Patients' ANX × Partners' COMP									-.11*
									-.09*
									.75
									-.23
									.04
									-.04
									-.10
									.02
									.02
									-.14
									-.15
									.55
									-.26
									.12
									.08
									.02
									.16
									.09
									.00
									-.01

Note: ANX = anxious attachment; AVO = avoidant attachment; SENS = sensitive caregiving; COMP = compulsive caregiving; CI = confidence interval. R<sup>2</sup> = .51 for the first step (p < .00); &Delta;R<sup>2</sup> = .03 for the second step (p = .02); &Delta;Delta;R<sup>2</sup> = .04 for the third step (p = .04). \*p < .05; \*\*p < .01; \*\*\*p < .001.



**Figure 1** The interactive effect of partners' COMP style and patients' ANX orientation on patients' improvement in anxiety symptoms 6 months after hospitalization. ANX = anxious attachment; COMP = compulsive caregiving..



**Figure 2.** The interactive effect of partners' SENS style and patients' ANX orientation on patients' improvement in anxiety symptoms 6 months after hospitalization. ANX = anxious attachment; SENS = sensitive caregiving.

mostly found when partners reported being high on either the compulsive or the SENS style. No significant interactive effect of patients' AVO orientation and partners' caregiving style on patients' anxiety symptoms was found.<sup>1</sup>

## Discussion

Our main aim in the current study was to shed light on the inconsistencies in the support literature in the context of coping with illness. Despite others views of partners' support as being beneficial across contexts and circumstances, the cumulative data attest to the fact that support is not a monolithic entity, nor is it always helpful (Uchino et al., 2018). The current findings add to the literature by showing that it is also patients' personality

traits which may buffer or facilitate the potency of partners' caregiving styles in reducing recipients' anxiety.

First, we detected a significant main effect of patients' ANX on improvement in anxiety symptoms 6 months after hospitalization. The more anxiously attached individuals were, the less improvement that was detected over time in their anxiety symptoms. This result is in line with previous studies, showing a consistent link between ANX and anxiety during a medical event (Kidd et al., 2016; Vilchinsky et al., 2010). Individuals scoring high on attachment anxiety tend to perceive negative emotions as congruent with their proximity-seeking goals and hyper-activation of attachment needs, and they may therefore focus on and even exaggerate them. These hyper-activation strategies may create an ongoing cycle of distress even after a threat objectively recedes (Mikulincer & Shaver, 2018).

As hypothesized, no association was found between patients' AVO and their anxiety symptoms. When trying to regulate emotions, avoidant people tend to block or inhibit any emotional state that is incongruent with the goal of keeping attachment needs and tendencies deactivated (Garrison et al., 2014). These inhibitory efforts are directed mainly at anxiety, because this emotional state is associated with threats and feelings of vulnerability (Mikulincer & Shaver, 2018).

In addition, no significant interactions were detected between patients' avoidance and partners' caregiving styles in predicting patients' improvement in anxiety. The anxiety symptoms of highly avoidant-attached individuals seem to be unrelated to partners' caregiving styles, be it sensitive or compulsive. Our findings seem to support the claim put forth by Mikulincer and Shaver (2007) that highly avoidant individuals prefer to cope independently and tend not to actively seek support; they seem to be oblivious to any style of caregiving enacted by their partners.

As for ANX, findings revealed that the interaction between patients' attachment orientations and partners' caregiving styles was predictive of patients' improvement in anxiety symptoms over time. This finding again highlights the importance of applying a dyadic perspective in the context of coping with illness. As hypothesized, higher levels of partners' COMP (which is considered to be a negative form of support) seem to exacerbate the negative association between patients' ANX and the improvement in their anxiety symptoms. Yet, and surprisingly, the same pattern was also found for partners' SENS, which had been expected to buffer the ANX/AVO symptoms link. Overall, it seems that highly anxiously attached patients' improvement in anxiety symptoms was lower when partners described themselves as high versus low on either COMP or SENS styles.

From a theoretical point of view, a partner's characteristic caregiving style, whether compulsive or sensitive, may relay a negative message to the care recipient, activating rejection concerns and negative self-evaluations typical of highly anxiously attached individuals (Girme et al., 2015). Indeed, partners' support is often ineffective at soothing highly anxious support recipients (Moreira et al., 2003; Simpson et al., 1992; Stanton & Campbell, 2014). Our findings support Mikulincer and Shaver's (2018) suggestion that highly anxiously attached individuals are locked in a vicious cycle in which any kind of caregiving acts offered by their partners are insufficient; that is, these acts seem unable to meet anxiously attached individuals' endless need for interpersonal security. By contrast, they may be related to an immediate hyper-activation of the attachment system, resulting in displays of anxiety as a means of getting more partner attention.

From a methodological point of view, another possible explanation for these findings may be that the highly anxious recipients' evaluations of their partners' caregiving styles may differ substantially from their partners' perceptions of their own styles (Collins & Feeney, 2004; Gallo & Smith, 2001; Priel & Shamai, 1995). In the current study, we did not examine patients' perceived support, and it may be that highly anxious patients perceived their partners' SENS in a negative manner that led to higher distress.

Generally, our findings showed that the recipient's personality characteristics contributed to the effects of the caregiver's efforts among couples coping with cardiac illness. High avoiders did not seem to benefit from either of the two caregiving styles, whereas highly anxiously attached individuals seemed to experience high levels of both styles as unhelpful. A better integration among the fields of personality and dyadic coping with illness is therefore needed in order to obtain a more comprehensive understanding of support effectiveness.

Notwithstanding the strengths of the current study—for example, its longitudinal design, the use of a clinical sample, and the fact that data were collected from both partners and patients—there were a number of potential limitations. First, patients' anxiety symptoms were measured via their own subjective perceptions. Given the fact that the sample of patients consisted of only male patients, and that most of the patients reported low levels of anxiety, a social desirability bias must be taken into account (Osterberg & Blaschke, 2005). That said, even a small improvement in patients' anxiety can make a big difference in terms of their cardiac event recurrence rates, as well as in their mortality rates (Bitton et al., 2013). Second, the explained variance of the contribution of the interaction between patients' attachment orientations and partners' caregiving styles to patients' improvement in anxiety symptoms was relatively low. Nevertheless, we must take into consideration the fact that the current study examined interactive effects longitudinally while controlling for Time 1 anxiety symptoms. Thus, finding even small significant interactive effects is meaningful.

The current study, by design, did not include female cardiac patients. The rationale for this exclusion was that a first ACS among women tends to occur more often as women get older and are more likely to be widowed; as such, they may no longer be part of a conjugal relationship, which was the focus of the current study. Therefore, because all of the caregivers in the current study were women, the caregiver role cannot be distinguished from the gender role. Finally, the current study's participants were either married or cohabiting, with high economic statuses and levels of education; caution must therefore be used in generalizing from the findings.

Future studies may benefit from examining the discrepancy between partners' given support and recipients' perceived support. More specifically, anxious individuals may view the offered support differently from how the providers both intend and view it, resulting in increased distress. Additionally, in the current study we focused on ANX, which is strongly linked to emotional distress at times of stress. Future studies would do well to focus on patients' physiological and behavioral outcomes, which may be particularly relevant for patients high on AVO, as these patients tend not to disclose negative feelings but do tend to present poor health outcomes following a medical event (Hunter & Maunder, 2001).

From a clinical point of view, the findings suggest that a greater focus should be placed on patients high on the ANX orientation, as these patients, in addition to experiencing higher levels of anxiety, also seem to find it difficult to benefit from their partners' caregiving efforts. Specifically, clinicians are advised to guide couples in how to coordinate one partner's need for care with the other partner's attempts to provide care in ways that will regulate the cyclical effect of insecure attachment and distress (Kobak & Bosmans, 2018).


### Authors' note

This study was partially based upon the first author's doctoral dissertation, which was supervised by the third and fourth authors and accepted by the Senate of Bar-Ilan University. The current study is a part of a large-scale research project of the psycho-cardiology lab, directed by the third author, Department of Psychology, Bar-Ilan University, Ramat Gan, Israel. The study was presented in the Society of stress, anxiety and coping 39th annual conference, July, 2018, Lublin, Poland.

### Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by grants from the Israel Foundation Trustees (grant number: 30), The Israel Heart Fund, and the Schnitzer Foundation for Research on the Israeli Economy and Society, Bar-Ilan University.

### ORCID iD

Sivan George-Levi  <https://orcid.org/0000-0002-1235-0978>

### Open research statement

As part of IARR's encouragement of open research practices, the authors have provided the following information: This research was not pre-registered. The data and materials used in the research are available. The data and materials can be obtained at [noa.vilchinsky@biu.ac.il](mailto:noa.vilchinsky@biu.ac.il).

### Note

1. The existence of a positive correlation between patients' anxious attachment and anxiety symptoms at  $T_1$  ( $r_{(131)} = .25, p < .001$ ) raised the possibility of the existence of Lord's paradox (Lord, 1967; Van Breukelen, 2013). We therefore applied additional analysis, and this time without controlling for anxiety symptoms at Time 1. Applying this analysis, the interactions between patient's attachment orientations and partner's caregiving styles for predicting improvement in patient's anxiety symptoms were not found significant, as Lord's paradox predicts.

### References

- Aiken, L. S., West, S. G., & Reno, R. R. (1991). *Multiple regression: Testing and interpreting interactions* (p. 43). Sage.
- Baraldi, A. N., & Enders, C. K. (2010). An introduction to modern missing data analyses. *Journal of School Psychology, 48*, 5–37. <https://doi.org/10.1016/j.jsp.2009.10.001>

- Bartholomew, K., & Allison, C.J. (2006). An attachment perspective on abusive dynamics in intimate relationships. In M. Mikulincer & G.S. Goodman (Eds.), *Dynamics of romantic love: Attachment, caregiving, and sex* (pp. 102–127). Guilford Press.
- Benjamin, E. J., Virani, S. S., Callaway, C. W., Chamberlain, A. M., Chang, A. R., Cheng, S., Chiuve, S. E., Cushman, M., Dellings, F. N., Deo, R., de Ferranti, S. D., Ferguson, J. F., Fornage, M., Gillespie, C., Isasi, C. R., Jiménez, M. C., Jordan, L. C., Judd, S. E., Lackland, D., & Lichtman, J. H., . . . American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2018). Heart disease and stroke statistics-2018 update: A report from the American Heart Association. *Circulation, 137*, 67–492. <https://doi.org/10.1161/CIR.0000000000000558>
- Bitton, A., Choudhry, N. K., Matlin, O. S., Swanton, K., & Shrank, W. H. (2013). The impact of medication adherence on coronary artery disease costs and outcomes: A systematic review. *The American Journal of Medicine, 126*, 7–27. <https://doi.org/10.1016/j.amjmed.2012.09.004>
- Bolger, N., & Amarel, D. (2007). Effects of social support visibility on adjustment to stress: Experimental evidence. *Journal of Personality and Social Psychology, 92*, 458–475. <https://doi.org/10.1037/0022-3514.92.3.458>
- Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry, 52*, 664–678. <https://doi.org/10.1111/j.1939-0025.1982.tb01456.x>
- Braun, M., Hales, S., Gilad, L., Mikulincer, M., Rydall, A., & Rodin, G. (2012). Caregiving styles and attachment orientations in couples facing advanced cancer. *Psycho Oncology, 21*, 935–943. <https://doi.org/10.1002/pon.1988>
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (pp. 46–76). Guilford Press.
- Collins, N. L., & Feeney, B. C. (2004). Working models of attachment shape perceptions of social support: Evidence from experimental and observational studies. *Journal of Personality and Social Psychology, 87*, 363–383. <https://doi.org/10.1037/0022-3514.87.3.363>
- Collins, N. L., & Ford, M. B. (2010). Responding to the needs of others: The caregiving behavioral system in intimate relationships. *Journal of Social and Personal Relationships, 27*, 235–244. <https://doi.org/10.1177/0265407509360907>
- Derogatis, L. R., & Melisaratos, N. (1983). The brief symptom inventory: An introductory report. *Psychological Medicine, 13*, 595–605. <https://doi.org/10.1017/S0033291700048017>
- DiMatteo, M. R. (2004). Social support and patient adherence to medical treatment: A meta-analysis. *Health Psychology, 23*, 207–218. <https://doi.org/10.1037/0278-6133.23.2.207>
- Falvo, D. R. (2014). *Medical and psychosocial aspects of chronic illness and disability*. Jones and Bartlett.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G\*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*, 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Feeney, J. A. (1996). Attachment, caregiving, and marital satisfaction. *Personal Relationships, 3*, 401–416. <https://doi.org/10.1111/j.1475-6811.1996.tb00124.x>
- Gable, S. L., Gosnell, C. L., Maisel, N. C., & Strachman, A. (2012). Safely testing the alarm: Close others' responses to personal positive events. *Journal of Personality and Psychology, 103*, 963–981. <https://doi.org/10.1037/a0029488>

- Gallo, L. C., & Smith, T. W. (2001). Attachment style in marriage: Adjustment and responses to interaction. *Journal of Social and Personal Relationships, 18*, 263–289. <https://doi.org/10.1177/0265407501182006>
- Garcia, M., Mulvagh, S. L., Bairey Merz, C. N., Buring, J. E., & Manson, J. E. (2016). Cardiovascular disease in women: Clinical perspectives. *Circulation Research, 118*, 1273–1293. <https://doi.org/10.1161/CIRCRESAHA.116.307547>
- Garrison, A. M., Kahn, J. H., Miller, S. A., & Sauer, E. M. (2014). Emotional avoidance and rumination as mediators of the relation between adult attachment and emotional disclosure. *Personality and Individual Differences, 70*, 239–245. <https://doi.org/10.1016/j.paid.2014.07.006>
- George-Levi, S., Vilchinsky, N., Rafaeli, E., Liberman, G., Khaskiaa, A., Mosseri, M., & Hod, H. (2017). Caregiving styles and anxiety among couples: Coping versus not coping with cardiac illness. *Anxiety, Stress, and Coping, 30*, 107–120. <https://doi.org/10.1080/10615806.2016.1206530>
- George-Levi, S., Vilchinsky, N., Tolmacz, R., Khaskiaa, A., Mosseri, M., & Hod, H. (2016). “It takes two to take”: Caregiving style, relational entitlement, and medication adherence. *Journal of Family Psychology, 30*, 743–751. <https://doi.org/10.1037/fam0000203>
- Gilbar, O., & Ben-Zur, H. (2002). Adult Israeli community norms for the brief symptom inventory (BSI). *International Journal of Stress Management, 9*, 1–10. <https://doi.org/10.1023/A:1013097816238>
- Girme, Y. U., Overall, N. C., Simpson, J. A., & Fletcher, G. J. (2015). “All or nothing”: Attachment avoidance and the curvilinear effects of partner support. *Journal of Personality and Social Psychology, 108*, 450–475. <https://doi.org/10.1037/a0038866>
- Gleason, M. E., Iida, M., Shrout, P. E., & Bolger, N. (2008). Receiving support as a mixed blessing: Evidence for dual effects of support on psychological outcomes. *Journal of Personality and Social Psychology, 94*, 824–838. <https://doi.org/10.1037/0022-3514.94.5.824>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: Methodology in the Social Sciences*. Guilford Press.
- Holt, R. I., Phillips, D. I., Jameson, K. A., Cooper, C., Dennison, E. M., & Peveler, R. C., & Hertfordshire Cohort Study Group. (2013). The relationship between depression, anxiety and cardiovascular disease: Findings from the Hertfordshire Cohort Study. *Journal of Affective Disorders, 150*, 84–90. <https://doi.org/10.1016/j.jad.2013.02.026>
- Howland, M., & Simpson, J. A. (2010). Getting in under the radar: A dyadic view of invisible support. *Psychological Science, 21*, 1878–1885. <https://doi.org/10.1177/0956797610388817>
- Hunter, J. J., & Maunder, R. G. (2001). Using attachment theory to understand illness behavior. *General Hospital Psychiatry, 23*, 177–182. [https://doi.org/10.1016/S0163-8343\(01\)00141-4](https://doi.org/10.1016/S0163-8343(01)00141-4)
- Kidd, T., Poole, L., Ronaldson, A., Leigh, E., Jahangiri, M., & Steptoe, A. (2016). Attachment anxiety predicts depression and anxiety symptoms following coronary artery bypass graft surgery. *British Journal of Health Psychology, 21*, 796–811. <https://doi.org/10.1111/bjhp.12191>
- Kobak, R., & Bosmans, G. (2018). Attachment and psychopathology: A dynamic model of the insecure cycle. *Current Opinion in Psychology, 25*, 76–80. <https://doi.org/10.1016/j.copsyc.2018.02.018>
- Knoll, N., Scholz, U., & Ditzen, B. (2018). Social Support, family processes and health. In T. A. Revenson & R. A. R. Gurung (Eds.), *Handbook of health psychology* (pp. 279–289). Routledge.



- Kunce, L. J., & Shaver, P. R. (1994). An attachment theoretical approach to caregiving in romantic relationships. In K. Bartholomew & D. Perlman (Eds.), *Advances in personal relationships: Vol. 5. Attachment process in adulthood* (pp. 205–237). Jessica Kingsley.
- Little, R. J. A. (1998). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*, 1198–1202.
- Lord, F. M. (1967). A paradox in the interpretation of group comparisons. *Psychological Bulletin*, *68*, 304–305.
- Markey, C. N., & Markey, P. M. (2014). Personality, relationships, and health. *Journal of Personality*, *82*, 467–471. <https://doi.org/10.1111/jopy.12080>
- Martire, L. M., & Helgeson, V. S. (2017). Close relationships and the management of chronic illness: Associations and interventions. *American Psychologist*, *72*, 601–612. <https://doi.org/10.1037/amp0000066>
- Meredith, P., Strong, J., & Feeney, J. A. (2006). Adult attachment, anxiety, and pain self-efficacy as predictors of pain intensity and disability. *Pain*, *123*, 146–154. <https://doi.org/10.1016/j.pain.2006.02.025>
- Mewly, N., Bodenmann, G., Germann, J., Bradbury, T. N., Ditzen, B., & Heinrichs, M. (2012). Dyadic coping, insecure attachment, and cortisol stress recovery following experimentally induced stress. *Journal of Family Psychology*, *26*, 937–947. <https://doi.org/10.1037/a0030356>
- Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. Guilford Press.
- Mikulincer, M., & Shaver, P. R. (2009). An attachment and behavioral systems perspective on social support. *Journal of Social and Personal Relationships*, *26*, 7–19. <https://doi.org/10.1177/0265407509105518>
- Mikulincer, M., & Shaver, P. R. (2012). An attachment perspective on psychopathology. *World Psychiatry*, *11*, 11–15. <https://doi.org/10.1016/j.wpsyc.2012.01.003>
- Mikulincer, M., & Shaver, P. R. (2018). Attachment orientations and emotion regulation. *Current Opinion in Psychology*, *25*, 6–10. <https://doi.org/10.1016/j.copsyc.2018.02.006>
- Moreira, J. M., de Fátima Silva, M., Moleiro, C., Aguiar, P., Andrez, M., Bernardes, S., & Afonso, H. (2003). Perceived social support as an offshoot of attachment style. *Personality and Individual Differences*, *34*, 485–501. [https://doi.org/10.1016/S0191-8869\(02\)00085-5](https://doi.org/10.1016/S0191-8869(02)00085-5)
- Osterberg, L., & Blaschke, T. (2005). Adherence to medication. *New England Journal of Medicine*, *353*, 487–497. <https://doi.org/10.1056/NEJMra050100>
- Pietromonaco, P. R., & Collins, N. L. (2017). Interpersonal mechanisms linking close relationships to health. *American Psychologist*, *72*, 531–542. <https://doi.org/10.1037/amp0000129>
- Pietromonaco, P. R., Uchino, B., & Dunkel-Schetter, C. (2013). Close relationship processes and health: Implications of attachment theory for health and disease. *Health Psychology*, *32*, 499–513. <https://doi.org/10.1037/a0029349>
- Pow, J., Stephenson, E., Hagedoorn, M., & DeLongis, A. (2018). Spousal support for patients with rheumatoid arthritis: Getting the wrong kind is a pain. *Frontiers in Psychology*, *9*, 1760–1771. <https://doi.org/10.3389/fpsyg.2018.01760>
- Priel, B., & Shamai, D. (1995). Attachment style and perceived social support: Effects on affect regulation. *Personality and Individual Differences*, *19*, 235–241. [https://doi.org/10.1016/0191-8869\(95\)91936-T](https://doi.org/10.1016/0191-8869(95)91936-T)
- Reges, O., Vilchinsky, N., Leibowitz, M., Khaskia, A., Mosseri, M., & Kark, J. D. (2014). Identifying barriers to participation in cardiac prevention and rehabilitation programmes via

- decision tree analysis: Establishing targets for remedial interventions. *Open Heart*, *1*, e000097. <https://doi.org/10.1136/openhrt-2014-000097>
- Regitz-Zagrosek, V., & Kararigas, G. (2017). Mechanistic pathways of sex differences in cardiovascular disease. *Physiological Reviews*, *97*, 1–37. <https://doi.org/10.1152/physrev.00021.2015>
- Revenson, T., Griva, K., Luszczynska, A., Morrison, V., Panagopoulou, E., Vilchinsky, N., & Hagedoorn, M. (2016). *Caregiving in the illness context*. Springer.
- Rholes, W. S., Simpson, J. A., & Oriña, M. M. (1999). Attachment and anger in an anxiety-provoking situation. *Journal of Personality and Social Psychology*, *76*, 940–957. <https://doi.org/10.1037/0022-3514.76.6.940>
- Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys*. Wiley.
- Scherrer, J. F., Chrusciel, T., Garfield, L. D., Freedland, K. E., Carney, R. M., Hauptman, P. J., Bucholz, K. K., Owen, R., & Lustman, P. J. (2012). Treatment-resistant and insufficiently treated depression and all-cause mortality following myocardial infarction. *The British Journal of Psychiatry*, *200*, 137–142. <https://doi.org/10.1192/bjp.bp.111.096479>
- Simpson, J. A., & Rholes, W. S. (2010). Attachment and relationships: Milestones and future directions. *Journal of Social and Personal Relationships*, *27*, 173–180. <https://doi.org/10.1177/0265407509360909>
- Simpson, J. A., Rholes, W. S., & Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. *Journal of Personality and Social Psychology*, *62*, 434–446. <https://doi.org/10.1037/0022-3514.62.3.434>
- Simpson, J. A., Winterheld, H. A., Rholes, W. S., & Oriña, M. M. (2007). Working models of attachment and reactions to different forms of caregiving from romantic partners. *Journal of Personality and Social Psychology*, *93*, 466–477. <https://doi.org/10.1037/0022-3514.93.3.466>
- Smith, T. W., & Baucom, B. R. (2017). Intimate relationships, individual adjustment, and coronary heart disease: Implications of overlapping associations in psychosocial risk. *American Psychologist*, *72*, 578–589. <https://doi.org/10.1037/amp0000123>
- Stanton, S. C., & Campbell, L. (2014). Perceived social support moderates the link between attachment anxiety and health outcomes. *PLoS One*, *9*, e95358. <https://doi.org/10.1371/journal.pone.0095358>
- Thoits, P. A. (2011). Mechanisms linking social ties and support to physical and mental health. *Journal of Health and Social Behavior*, *52*, 145–161. <https://doi.org/10.1177/0022146510395592>
- Tolmacz, R. (2010). Forms of concern: A psychoanalytic perspective. In M. Mikulincer & P. R. Shaver (Eds.), *Prosocial motives, emotions, and behavior: The better angels of our nature* (pp. 93–107). American Psychological Association.
- Tully, P. J., Harrison, N. J., Cheung, P., & Cosh, S. (2016). Anxiety and cardiovascular disease risk: A review. *Current Cardiology Reports*, *18*, 120. <https://doi.org/10.1007/s11886-016-0800-3>
- Uchino, B. N., Bowen, K., de Grey, R. K., Mikel, J., & Fisher, E. B. (2018). Social support and physical health: Models, mechanisms, and opportunities. In *Principles and Concepts of Behavioral Medicine* (pp. 341–372). Springer.
- Van Breukelen, G. J. (2013). ANCOVA versus CHANGE from baseline in nonrandomized studies: The difference. *Multivariate Behavioral Research*, *48*, 895–922. <https://doi.org/10.1080/00273171.2013.831743>

- Vilchinsky, N., Dekel, R., Leibowitz, M., Reges, O., Khaskia, A., & Mosseri, M. (2011). Dynamics of support perceptions among couples coping with cardiac illness: The effect on recovery outcomes. *Health Psychology, 30*, 411–419. <https://doi.org/10.1037/a0023453>
- Vilchinsky, N., Haze-Filderman, L., Leibowitz, M., Reges, O., Khaskia, A., & Mosseri, M. (2010). Spousal support and cardiac patients' distress: The moderating role of attachment orientation. *Journal of Family Psychology, 24*, 508–512. <https://doi.org/10.1037/a0020009>
- Vilchinsky, N., Reges, O., Leibowitz, M., Khaskia, A., Mosseri, M., & Kark, J. D. (2018). Symptoms of depression and anxiety as barriers to participation in cardiac rehabilitation programs among Arab and Jewish patients in Israel. *Journal of Cardiopulmonary Rehabilitation and Prevention, 38*, 163–169. <https://doi.org/10.1097/HCR.0000000000000310>