

Caring hearts, weighted shoulders: The moderating role of attachment in the relationship between received support and caregiver burden in cardiac illness

Journal of Social and
Personal Relationships
2025, Vol. 0(0) 1–25
© The Author(s) 2025
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/02654075251393443
journals.sagepub.com/home/spr


Eran Katz¹ , Eran Bar-Kalifa² , Paula Pietromonaco³ ,
Hodaya Wolf¹, Robert Klempfner^{4,5}, Hanoch Hod^{4,5} and
Noa Vilchinsky¹ 

Abstract

Caregiving for cardiac patients is often accompanied by significant emotional and physical strain. While prior research has emphasized the contribution of support to mitigate caregivers' burden, limited attention has been paid to the support they may receive from the patients themselves. Attachment theory provides a crucial lens for understanding individual differences in how this specific kind of partner's support is perceived and utilized. Drawing on dyadic coping models and attachment theory, this study examines how support dynamics within the couple influence caregivers' burden, and whether these effects depend on caregivers' attachment orientations. Specifically, the study investigates whether caregivers' attachment anxiety and avoidance moderate the associations between (a) patient-reported support provided to the caregiver (b) caregiver perceived received support from the patient, and (c) levels of caregiver burden during cardiac rehabilitation. Eighty-eight heterosexual couples, in which the male partner had experienced a recent cardiac event, were assessed at the beginning and end of a three-month rehabilitation program. Measures included self-reported support (provided and

¹Bar-Ilan University, Israel

²Ben-Gurion University of the Negev, Israel

³University of Massachusetts, USA

⁴Chaim Sheba Medical Center, Israel

⁵Tel Aviv University, Israel

Corresponding author:

Eran Katz, Department of Psychology, Bar-Ilan University, Ramat Gan 52900, Israel.

Email: erankatz@gmail.com

received), attachment orientations, and multidimensional caregivers' burden. Overall support was not directly associated with reduced general burden. Caregivers high in avoidant attachment reported lower emotional burden when they perceived receiving greater support from their ill partner. No such effect was found among caregivers low in avoidance or those high in anxious attachment. These findings highlight the importance of considering both interpersonal and intrapersonal factors in understanding caregiver burden. Recognizing and addressing attachment-related patterns in caregiving dyads could inform targeted interventions aimed at reducing emotional distress and enhancing resilience in couples coping with cardiac illness.

Keywords

Avoidant attachment, caregivers burden, dyadic support

Introduction

Chronic illness presents a significant challenge in intimate relationships, particularly among couples. In the United States, chronic health conditions, such as diabetes, cancer, and coronary heart disease, affect half of the adult population (Boersma, 2020). The journey following a chronic illness diagnosis involves a lifelong commitment to lifestyle adjustments aimed at enhancing the quality of life, minimizing the illness burden, and preventing further health deterioration (Martire & Helgeson, 2017). These lifestyle changes, encompassing both the adoption of new habits and the cessation of old ones, are often challenging, and when individuals have the support of loved ones, their chances of success increase. In the context of adult chronic illnesses, the patient's romantic partner frequently becomes the primary source of support (Knoll et al., 2018; Smith & Baucom, 2017).

Yet, the role of a healthy partner in caregiving can be demanding, often leading to significant personal strain manifesting in either physical or mental ailments (George-Levy et al., 2017; Revenson et al., 2016). The responsibilities of caregiving, which include providing both emotional support during setbacks and practical support such as dietary or medication management, can impose substantial emotional and physical burdens on the caregiver (Aggarwal et al., 2009; Caputo et al., 2016; Fabà et al., 2023). Compared to their non-caregiving counterparts, caregivers face an increased risk of developing health issues, such as heightened cardiovascular reactivity, metabolic syndrome, and even coronary heart disease (Bouchard et al., 2019; Durante et al., 2021; Vitaliano et al., 2003). They are also less likely to engage in self-care activities (Bouchard et al., 2019). Research has shown that, in the context of cardiac illness, caregiver burden is linked to a range of health risks, including heightened anxiety, depression, and cardiac-disease-induced post-traumatic stress disorder (CDI-PTSD) (Fait et al., 2018; Randall et al., 2009; Van Wijnen et al., 2017; Vilchinsky et al., 2015).

Despite extensive research documenting the adverse effects of caregiving on partners, the medical community often focuses primarily on patients and neglects the needs and

challenges faced by their caregiving partners (Revenson et al., 2016). Contrary to this patient-centric view, the theoretical framework of caregiving emphasizes the necessity of attending to the well-being of a healthy caregiver (Cipolletta et al., 2021; Revenson et al., 2016; Vilchinsky et al., 2017). In the realm of chronic illness, research on factors contributing to the burden of caregiving partners has primarily concentrated on intra-personal variables of either the patient or caregiver, such as the patient's adherence levels (Durante et al., 2019). However, this approach often overlooks the significance of inter-personal variables such as perceptions of social support (Durante et al., 2019). This oversight represents a significant limitation in relational health psychology, especially considering the extensive literature on the importance of interpersonal processes in coping with illness (Pietromonaco & Collins, 2017; Pietromonaco & Overall, 2021; Rapelli et al., 2024; Uchino et al., 2018). In psychology, the dyadic coping model proposes a shift in perspective, suggesting that coping with significant stressors, such as illness, should be viewed as a joint process involving both partners, rather than an individual endeavour (Acitelli & Badr, 2005; Berg & Upchurch, 2007; Coyne & DeLongis, 1986; Kayser et al., 2007; Vilchinsky & Dekel, 2018). This model posits that the coping efforts of patients and caregivers are interdependent and influence each other's outcomes. More specifically, patients may continue to provide meaningful support to their caregiving partners, despite the shift in roles that may be imposed by their illness. Such support can take various forms, not necessarily related to the illness management, including emotional reassurance and expression of gratitude; tangible help (such as fixing things around the house and other house chores); and collaborative problem-solving. These behaviours may help buffer the caregiving partners' sense of burden and reinforce a sense of relational balance (Katz et al., 2023; Lai et al., 2024).

In line with this perspective, the current study focuses on healthy caregiving partners and examines how inter-personal variables - specifically patients' reports of support provided to the caregiver and caregiver's perceptions of support received from their patient/caregiver - are associated with caregivers' levels of caregiving burden.

Caregivers' burden from an interpersonal perspective

Caregivers' burden encompasses the impact on a caregiver's emotional, physical, social, and financial well-being owing to the responsibilities of caring for a chronically ill relative (Adelman et al., 2014; Zarit et al., 1986). Research in chronic illness contexts often focuses on caregivers' personal attributes, such as their involuntary role in caregiving (Adelman et al., 2014), attachment styles (Tsilika et al., 2014; Vilchinsky et al., 2010), personality traits such as neuroticism (Revenson et al., 2016), and their own health (Bekdemir & Ilhan, 2019). However, this approach typically overlooks the reciprocal nature of caregiving, where both the caregiver and care recipient influence each other (Bodenmann et al., 2005; Revenson et al., 2016).

Caregiving often entails significant disruptions to the caregiver's personal, social, and occupational life. Prior research has shown that informal caregivers may experience diminished time for self-care, decreased participation in leisure or social activities, and increased role strain due to conflicting family and work demands (Adelman et al., 2014;

Miller et al., 2024). These disruptions can contribute to psychological distress, physical exhaustion, and reduced quality of life, particularly when caregiving is prolonged or intensive (Aggarwal et al., 2009; Caputo et al., 2016; Hwang et al., 2011).

While recent research has begun to consider patients' individual characteristics, such as illness type (Rodríguez-González & Rodríguez-Míguez, 2020) or dependency level (Lin et al., 2019), as factors influencing caregiver burden, there remains a gap in understanding the dyadic relationship between caregivers and care recipients, particularly concerning how interpersonal factors like relationship satisfaction and social support perceptions contribute to caregiver burden. This oversight is especially critical in psychocardiology, where the onset of cardiac illness often leads to a reliance on romantic partners for support (Rapelli et al., 2021). Bennett (1999) emphasized that the response to a cardiac event should be viewed as a collaborative process between both partners, suggesting that recovery is a shared journey rather than an individual endeavour.

A few studies have recognized the importance of interpersonal dynamics in caregiving, showing that factors such as reciprocity in the relationship can reduce caregiver burden, whereas negative perceptions of relationship quality can increase it (Rodakowski et al., 2012; Shiba et al., 2016; Tough et al., 2017). However, these studies have often focused solely on the caregivers' perspectives. In our study, we explored perceptions of both provided and received support, and their effects on the experience of burden. The literature indicates that lower levels of social support are linked to increased caregiver burden (del-Pino-Casado et al., 2018; Kim et al., 2005) and receiving support from family members can mitigate this burden (Isac et al., 2021). However, support is a multifaceted concept that can be examined through different perspectives. One such perspective makes the distinction between supportive actions that are being provided (typically by the caregiver) and the experience of receiving support as it is perceived (typically by the patient). A recent meta-analysis highlighted that the relationship between social support and caregiver burden varies depending on how support is measured, with received support showing a stronger association with burden than with provided support (del-Pino-Casado et al., 2018; Shieh et al., 2012). In our study, we assessed the impact of both patients' perceptions of provided support and caregivers' perceptions of receiving on caregiver burden.

The role of attachment orientation in support transactions

Attachment theory suggests that, in the face of threat, humans are predisposed to seek out a trusted attachment figure to restore closeness with a trusted figure and regain a sense of security (Bowlby, 1979). Those who have experienced consistent and reliable care in childhood typically develop a secure attachment style, equipping them with effective strategies for managing distress and utilizing support (Mikulincer & Shaver, 2018; Saleem et al., 2019; Simpson & Rholes, 2010). In contrast, insecure attachment, manifesting as either avoidant or anxious attachment, arises from less-stable childhood relationships (Brennan et al., 1998; Mikulincer & Shaver, 2018). Although these early relationships set the stage for attachment style, individuals also continue to learn from relationships with peers and romantic partners, and their attachment style may shift

depending on these later experiences (e.g., Mikulincer & Shaver, 2016; Pietromonaco & Beck, 2015). As a result of these experiences, attachment styles incorporate varying expectations of emotional availability from significant others in times of need (Collins & Feeney, 2004).

Research indicates that individuals with insecure attachment often experience a “support gap,” perceiving the support they receive as insufficient (McLeod et al., 2020). Those with higher levels of insecure attachment may find it challenging to perceive support as accessible and adequate compared to their securely attached counterparts (Collins & Feeney, 2000; McLeod et al., 2020; Mikulincer & Shaver, 2018). They also tend to interpret supportive interactions differently, influenced by their attachment orientation (Collins & Feeney, 2004).

Individuals with a predominantly avoidant attachment style often distrust and devalue their support network, a trait stemming from early experiences of neglect or dismissal of their needs (Shaver et al., 2019). They usually prefer self-reliance to seeking support. Conversely, those with an anxious attachment style perceive support as inconsistent and are prone to excessively seeking reassurance in stressful situations, feeling that the support they receive is insufficient (Cundy, 2018; Platts et al., 2022).

Both acute and chronic health crises can trigger emotional and physical challenges, activating the attachment system in individuals and their close relationships (Maunder & Hunter, 2015; Meredith & Strong, 2019; Pietromonaco & Overall, 2021). Attachment orientation plays a crucial role in how individuals utilize social support and regulate their emotions during illness (Pietromonaco & Beck, 2018; Pietromonaco & Beck, 2018). For caregivers, attachment orientations influence how the support they themselves receive is being interpreted (Feeney & Thrush, 2010; Monin et al., 2010).

Studies have established a link between attachment orientations and individuals’ approaches to illness management (Maras et al., 2021; Pietromonaco & Beck, 2018). For instance, avoidant attachment is often associated with poor adherence to medical care, whereas anxious attachment is linked to excessive reliance on medical services (Jimenez, 2017). People with avoidant attachment may isolate themselves and downplay their need for support, whereas those with anxious attachment may seek excessive care and support (Kidd et al., 2016; Meredith & Strong, 2019). Notably, individuals with lower levels of attachment anxiety or avoidance tend to be more resilient and open to receiving help, making them more likely to benefit from supportive relationships during chronic illnesses (Hunter & Maunder, 2001; Meredith & Strong, 2019; Mikulincer & Shaver, 2007).

Individual differences in attachment anxiety or avoidance shape how people perceive and respond to support, particularly in the face of relationship stressors (Collins & Feeney, 2004; Mikulincer & Shaver, 2007). In the caregiving context, attachment orientations may not only shape how care is provided but also how support from the care recipient is internalized and experienced (B. C. Feeney & Thrush, 2010; Monin et al., 2010). Therefore, we hypothesized that caregivers’ attachment orientations would moderate the association between perceived support and caregivers’ burden.

The current study

This study is part of a large-scale research project focusing on dyadic coping in the context of cardiovascular disease (CVD), which is considered to be the leading cause of death worldwide (CDC, 2025; World Health Organization, 2025). Cardiovascular disease was selected as the focus due to its sudden onset, which creates an immediate shift in relationship dynamics, and its prevalence among middle-aged couples who are typically in established long-term relationships. After incurring a cardiac event, the patient is usually required to undergo several lifestyle changes such as exercise, dietary changes, and new medication regimens (Taylor et al., 2022). As most events occur in an age-frame in which most patients are part of a romantic dyad, their partners are also affected by these changes and usually assume the role of an informal caregiver (Mauder et al., 2015; Rapelli et al., 2021).

Guided by attachment theory (Bowlby, 1969, 1988; Mikulincer & Shaver, 2018) and dyadic models of coping with illness (Berg & Upchurch, 2007), the current study conceptualizes caregiver burden as shaped by both interpersonal and intrapersonal factors. Individual differences in attachment anxiety or avoidance influence how people perceive and respond to support, particularly in the face of relationship stressors (Collins & Feeney, 2004; Mikulincer & Shaver, 2007). In the caregiving context, attachment orientations may not only shape how care is provided but also how support is internalized and experienced by the care recipient (Feeney & Thrush, 2010; Monin et al., 2010). Therefore, we hypothesized that caregivers' attachment orientations would moderate the association between perceived support and caregivers' burden.

The current study examined the extent to which support provided by patients to their caregiving partners and the caregivers' perceived sense of receiving support from their ill partners are associated with caregivers' experiences of burden. In line with our hypotheses, we expected that greater support, both given and perceived, would be associated with lower levels of caregiver burden. In addition, as suggested above, caregivers' insecure attachment orientations would moderate these associations.

A three-month longitudinal study was designed and conducted to examine our hypotheses. In Israel, cardiac rehabilitation programs are publicly funded by the government for a duration of three months. Therefore, this timeframe was selected to align with the structured rehabilitation period and reduce confounding effects associated with post-program attrition.

Hypotheses:

- (1) Patients' reports of provided support at the beginning of a state-funded cardiac rehabilitation and prevention program (Time 1) would be negatively associated with caregivers' burden at the program's end three months later (Time 2).
- (2) Caregivers' perceptions of received support at Time 1 would be negatively associated with caregivers' burden at Time 2.
- (3) High levels of attachment insecurity among caregiving would weaken the aforementioned associations. Specifically, the strongest negative association between caregivers' perceptions of received support at Time 1 and their burden at

Time 2 would be seen at low levels of attachment insecurity, moderate associations at mean levels, and significantly attenuated associations at high levels of attachment insecurity.

Method

Participants and procedure

This study constitutes part of a larger research project focused on the relational dynamics of couples navigating the consequences of a novel cardiac event. We assessed 88 heterosexual pairs by using a two-stage questionnaire design. The participants were recruited at the Cardiac Prevention and Rehabilitation Center (CPRC) of Sheba Medical Center. With the endorsement of the hospital's Institutional Review Board (IRB), the records of patients referred to the CPRC between November 2017 and March 2020 were screened. Inclusion criteria were couples that included male patients who had undergone their first acute cardiac event (either myocardial infarction or severe unstable angina) and were 35 years of age or older at the time. The couple had to be in a committed marital or cohabitating relationship for a minimum period of a year.

Research by [Tsao et al. \(2022\)](#) indicates that males tend to be more afflicted by cardiac events than females, regardless of age, by an average of 34%. Females who experience acute cardiac events tend to be older, and their health status tends to include additional medical issues. They are also more likely to be widowed at the time of an event ([Tsao et al., 2022](#)). Considering the small chance of recruiting female cardiac patients who met the inclusion criteria, our study focused on dyads of male patients and female caregivers.

The study excluded patients who had experienced a prior cardiac event, those who had an alternate cardiac diagnosis or comorbid illnesses, and those under 35 years of age. We decided to restrict inclusion according to age to omit cases in which the cardiac event may be attributed to a congenital disease (notably, initial patient records revealed that only 2.62% were below 35 years). Additionally, dyads in which one or both partners coped with additional cognitive or physical ailments (reflected in medical files or self-reported by participants) were excluded, as were couples in which one or both partners were not fluent in Hebrew.

Throughout the study period, 3,318 patients were referred to the CPRC. Medical records were screened according to predefined inclusion criteria: male patients aged 35 or older who had experienced their first acute coronary syndrome (ACS) event (myocardial infarction or unstable angina) and were married or cohabiting with a female partner. Couples were excluded if either partner had a history of cardiac events, other comorbid illnesses, cognitive or physical impairments, or insufficient fluency in Hebrew. A total of 749 potential participants were contacted for phone screening, 408 attended an in-person meeting, and 359 were confirmed eligible. Of those, 228 declined participation. Ultimately, 131 couples completed the baseline assessment (Time 1), and 88 completed both waves of data collection (Time 2). A full breakdown of the recruitment and exclusion process is presented in [Supplemental Figure 1](#).

Following initial screening and exclusion criteria, 88 couples participated in both phases of the study, yielding a participation rate of 67.1%. A detailed account of this process is available in a previously published study (Katz et al., 2023) and the recruitment process breakdown is detailed in Figure 1 (supplemental material).

After receiving both partners' agreement to participate in the study, both patients and caregivers were added to the study's online platform (Qualtrics.com) and sent the study's questionnaires. Patient agreement was based on their signing of the informed consent form during the first meeting; caregivers were exempted by the IRB from signing, as their agreement to answer the study's questionnaires after reading the explanation sheet online was accepted as informed consent to participate.

The questionnaires were completed online. Each participant and dyad were assigned a unique code so that personal data were kept separately from their responses to the questionnaires. To avoid missing data, all questions had to be answered to complete the questionnaires. However, participants were informed that they were free to discontinue their participation at any point. In the few cases where participants did not have Internet access, they were provided with hard-copy questionnaires ($n = 9$). These participants were asked to complete the questionnaires separately by hand, and their answers were coded manually into the online platform by the research team. For their participation in the study, couples were compensated with gift cards valued at \$220.

The ages of the patients at the start of the study ranged from 35 to 90 years ($M = 57.7$, $SD = 10.3$). Most patients (92.4%) had completed at least 12 years of formal education, and most (65.6%) had a part- or full-time job at the time of the study. All patients underwent angioplasty, and almost all (97%) underwent echocardiography. Both measures showed low-to-moderate illness severity ($M_{\text{Angio}} = 2.28$, $SD = 1.140$; $M_{\text{Echo}} = 1.79$, $SD = .950$).

Caregivers' ages ranged from 35 to 73 years ($M = 54.60$, $SD = 9.90$). Most caregivers (89.70%) had completed at least 12 years of formal education, and most (68.50%) had a part- or full-time job at the time of the study. Most of the caregivers (81.70%) reported good to very good health.

The couples were married (or in long-term relationships) for an average of 29.6 years ($SD = 13.50$; range: 1–55). According to the caregivers' responses, the couples had an average of 3.12 children ($SD = 1.70$, range: 1–11). Almost half of the sample (46.20%) defined their SES as high, one-third (31.50%) as average, and a quarter (22.30%) as lower than average.

Of all the demographic and clinical variables, only echocardiogram results (M_{Echo}) were significantly associated with the outcome variables and were thus set as controls in the primary analysis.

Measures

Caregivers' burden. Caregiving partners completed the Hebrew version of the Multidimensional Caregiver Burden Inventory (CBI; Novak & Guest, 1989) at the beginning of the rehabilitation program (Time 1) and at its end three months later (Time 2). The translated version was validated among a sample of war veteran wives with post-traumatic

stress disorder and brain injuries (Arzhi et al., 2000). The CBI includes 24 items measuring the experience of burden across five dimensions: time-dependence burden, developmental burden, physical burden, social burden, and emotional burden. The CBI has been validated for the total scale as well as its five dimensions (Cohen et al., 2021; Merlo et al., 2020). Most dimensions consist of five items (except for the physical burden dimension which has four items). Participants were asked to rate each statement on a scale ranging from *not at all* (0) to *very much* (4), and scores are later transformed to a scale of 1–5 for clarity. Scores are calculated by averaging the relevant items for each scale as well as the general score including all items.

Time-dependent burden describes the tangible experience of having the caregiver's time restricted due to caregiving tasks. It contains items such as "I have to watch my care receiver constantly" or "I have to help my care receiver with many basic functions."

Developmental burden describes feelings of disconnection from age-appropriate milestones of personal development compared to the caregiver's peers. It includes items such as "I feel that I am missing out on life" or "I expected that things would be different at this point in my life."

Physical burden describes the experiences of fatigue or strain on caregivers' physical health. It includes items like "I'm not getting enough sleep" or "Caregiving has made me physically sick."

Social burden describes the feeling of conflicting with the caregiving role, especially regarding the lack of appreciation one might feel from one's environment. Example items include "My caregiving efforts are not appreciated by others in my family" or "I feel resentful of other relatives who could but do not help."

Finally, *emotional burden* describes negative feelings that the caregiver harbours toward the care recipient, or negative feelings the caregiver has towards oneself because of having such negative feelings. Items include, for example, "I resent my care receiver" or "I feel angry about my interactions with my care receiver."

In the current study, the Pearson correlations among the different burden dimensions ranged from .34 to .66 at Time 1, and from .24 to .71 at Time 2. Exploratory factor analysis using the Promax method revealed the existence of one factor that explained 70% of the variance (Eigenvalue = 4.19).

Attachment. The attachment orientations of the caregiving partners were measured at Time 1 using the shortened, 9-item version of the Experiences in Close Relationship - Relationship Structures (ECR-RS) Scale (Fraley et al., 2011). This scale consists of nine items, six of which comprise the avoidant attachment subscale (e.g., "I prefer not to show a partner how I feel deep down"), and the other three the anxious attachment subscale (e.g., "I worry that romantic partners won't care about me as much as I care about them"). Participants rated the extent to which each item was descriptive of their feelings in their current romantic relationship on a 7-point scale, ranging from *not at all* (1) to *very much* (7). Cronbach's alpha reliabilities of the questionnaire were .79 for the avoidant subscale and .75 for the anxious subscale.

Provided and received support. To assess the perceptions of support received and provided by each partner at Time 1, we used the Daily Support Inventory (Bar-Kalifa & Rafaeli, 2013). This questionnaire assesses general practical and emotional support acts provided and received by each partner in the previous month. Example items include “I told them I care about them” or “I offered them information that will help them with their problems” for provided support, and “They comforted me physically with a hug or a kiss” or “They thought with me about possible solutions to my problems” for received support. Each partner answered 15 questions on each scale. Participants rated statements on a scale ranging from *not at all* (0) to *very much* (4). Scores were calculated for each scale by averaging the relevant items. Cronbach’s alpha reliabilities of the provided support scale were .94 for patients and .91 for partners. Cronbach’s alpha reliabilities of the received support scale were .93 for patients and .93 for partners.

Demographic and medical characteristics. At Time 1, all participants completed a short demographic questionnaire consisting of their age; relationship duration; number of children; level of education (1 = *elementary* to 6 = *doctorate*); subjective socioeconomic status (SES; 1 = *much above average* to 5 = *much below average*); and current employment status (1 = *full-time*, 2 = *part-time*, 3 = *unemployed*, 4 = *retired*, 5 = *on sick leave*, and 6 = *other*). Partners were asked to define their health status on a scale ranging from 1 (*excellent*) to 7 (*extremely bad*).

Patients’ illness severity. Illness severity was assessed at Time 2 by a senior cardiologist based on two criteria measured during hospitalization (Neeland et al., 2012): echocardiogram (examination of the structure and functioning of the heart) and angiogram (examination of obstructed artery status). Echocardiogram and angiogram scores were both assessed on a scale ranging from 1 (mild) to 4 (most severe).

Analysis

Descriptive statistics were used to describe the sociodemographic data of the sample as well as the study’s measures. Pearson’s correlations were calculated to assess bivariate correlations between study variables. Prior to creating interaction terms for moderation analyses, all continuous variables (support measures and attachment orientation scores) were mean-centered to reduce multicollinearity and facilitate interpretation of interaction effects.

To assess the moderating effect of attachment, hierarchical regressions were calculated for each outcome (general burden and burden factors) using the SPSS V.29. Main effects were entered at the first step, and the interaction-moderation effect was entered in the second step. As both avoidance and anxiety were highly correlated ($r = .51$, $p < .001$), we tested each moderator while the other was controlled for. The PROCESS procedure for SPSS was used to test interaction effects (Hayes, 2018, Model 1). Simple slopes were estimated for low and high levels of the moderators (mean \pm 1SD).

A post hoc power analysis was conducted using the G*Power 3.1.9 (Faul et al., 2009; Linear multiple regression, $\alpha = .05$, $ES = .15$, $n = 88$), for which we received the power ($1-\beta$) of .81.

Results

Sample characteristics

The ages of the patients at the start of the study ranged from 35 to 90 years ($M = 57.7$, $SD = 10.3$). Most patients (92.4%) had completed at least 12 years of formal education, and most (65.6%) had a part- or full-time job at the time of the study. All patients underwent angioplasty, and almost all (97%) underwent echocardiography. Both measures showed low-to-moderate illness severity ($M_{\text{Angio}} = 2.28$, $SD = 1.140$; $M_{\text{Echo}} = 1.79$, $SD = .950$).

Partners' ages ranged from 35 to 73 years ($M = 54.60$, $SD = 9.90$). Most partners (89.70%) had completed at least 12 years of formal education, and most (68.50%) had a part- or full-time job at the time of the study. Most of the partners (81.70%) reported good to very good health.

The couples were married (or in long-term relationships) for an average of 29.6 years ($SD = 13.50$; range: 1–55). According to the partners' responses, the couples had an average of 3.12 children ($SD = 1.70$, range: 1–11). Almost half of the sample (46.20%) defined their SES as high, one-third (31.50%) as average, and a quarter (22.30%) as lower than average.

Of all the demographic and clinical variables, only echocardiogram results (M_{Echo}) were significantly associated with the outcome variables and were thus set as controls in the primary analysis.

Table 1. Descriptive statistics for the study's main variables ($N = 88$).

Variable	Study phase	Role	<i>M</i>	<i>SD</i>	<i>n</i>	Range	Median
Provided support	Time 1	Patient	2.93	0.74	88	1.26–4.00	3.00
Received support	Time 1	Caregiver	2.60	0.83	88	0.13–4.80	2.63
Avoidant attachment	Time 1	Caregiver	2.65	1.23	88	1.00–6.16	2.66
Anxious attachment	Time 1	Caregiver	1.79	1.18	88	1.00–6.33	1.00
General burden	Time 2	Caregiver	0.49	0.53	88	0.00–2.29	0.29
Time dependent burden	Time 2	Caregiver	0.63	0.77	88	0.00–3.80	0.40
Developmental burden	Time 2	Caregiver	0.57	0.79	88	0.00–3.80	0.20
Physical burden	Time 2	Caregiver	0.62	0.77	88	0.00–4.00	0.50
Social burden	Time 2	Caregiver	0.43	0.61	88	0.00–2.40	0.20
Emotional burden	Time 2	Caregiver	0.20	0.39	88	0.00–2.00	0.00

Preliminary analysis

Table 1 presents the descriptive statistics of the main study variables. Caregivers reported high levels of received and patients report high level of provided support at Time 1. Caregivers' attachment levels at Time 1 were low for anxious attachment and moderate for avoidant attachment. At Time 2, patients reported low levels of caregivers' burden.

Table 2 presents the correlations between the main variables. Caregivers' avoidant as well as anxious attachment levels were negatively associated with both received and provided support. In addition, caregivers' burden was positively associated with both insecure attachment orientations and negatively associated with both provided and received support.

Moderation analysis

The effect of caregivers' received support on emotional burden was moderated by attachment avoidance ($\beta = -.30, p < .01$). To further examine this moderated effect, we plotted the simple slopes of caregivers' received support on emotional burden for high and low avoidance (Figure 1). For caregivers with high levels of avoidant attachment, higher levels of received support were associated with lower levels of emotional burden ($b = -0.25, p < .001$). In contrast, for caregivers with low levels of avoidant attachment no significant association between received support and emotional burden was detected. No other significant interaction effects were found for attachment avoidance. Attachment anxiety did not moderate any links between support and caregiver burden measures.

Discussion

Previous investigations into caregivers' burden have concentrated on individual-level determinants, with less attention given to understanding the relational, and reciprocal dimensions of the patient-caregiver relationship, and how these could be associated with burden levels. The current study follows our previous study in which we assessed the effects of dyadic support transactions on caregivers' burden (Katz et al., 2023). In the

Table 2. Intercorrelations among the study's main variables ($N = 88$).

	1	2	3	4	5
1. Caregiver avoidant attachment					
2. Caregiver anxious attachment	.512***				
3. Caregiver received support	-.472***	-.564***			
4. Patient provided support	-.221**	-.203*	.366***		
5. Caregiver's burden	.364***	.393***	-.454***	-.196*	

Note. Received support, provided support, avoidant attachment, and anxious attachment were measured at Time 1. Caregivers' Burden was measured at Time 2.

* $p < .05$. ** $p < .005$. *** $p < .001$.

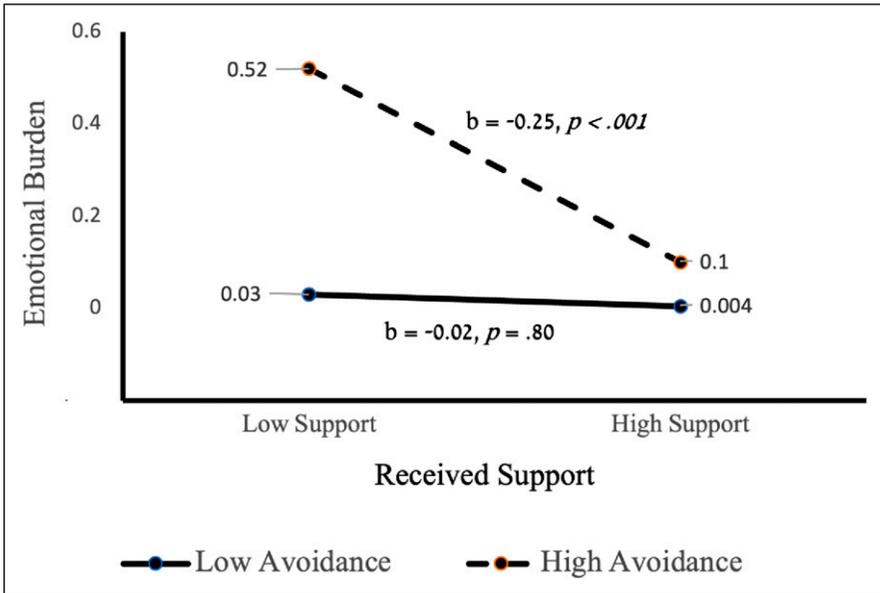


Figure 1. Interaction between received support and avoidance on emotional burden.
 Note. Low avoidance: $b = -.02, t = XX, p = .80$; high avoidance: $b = -.25, t = XX, p < .001$.

current study we further investigated the putative moderation effect of attachment orientations on the associations among provided and received support and caregivers' burden.

Contrary to our first two hypotheses, either patient's reports of provided support to their caregiving partners at Time 1, and caregivers' reports of received support from the patients at Time 1, were not significantly associated with reduced caregivers' burden at Time 2. While correlations suggested a modest negative association, these relationships did not remain significant when controlling for other variables in the regression model.

These null findings contrast with existing literature that generally supports the beneficial effects of social support on caregiver outcomes (del-Pino-Casado et al., 2018; Shieh et al., 2012). Several explanations may account for this unexpected finding. First, there may be a critical distinction between support provided and support that is effectively received and utilized by the caregiver, as suggested by Bolger's (2000) research on invisible support. Second, the type and timing of support may be crucial factors not captured in our support measures. Support that is well-intentioned but mismatched to caregiver needs may have limited impact on burden reduction (Cutrona & Russell, 1990).

In addition, it is possible that the relatively low levels of burden reported in our sample may have created a floor effect, in which caregivers were not experiencing sufficient distress for support to demonstrate measurable protective benefits. Second, the specific nature of caregiving after a cardiac event may differ from other chronic illness contexts (or other, more severe cardiac conditions) in ways that affect support dynamics (Durante

et al., 2023). The acute nature of cardiac events followed by structured rehabilitation may create different support needs compared to progressive conditions like dementia.

Our third hypothesis proposed that caregivers' insecure attachment orientations would attenuate the associations between support and caregiver burden. This hypothesis received partial support, but in an unexpected direction for avoidant attachment, whereas anxious attachment showed no moderating effects.

First, we found that caregiving partners high in either attachment avoidance or anxiety attachment perceived lower levels of received support from their partners. Similarly, patients high in either attachment avoidance or anxiety also reported providing lower levels of provided support to their caregiving partners. Additionally, caregivers with high levels of either avoidant or anxious attachment experienced higher levels of caregivers' burden.

While high levels of avoidant or anxious attachment were not found to moderate the general burden scores, caregivers with high levels of avoidant attachment experienced significantly *lower* emotional burden when they perceived receiving support from their ill partners. This association between received support and reduced emotional burden was not observed in caregivers with low attachment avoidance or in those with high attachment anxiety.

This finding is surprising because although there are not many studies examining the associations between caregivers' burden and attachment orientations, most studies have found that higher levels of attachment insecurity are associated with higher levels of burden (Bei et al., 2022; Laflamme et al., 2022; Zhao et al., 2023). More specifically, this finding may seem counterintuitive given that individuals with high avoidant attachment often avoid seeking support to minimize feelings of dependency within the relationship (Mikulincer & Shaver, 2018). Their defensive strategies typically involve emotional suppression and distancing from attachment-related threats, which would theoretically limit their ability to process and benefit from supportive interactions (Bretaña et al., 2020). Therefore, it might be expected that receiving more support would not positively affect these individuals, such as reducing their emotional burden.

However, studies that examine dyadic dynamics of support in light of attachment orientations find that highly avoidant individuals tend to fare better when they perceive higher levels of support from their partners, as opposed to low to moderate levels (Girme et al., 2015). As suggested in Girme (2015), higher levels of perceived received support may "break through" the avoidant defences as they contradict the assumption that support will not be available.

Our finding raises the possibility that for these caregivers, perceiving their ill husbands as supportive rather than merely needy and dependent, may foster a sense of balance in the relationship. Perceiving their husband in such a way may reduce the overwhelming feelings of dependency, thereby lessening their emotional burden and negative feelings toward the care recipient which comprise the emotional burden. When ill partners demonstrate their continued capacity to provide emotional and practical support, it may reassure avoidant caregivers that the relationship maintains some reciprocity, reducing fears of being trapped in a one-sided caregiving dynamic. Moreover, it is important to note that underneath the dismissive and de-activating tendencies of the avoidant attachment

orientation, these individuals are still experiencing stress in the face of threat to the relationship (Bernard & Dozier, 2010) and are in need of support. Collins and Feeney suggest that acts of support may have more impact on insecure individuals who do not usually expect to receive support, although they are in need of it (Feeney & Collins, 2019).

The unique situation of facing chronic and life-threatening illness, as a cardiac illness, holds an immediate threat to the relationship and to the well-being of each member of the dyad. It has been previously shown that in such cases, avoidant strategies of de-activation are less effective than in situations in which the threat is less severe or immediate (Vilchinsky et al., 2012). It is therefore plausible to suggest that in the context of the current study, the higher caregivers' attachment avoidance is, the less they can deactivate their attachment system and thus receiving support becomes effective in reducing their emotional burden. Caregivers low on attachment avoidance seem to cope well with the situation, with or without receiving such support.

We have not found the same trend among caregivers with attachment anxiety. This could be a result of anxiously attached individuals tendency to catastrophize their situation, especially in the face of a major crisis (Cundy, 2018; Mikulincer & Shaver, 2018). Even when receiving adequate support, their heightened emotional reactivity and fear of abandonment may make it difficult to experience reduced burden. The chronic nature of cardiac illness may perpetually activate their attachment system, making them less responsive to support variations. This catastrophizing tendency may be particularly pronounced in the context of cardiac illness, where the reality of mortality and vulnerability provides a concrete reminder for the possibility of abandonment that support alone cannot easily counteract.

Limitations

A few limitations of the study are important to address. First, this study used self-report measures which might be susceptible to biases. Future studies could overcome these limitations by utilizing mixed-methods approaches, such as adding behavioural or observational assessments (see examples in Collins & Feeney, 2004; Feeney & Collins, 2015) to self-reported measures. These types of assessments could enrich the data by adding less biased and more robust measures of support transactions, thus strengthening the validity of the findings.

Second, this study was conducted with a population of heterosexual couples who cope with CVD. We did not collect data on participants sexual orientation (beyond identifying heterosexual couples), or gender identity. Participant were asked about additional illness or disability other than the ACS. We also did not collect specific race or ethnicity data as this study was conducted in Israel, where approximately 80% of the population share the same ethnicity.

Therefore, the generalizability of the findings is limited. Future research that would include same-sex couples, as well as focus on a diversity of chronic illnesses could enhance our general understanding of the studied dynamics. Similarly, this study included male patients and female caregivers. This decision is based on findings showing that women tend to experience these type of cardiac events at an older age, when they are more

likely to be either widowed, or also taking care of their ill spouses (Tsao et al., 2022). Future studies that would incorporate female patients, adapting the scope to these unique circumstances, would help with expanding the generalizability of findings across genders and gender roles. In addition, the study was conducted in a single healthcare system in Israel, which may limit generalizability to other cultural contexts.

Third, the current study examined the attachment orientations of caregivers alone, without considering those of the care recipients. Examining the combinations of attachment orientations between caregivers and care recipients could provide a more detailed and nuanced understanding of the effectiveness of support transactions.

In addition, while demographic factors such as patient age may be associated with caregiving dynamics, we did not examine age-related effects in the current analyses, as most participants were within the age range of 40–60 years. Future research could explore whether age moderates the associations between support processes and caregiver burden.

Finally, conclusions from this study should be approached with caution as we identified only one moderation effect. This limitation may be due to the relatively small sample size, which could have affected the statistical power of our results. Future studies with larger samples may yield more robust and nuanced findings.

Theoretical contributions and clinical implications

This study provides valuable insights into the important and nuanced role of attachment orientations in shaping the experience of caregivers for cardiac patients. The findings contribute to the work of clinicians and researchers involved in supporting patients with cardiac diseases and their caregivers. Specifically, this study advances attachment theory in health contexts by demonstrating that insecure attachment does not uniformly limit support effectiveness. Our finding that avoidant attachment moderated support effectiveness specifically for emotional burden, but not other burden dimensions, points toward a more nuanced understanding of how attachment orientations interact with different aspects of caregiving stress, and suggests that existing models of attachment and support may need refinement to account for the intensity and immediacy of health threats, which can override typical attachment-based defensive strategies. The unexpected finding.

Clinicians who work with patients and caregivers should include assessments of attachment orientations as a standard component of assessment and interventions. This could involve brief attachment screening tools administered during initial consultations, followed by more comprehensive assessment for caregivers showing signs of burden or distress. Such understanding of the role of attachment in the aforementioned support dynamics can enhance mutual understanding between the coping dyad members, as well as other family and staff members, and reduce barriers to support utilization (Collins & Feeney, 2000; Jimenez, 2017; Pietromonaco & Overall, 2021). Attachment-informed interventions could alleviate tensions and shame, strengthen the patient-caregiver relationship and educate both patient and caregiver on the importance of expressing needs and seeking support, as well as providing it to their partners (Tulloch et al., 2021). Caregivers with avoidant attachment orientations could benefit from interventions that prioritize

trust-building, emotional openness, and acceptance of support from family members or medical professionals (Brown & Elliot, 2016).

Our findings contribute to a more nuanced understanding of the factors influencing caregivers' burden. By emphasizing the importance of interpersonal support dynamics as well as individual personality differences, we expand existing models of caregivers' burden.

In conclusion, this study investigated the associations between support provided by the patient and received by the caregiver with the experience of caregivers' burden, and whether these associations are moderated by the caregivers' attachment orientations.

Consent to participate

The participants of this study did not give written consent for their data to be shared publicly, so due to the sensitive nature of the research supporting data is not available.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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 the Israel Science Foundation under grant ISF 881/16.

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 used in the research cannot be publicly shared because participants did not provide the required consent. However, deidentified data is available upon a reasonable request to the corresponding author via email at crankatz@gmail.com.

ORCID iDs

Eran Katz  <https://orcid.org/0000-0002-4189-9839>

Eran Bar-Kalifa  <https://orcid.org/0000-0003-3579-3015>

Paula Pietromonaco  <https://orcid.org/0000-0003-1569-0246>

Noa Vilchinsky  <https://orcid.org/0000-0003-4965-4745>

Supplemental Material

Supplemental material for this article is available online.

References

- Acitelli, L. K., & Badr, H. J. (2005). My illness or our illness? Attending to the relationship when one partner is ill. In: *Couples coping with stress: Emerging perspectives on dyadic coping* (pp. 121–136). American Psychological Association. <https://doi.org/10.1037/11031-006>
- Adelman, R. D., Tmanova, L. L., Delgado, D., Dion, S., & Lachs, M. S. (2014). Caregiver burden: A clinical review. *JAMA*, *311*(10), 1052–1060. <https://doi.org/10.1001/jama.2014.304>
- Aggarwal, B., Liao, M., Christian, A., & Mosca, L. (2009). Influence of caregiving on lifestyle and psychosocial risk factors among family members of patients hospitalized with cardiovascular disease. *Journal of General Internal Medicine*, *24*(1), 93–98. <https://doi.org/10.1007/s11606-008-0852-1>
- Arzhi, N. B., Solomon, Z., & Dekel, R. (2000). Secondary traumatization among wives of PTSD and post-concussion casualties: Distress, caregiver burden and psychological separation. *Brain Injury*, *14*(8), 725–736. <https://doi.org/10.1080/026990500413759>
- Bar-Kalifa, E., & Rafaeli, E. (2013). Disappointment's sting is greater than help's balm: Quasi-signal detection of daily support matching. *Journal of Family Psychology: JFP: Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *27*(6), 956–967. <https://doi.org/10.1037/a0034905>
- Bei, E., Mashevich, K., Rotem-Mindali, O., Galin-Soibelman, S., Kalter-Leibovici, O., Schifter, T., & Vilchinsky, N. (2022). Extremely distant and incredibly close: Physical proximity, emotional attachment and caregiver burden. *International Journal of Environmental Research and Public Health*, *19*(14), 8722. <https://doi.org/10.3390/ijerph19148722>
- Bekdemir, A., & Ilhan, N. (2019). Predictors of caregiver burden in caregivers of bedridden patients. *Journal of Nursing Research: Journal of Nursing Research*, *27*(3), Article e24. <https://doi.org/10.1097/JNR.0000000000000297>
- Bennett, P. (1999). Dyadic processes in response to myocardial infarction. *Psychology Health & Medicine*, *4*(1), 45–55. <https://doi.org/10.1080/135485099106397>
- Berg, C. A., & Upchurch, R. (2007). A developmental-contextual model of couples coping with chronic illness across the adult life span. *Psychological Bulletin*, *133*(6), 920–954. <https://doi.org/10.1037/0033-2909.133.6.920>
- Bernard, K., & Dozier, M. (2010). Examining infants' cortisol responses to laboratory tasks among children varying in attachment disorganization: Stress reactivity or return to baseline? *Developmental Psychology*, *46*(6), 1771–1778. <https://doi.org/10.1037/a0020660>
- Bodenmann, G., Kayser, K. E., & Revenson, T. A. (2005). *Couples coping with stress: Emerging perspectives on dyadic coping*. American Psychological Association.
- Boersma, P., Black, L. I., & Ward, B. W. (2020). Prevalence of multiple chronic conditions among US adults, 2018. *Preventing Chronic Disease*, *17*, E106. <https://doi.org/10.5888/pcd17.200130>
- Bolger, N., Zuckerman, A., & Kessler, R. C. (2000). Invisible support and adjustment to stress. *Journal of Personality and Social Psychology*, *79*(6), 953–961. <https://doi.org/10.1037/0022-3514.79.6.953>
- Bouchard, K., Greenman, P., Pipe, A., Johnson, S., & Tulloch, H. (2019). Reducing caregiver distress and cardiovascular risk: A focus on caregiver-patient relationship quality. *Canadian Journal of Cardiology*, *35*(10), 1409–1411. <https://doi.org/10.1016/J.CJCA.2019.05.007>

- Bowlby, J. (1969). Attachment and loss: Attachment. In *Attachment* (Vol. 1). Basic Books. <https://doi.org/10.1177/000306518403200125>
- Bowlby, J. (1979). *The making and breaking of bonds*. Routledge. <https://doi.org/10.1038/nphys1877>
- Bowlby, J. (1988). *A secure base* (Reprint edition). Basic Books.
- 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*. Guilford Press.
- Breña, I., Alonso-Arbiol, I., Molero, F., & Pardo, J. (2020). Avoidant attachment and own and perceived partner's conflict resolution in relationship satisfaction. *Journal of Social and Personal Relationships*, 37(12), 3123–3138. <https://doi.org/10.1177/0265407520949697>
- Brown, D., & Elliot, D. (2016). *Attachment disturbances in adults: Treatment for comprehensive repair*. W. W. Norton & Company.
- Caputo, J., Pavalko, E. K., & Hardy, M. A. (2016). The long-term effects of caregiving on women's health and mortality. *Journal of Marriage and Family*, 78(5), 1382–1398. <https://doi.org/10.1111/jomf.12332>
- CDC. (2025). *Heart disease facts*|heart disease|CDC. <https://www.cdc.gov/heart-disease/data-research/facts-stats/index.html>
- Cipolletta, S., Morandini, B., & Tomaino, S. C. M. (2021). Caring for a person with dementia during the COVID-19 pandemic: A qualitative study with family care-givers. *Ageing and Society*, 43(3), 1–21. <https://doi.org/10.1017/S0144686X21000696>
- Cohen, S. A., Kunicki, Z. J., Drohan, M. M., & Greaney, M. L. (2021). Exploring changes in caregiver burden and caregiving intensity due to COVID-19. *Gerontology & Geriatric Medicine*, 7, 2333721421999279. <https://doi.org/10.1177/2333721421999279>
- Collins, N. L., & Feeney, B. C. (2000). A safe haven: An attachment theory perspective on support seeking and caregiving in intimate relationships. *Journal of Personality and Social Psychology*, 78(6), 1053–1073. <https://doi.org/10.1037/0022-3514.78.6.1053>
- 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(3), 363–383. <https://doi.org/10.1037/0022-3514.87.3.363>
- Coyne, J. C., & DeLongis, A. (1986). Going beyond social support: The role of social relationships in adaptation. *Journal of Consulting and Clinical Psychology*, 54(4), 454–460. <https://doi.org/10.1037/0022-006X.54.4.454>
- Cundy, L. (2018). *Anxiously attached: Understanding and working with preoccupied attachment* (1st ed.). Routledge.
- Cutrona, C. E., & Russell, D. W. (1990). Type of social support and specific stress: Toward a theory of optimal matching. In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Social support: An interactional view* (pp. 319–366). John Wiley & Sons. <https://psycnet.apa.org/psycinfo/1990-97699-013>
- del-Pino-Casado, R., Frías-Osuna, A., Palomino-Moral, P. A., Ruzafa-Martínez, M., & Ramos-Morcillo, A. J. (2018). Social support and subjective burden in caregivers of adults and older adults: A meta-analysis. *PLoS One*, 23(1), Article e0189874. <https://doi.org/10.1371/journal.pone.0189874>

- Durante, A., Ahtisham, Y., Cuoco, A., Boyne, J., Brawner, B., Juarez-Vela, R., & Vellone, E. (2021). Informal caregivers of people with heart failure and resilience: A convergent mixed methods study. *Journal of Advanced Nursing*, 78, 1–12. <https://doi.org/10.1111/jan.15078>
- Durante, A., Greco, A., Annoni, A. M., Steca, P., Alvaro, R., & Vellone, E. (2019). Determinants of caregiver burden in heart failure: Does caregiver contribution to heart failure patient self-care increase caregiver burden? *European Journal of Cardiovascular Nursing*, 18(8), 691–699. <https://doi.org/10.1177/1474515119863173>
- Durante, A., Younas, A., Cuoco, A., Boyne, J., Rice, B. M., Juarez-Vela, R., Zeffiro, V., & Vellone, E. (2023). Burden among informal caregivers of individuals with heart failure: A mixed methods study. *PLoS One*, 18(11), Article e0292948. <https://doi.org/10.1371/journal.pone.0292948>
- Fabà, J., Villar, F., & Westerhof, G. (2023). Perceived caregiving trajectories and their relationship with caregivers' burdens and gains. *Spanish Journal of Psychology*, 26, Article e12. <https://doi.org/10.1017/SJP.2023.12>
- Fait, K., Vilchinsky, N., Dekel, R., Levi, N., Hod, H., & Matetzky, S. (2018). Cardiac-disease-induced PTSD and fear of illness progression: Capturing the unique nature of disease-related PTSD. *General Hospital Psychiatry*, 53, 131–138. <https://doi.org/10.1016/J.GENHOSPSPSYCH.2018.02.011>
- 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(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Feeney, B., & Collins, N. (2015). A new look at social support: A theoretical perspective on thriving through relationships. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc*, 19(2), 113–147. <https://doi.org/10.1177/1088868314544222>
- Feeney, B., & Collins, N. (2019). The importance of relational support for attachment and exploration needs. *Current Opinion in Psychology*, 25, 182–186. <https://doi.org/10.1016/j.copsyc.2018.11.011>
- Feeney, B. C., & Thrush, R. L. (2010). Relationship influences on exploration in adulthood: The characteristics and function of a secure base. *Journal of Personality and Social Psychology*, 98(1), 57–76. <https://doi.org/10.1037/a0016961>
- Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships-relationship structures questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment*, 23(3), 615–625. <https://doi.org/10.1037/a0022898>
- George-Levy, S., Vilchinsky, N., Rafaeli, E., Liberman, G., Khaskia, A., Mosseri, M., & Hod, H. (2017). Caregiving styles and anxiety among couples: The context of coping, versus not coping, with cardiac illness. *Anxiety, Stress & Coping*, 30(1), 107–120. <https://doi.org/10.3109/17483107.2016.1167260>
- Girme, Y. U., Overall, N. C., Simpson, J. A., & Fletcher, G. J. O. (2015). “All or nothing”: Attachment avoidance and the curvilinear effects of partner support. *Journal of Personality and Social Psychology*, 108(3), 450–475. <https://doi.org/10.1037/a0038866>
- Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (Vol. 507, p. xvii). Guilford Press.

- Hunter, J. J., & Maunder, R. G. (2001). Using attachment theory to understand illness behavior. *General Hospital Psychiatry, 23*(4), 177–182. [https://doi.org/10.1016/S0163-8343\(01\)00141-4](https://doi.org/10.1016/S0163-8343(01)00141-4)
- Hwang, B., Fleischmann, K. E., Howie-Esquivel, J., Stotts, N. A., & Dracup, K. (2011). Caregiving for patients with heart failure: Impact on patients' families. *American Journal of Critical Care: An Official Publication, American Association of Critical-Care Nurses, 20*(6), 431–442. <https://doi.org/10.4037/ajcc2011472>
- Isac, C., Lee, P., & Arulappan, J. (2021). Older adults with chronic illness – Caregiver burden in the Asian context: A systematic review. *Patient Education and Counseling, 104*(12), 2912–2921. <https://doi.org/10.1016/J.PEC.2021.04.021>
- Jimenez, X. F. (2017). Attachment in medical care: A review of the interpersonal model in chronic disease management. *Chronic Illness, 13*(1), 14–27. <https://doi.org/10.1177/1742395316653454>
- Katz, E., Bar-Kalifa, E., Pietromonaco, P., Wolf, H., Klempfner, R., Hod, H., & Vilchinsky, N. (2023). Interpersonal variables and caregiving partners' burden in cardiac illness: A longitudinal study. *Journal of Social and Personal Relationships, 40*(11), 02654075231177259. <https://doi.org/10.1177/02654075231177259>
- Kayser, K., Watson, L. E., & Andrade, J. T. (2007). Cancer as a “we-disease”: Examining the process of coping from a relational perspective. *Families, Systems & Health, 25*(4), 404–418. <https://doi.org/10.1037/1091-7527.25.4.404>
- 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*(4), 796–811. <https://doi.org/10.1111/bjhp.12191>
- Kim, Y., Duberstein, P. R., Sörensen, S., & Larson, M. R. (2005). Levels of depressive symptoms in spouses of people with lung cancer: Effects of personality, social support, and caregiving burden. *Psychosomatics, 46*(2), 123–130. <https://doi.org/10.1176/appi.psy.46.2.123>
- 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*. Routledge.
- Laflamme, S. Z., Bouchard, K., Sztajerowska, K., Lalonde, K., Greenman, P. S., & Tulloch, H. (2022). Attachment insecurities, caregiver burden, and psychological distress among partners of patients with heart disease. *PLoS One, 17*(9), Article e0269366. <https://doi.org/10.1371/journal.pone.0269366>
- Lai, V. D., Paoletti-Hatcher, J., Wu-Chung, E. L., Mahant, I., Argueta, D. L., Brice, K. N., Denny, B. T., Green, C., Medina, L. D., Schulz, P. E., Stinson, J. M., Heijnen, C. J., & Fagundes, C. P. (2024). Perceived partner responsiveness alters the association between marital distress and well-being in dementia spousal caregivers. *Comprehensive Psychoneuroendocrinology, 20*, 100271. <https://doi.org/10.1016/j.cpnec.2024.100271>
- Lin, C., Shih, P. Y., & Ku, L. J. E. (2019). Activities of daily living function and neuropsychiatric symptoms of people with dementia and caregiver burden: The mediating role of caregiving hours. *Archives of Gerontology and Geriatrics, 81*(November 2018), 25–30. <https://doi.org/10.1016/j.archger.2018.11.009>
- Maras, D., Balfour, L., Lefebvre, M., & Tasca, G. A. (2021). Attachment avoidance and health-related quality of life: Mediating effects of avoidant coping and health self-efficacy in a

- rehabilitation sample. *Rehabilitation Psychology*, 66(4), 618–630. <https://doi.org/10.1037/rep0000398>
- Martire, L. M., & Helgeson, V. S. (2017). Close relationships and the management of chronic illness: Associations and interventions. *American Psychologist*, 72(6), 601–612. <https://doi.org/10.1037/amp0000066>
- Maunder, R., & Hunter, J. (2015). *Love, fear, and health: How our attachments to others shape health and health care* (1st ed.). University of Toronto Press. <https://www.amazon.com/Love-Fear-Health-Attachments-Others/dp/1442615605>
- Maunder, R., Nolan, R. P., Park, J. S., James, R., & Newton, G. (2015). Social support and the consequences of heart failure compared with other cardiac diseases: The contribution of support received within an attachment relationship. *Archives of Cardiovascular Diseases*, 108(8–9), 437–445. <https://doi.org/10.1016/j.acvd.2015.03.005>
- McLeod, S., Wearden, A., Berry, K., & Hodgson, C. (2020). Attachment and Social Support in Romantic Dyads: A systematic review. *Journal of Clinical Psychology*, 76(1), 59–101. <https://doi.org/10.1002/jclp.22868>
- Meredith, P. J., & Strong, J. (2019). Attachment and chronic illness. *Current Opinion in Psychology*, 25, 132–138. <https://doi.org/10.1016/j.copsyc.2018.04.018>
- Merlo, E. M., Stoian, A. P., Motofei, I. G., & Settineri, S. (2020). Clinical psychological figures in healthcare professionals: Resilience and maladjustment as the “Cost of Care”. *Frontiers in Psychology*, 11, 607783. <https://doi.org/10.3389/fpsyg.2020.607783>
- Mikulincer, M., & Shaver, P. (2016). *Attachment in adulthood, second edition: Structure, dynamics, and change* (2nd ed.). The Guilford Press. https://www.amazon.com/Attachment-Adulthood-Second-Structure-Dynamics/dp/1462525547/ref=sr_1_1?s=books&ie=UTF8&qid=1477122818&sr=1-1&keywords=attachment+in+adulthood+structure+dynamics+and+change
- Mikulincer, M., & Shaver, P. R. (2007). An attachment perspective on interpersonal regulation. In *Attachment in adulthood: Structure, dynamics, and change*, *Idc* (pp. 555–626). Routledge.
- Mikulincer, M., & Shaver, P. R. (2018). Attachment theory as a framework for studying relationship dynamics and functioning. In *The Cambridge handbook of personal relationships* (pp. 175–185). Cambridge University Press. <https://doi.org/10.1017/9781316417867.015>
- Miller, M., Neiterman, E., Keller, H., & McAiney, C. (2024). Being a husband and caregiver: The adjustment of roles when caring for a wife who has dementia. *Canadian Journal on Aging/La Revue Canadienne Du Vieillessement*, 44, 1–10. <https://doi.org/10.1017/S0714980824000291>
- Monin, J. K., Schulz, R., Feeney, B. C., & Cook, T. B. (2010). Attachment insecurity and perceived partner suffering as predictors of personal distress. *Journal of Experimental Social Psychology*, 46(6), 1143–1147. <https://doi.org/10.1016/j.jesp.2010.05.009>
- Neeland, I. J., Patel, R. S., Eshthardi, P., Dhawan, S., McDaniel, M. C., Rab, S. T., Vaccarino, V., Zafari, A. M., Samady, H., & Quyyumi, A. A. (2012). Coronary angiographic scoring systems: An evaluation of their equivalence and validity. *American Heart Journal*, 164(4), 547.e1–552.e1. <https://doi.org/10.1016/j.ahj.2012.07.007>
- Novak, M., & Guest, C. (1989). Application of a multidimensional caregiver burden inventory. *The Gerontologist*, 29(1986), 798–803. <https://doi.org/10.1093/geront/29.6.798>
- Pietromonaco, P. R., & Beck, L. A. (2015). Attachment processes in adult romantic relationships. In *APA handbook of personality and social psychology, volume 3: Interpersonal relations* (pp. 33–64). American Psychological Association. <https://doi.org/10.1037/14344-002>

- Pietromonaco, P. R., & Beck, L. A. (2018). Adult attachment and physical health. *Current Opinion in Psychology*, 25, 115–120. <https://doi.org/10.1016/j.copsyc.2018.04.004>
- Pietromonaco, P. R., & Collins, N. L. (2017). Interpersonal mechanisms linking close relationships to health. *American Psychologist*, 72(6), 531–542. <https://doi.org/10.1037/amp0000129>
- Pietromonaco, P. R., & Overall, N. C. (2021). Applying relationship science to evaluate how the COVID-19 pandemic may impact couples' relationships. *American Psychologist*, 76(3), 438–450. <https://doi.org/10.1037/amp0000714>
- Platts, L. G., Alm Norbrian, A., & Frick, M. A. (2022). Attachment in older adults is stably associated with health and quality of life: Findings from a 14-year follow-up of the Whitehall II study. *Aging & Mental Health*, 27(9), 1–8. <https://doi.org/10.1080/13607863.2022.2148157>
- Randall, G., Molloy, G. J., & Steptoe, A. (2009). The impact of an acute cardiac event on the partners of patients: A systematic review. *Health Psychology Review*, 3(1), 1–84. <https://doi.org/10.1080/17437190902984919>
- Rapelli, G., Donato, S., Giusti, E. M., Pietrabissa, G., Parise, M., Pagani, A. F., Spatola, C. A. M., Bertoni, A., & Castelnovo, G. (2024). Recognizing and appreciating the partner's support protects relationship satisfaction during cardiac illness. *Journal of Clinical Medicine*, 13(4), 1180. <https://doi.org/10.3390/jcm13041180>
- Rapelli, G., Donato, S., Pagani, A. F., Parise, M., Iafra, R., Pietrabissa, G., Giusti, E. M., Castelnovo, G., & Bertoni, A. (2021). The association between cardiac illness-related distress and partner support: The moderating role of dyadic coping. *Frontiers in Psychology*, 12, 106. <https://doi.org/10.3389/fpsyg.2021.624095>
- Revenson, T. A., Griva, K., Luszczynska, A., Morrison, V., Panagopoulou, E., Vilchinsky, N., & Hagedoorn, M. (2016). Personality and caregiving. In *Caregiving in the illness context* (pp. 79–89). Springer.
- Rodakowski, J., Skidmore, E. R., Rogers, J. C., & Schulz, R. (2012). Role of social support in predicting caregiver burden. *Archives of Physical Medicine and Rehabilitation*, 93(12), 2229–2236. <https://doi.org/10.1016/j.apmr.2012.07.004>
- Rodríguez-González, A. M., & Rodríguez-Míguez, E. (2020). A meta-analysis of the association between caregiver burden and the dependent's illness. *Journal of Women & Aging*, 32(2), 220–235. <https://doi.org/10.1080/08952841.2019.1700728>
- Saleem, S., Qureshi, N. S., & Mahmood, Z. (2019). Attachment, perceived social support and mental health problems in women with primary infertility. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 8(6), 2533–2540. <https://doi.org/10.18203/2320-1770.ijrcog20192463>
- Shaver, P. R., Mikulincer, M., & Cassidy, J. (2019). Attachment, caregiving in couple relationships, and prosocial behavior in the wider world. *Current Opinion in Psychology*, 25, 16–20. <https://doi.org/10.1016/j.copsyc.2018.02.009>
- Shiba, K., Kondo, N., & Kondo, K. (2016). Informal and formal social support and caregiver burden: The AGES caregiver survey. *Journal of Epidemiology*, 26(12), 622–628. <https://doi.org/10.2188/jea.JE20150263>
- Shieh, S.-C., Tung, H.-S., & Liang, S.-Y. (2012). Social support as influencing primary family caregiver burden in Taiwanese patients with colorectal cancer. *Journal of Nursing Scholarship*:

- An Official Publication of Sigma Theta Tau International Honor Society of Nursing*, 44(3), 223–231. <https://doi.org/10.1111/j.1547-5069.2012.01453.x>
- Simpson, J. A., & Rholes, W. S. (2010). Attachment and relationships: Milestones and future directions. *Journal of Social and Personal Relationships*, 27(2), 173–180. <https://doi.org/10.1177/0265407509360909>
- Smith, T. W., & Baucom, B. R. W. (2017). Intimate relationships, individual adjustment, and coronary heart disease: Implications of overlapping associations in psychosocial risk. *American Psychologist*, 72(6), 578–589. <https://doi.org/10.1037/AMP0000123>
- Taylor, R. S., Dalal, H. M., & McDonagh, S. T. J. (2022). The role of cardiac rehabilitation in improving cardiovascular outcomes. *Nature Reviews Cardiology*, 19(3), 180–194. <https://doi.org/10.1038/s41569-021-00611-7>
- Tough, H., Brinkhof, M., Siegrist, J., & Fekete, C. (2017). Subjective caregiver burden and caregiver satisfaction: The role of partner relationship quality and reciprocity. *Archives of Physical Medicine and Rehabilitation*, 98(10), 2042–2051. <https://doi.org/10.1016/J.APMR.2017.02.009>
- Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Alonso, A., Beaton, A. Z., Bittencourt, M. S., Boehme, A. K., Buxton, A. E., Carson, A. P., Commodore-Mensah, Y., Elkind, M. S. V., Evenson, K. R., Eze-Nliam, C., Ferguson, J. F., Generoso, G., Ho, J. E., Kalani, R., Khan, S. S., Kissela, B. M., & on behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2022). Heart disease and stroke Statistics—2022 update: A report from the American heart association. *Circulation*, 145(8), e153–e639. <https://doi.org/10.1161/CIR.0000000000001052>
- Tsilika, E., Parpa, E., Zygogianni, A., Kouloulas, V., & Mystakidou, K. (2014). Caregivers' attachment patterns and their interactions with cancer patients' patterns. *Supportive Care in Cancer: Official Journal of the Multinational Association of Supportive Care in Cancer*, 23(1), 87–94. <https://doi.org/10.1007/s00520-014-2329-6>
- Tulloch, H., Johnson, S., Demidenko, N., Clyde, M., Bouchard, K., & Greenman, P. S. (2021). An attachment-based intervention for patients with cardiovascular disease and their partners: A proof-of-concept study. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 40(12), 909–919. <https://doi.org/10.1037/hea0001034>
- Uchino, B. N., Bowen, K., Grey, R. K. d., 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 Wijnen, H. G. F. M., Rasquin, S. M. C., Van Heugten, C. M., Verbunt, J. A., & Moolaert, V. R. M. (2017). The impact of cardiac arrest on the long-term wellbeing and caregiver burden of family caregivers: A prospective cohort study. *Clinical Rehabilitation*, 31(9), 1267–1275. <https://doi.org/10.1177/0269215516686155>
- Vilchinsky, N., & Dekel, R. (2018). Cardiac disease-induced PTSD: The need for a dyadic perspective. In *When “we” are stressed: A dyadic approach to coping with stressful events* (pp. 109–124). Nova Science Publishers.
- Vilchinsky, N., Dekel, R., Asher, Z., Leibowitz, M., & Mosseri, M. (2012). The role of illness perceptions in the attachment-related process of affect regulation. *Anxiety, Stress & Coping*, 5806(June), 1–16. <https://doi.org/10.1080/10615806.2012.682649>

- Vilchinsky, N., Dekel, R., Revenson, T. A., Liberman, G., & Mosseri, M. (2015). Caregivers' burden and depressive symptoms: The moderational role of attachment orientations. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*, 34(3), 262–269. <https://doi.org/10.1037/hea0000121>
- Vilchinsky, N., Ginzburg, K., Fait, K., & Foa, E. (2017). Cardiac-disease-induced PTSD (CDI-PTSD): A systematic review. *Clinical Psychology Review*, 55, 92–106. <https://doi.org/10.1016/j.cpr.2017.04.009>
- 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: JFP: Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, 24(4), 508–512. <https://doi.org/10.1037/a0020009>
- Vitaliano, P. P., Zhang, J., & Scanlan, J. M. (2003). Is caregiving hazardous to one's physical health? A meta-analysis. *Psychological Bulletin*, 129(6), 946–972. <https://doi.org/10.1037/0033-2909.129.6.946>
- World Health Organization. (2025). *Cardiovascular diseases (CVDs)*. World Health Organization Health Topics. [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))
- Zarit, S. H., Todd, P. A., & Zarit, J. M. (1986). Subjective burden of husbands and wives as caregivers: A longitudinal study. *The Gerontologist*, 26(3), 260–266. <https://doi.org/10.1093/geront/26.3.260>
- Zhao, X., Cheng, F., Gao, Y., Wang, Q., Zhao, Y., & Li, P. (2023). Association between adult attachment style, communication patterns and caregiver burden in parents of children with solid tumors: A cross-sectional study. *European Journal of Oncology Nursing: The Official Journal of European Oncology Nursing Society*, 67, 102437. <https://doi.org/10.1016/j.ejon.2023.102437>