Social connectedness moderates the relationship between warfare exposure, PTSD symptoms and health among older adults

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ABSTRACT

Objective: The goal of the current study is to examine whether social connectedness among older adults mitigates the risk of poor health due to exposure to warfare and related symptoms of posttraumatic stress disorder (PTSD). Prior research has indicated a protective role for social connectedness in the face of trauma, in general. However, this same association has not been examined among older adults exposed to warfare, even though they are potentially a more vulnerable population with unique social needs. *Method:* The study used cross-sectional data from the Israeli component of the Survey of Health, Ageing and Retirement in Europe (SHARE-Israel; *N*=1,557, mean age=69.03, age range=50-105). It employed a composite scale of social connectedness, data on exposure to war-related events during the 2014 Israel-Gaza conflict, and ensuing symptoms of PTSD. Social connectedness, warfare exposure and PTSD symptoms were used to predict physical and mental health, as well as engagement in health behaviors. *Results:* Warfare exposure and PTSD symptoms were related to worse health. Moreover, social connectedness moderated this association, such that persons suffering from PTSD symptoms suffered less from worse health when they were highly connected. This trend was found for physical and mental health and in relation to health behaviors. *Conclusions:* While war-related PTSD is indeed related to poorer health, social connectedness moderates the strength of the association. Practitioners should be aware of the protective role of social connectedness in the context of warfare exposure in old age and intervention programs with this population should strive towards bolstering social connections.

Keywords: warfare exposure; PTDS symptoms; social connectedness; health.

The extent of social connectedness, frequently termed in the literature as social networks, has been identified as an important factor in coping with adverse life events (Cohen & Wills, 1985). However, less is known regarding the protective role of social networks among older adults exposed to warfare, even though the latter are potentially a quite vulnerable population. Moreover, investigations of the protective role of social connectedness tend to look at its association with mental health, with little attention given to other health-related outcomes of warfare exposure in old age. The current study, therefore, examines the protective role of social connectedness in relation to a wide range of health-related outcomes among older adults exposed to warfare in late life. It examines a social connectedness measure that encompasses several aspects of the social network, providing a more comprehensive account of social resources in later life.

Several theories suggest that social connectedness can mitigate the negative impact of trauma exposure. The Conservation of Resources theory identifies social resources, such as social connections and social support, as potential protectors against the effect of negative life events (Hobfoll, Canetti-Nisim, & Johnson, 2006; Hobfoll & Lilly, 1993). Similarly, the buffering hypothesis posits that close and meaningful social relationships can protect against the potentially negative effects of stressful events (Cohen & Wills, 1985). These social connections are valuable insofar as they can be manipulated and mobilized to deal with negative occurrences (Kaniasty & Norris, 2000; Kaniasty, 2005). Close ties can provide social support that helps regulate emotion and soothe trauma-driven fears (see review in Charuvastra & Cloitre, 2009). Moreover, social bonding can promote faster recovery among people that developed posttraumatic stress disorder (PTSD) following trauma (see Olff, 2012).

In the general population, the availability of close supportive relationships was shown to lead to less stressful reactions among persons who suffered from a traumatic experience in the earlier post disaster phase (Kaniasty & Norris, 2008). In the context of war and terror, Israelis who were exposed to missile attacks and who reported higher social support and availability of close ties following war also exhibited better mental health (Weinberg et al., 2017). High levels of social support were related to a more moderate course of depression among residents of the New-York City metropolitan area following the September 11 attacks (Nandi, Tracy, Beard, Vlahov, & Galea, 2009). Presence of close family members was related to less mental health problems among refugees from Latin-America who were exposed to trauma during war or other types of organized violence in their countries of origin (Rousseau, Mekki-Berrada, & Moreau, 2001).

The social milieu of older adults, however, has not often been explored as a potential moderator (for examples of such research, see: Cherry et al., 2015, 2017), even though the social environment may be particularly important in old age. Older adults, compared to younger age groups, have a strong need for social support during a disaster in order to mitigate the effects of stress (Bolin & Klenow, 1988). This tendency may reflect the general change in priorities that occurs in old age, in which older adults tend to emphasize their emotionally close social ties (Carstensen, 2006). However, despite these changed social priorities, older age also entails a danger of dwindling social resources (Wrzus, Hänel, Wagner, & Neyer, 2013). Transitions such as retirement, spousal loss and health declines can alter one's available social sources and may result in lower support when needed. Thus, the social environment of older adults involves unique challenges and opportunities in relation to how older adults adapt to traumatic events.

The social milieu in old age is complex and its benefits may not be fully captured by assessing provided and functional support. For example, even if support is not provided, knowing that support is within reach can have positive implications for coping (see Charuvastra & Cloitre, 2009), and social interactions can be meaningful for general positive feelings of belongingness and self-worth. Thus, the current study utilizes a measure of social connectedness that captures several aspects of the social network and provides a more comprehensive account of social resources. Social connectedness is conceptualized as being embedded in a resourceful network of ties. In this study it is operationalized as a quantitative 'count' of persons across four categories – a count of important social ties, of ties contacted often, of diverse ties and of emotionally close ties. Although this is mainly a measure of quantitative structural support, the literature linking such structural support to warfare exposure is limited. Hence, the current literature review also refers to studies on functional social support. However, conclusions should be drawn carefully from such literature to this measure of social connectedness.

Research on the protective effects of the social environment in the face of warfare has mostly focused on depression and anxiety (see, for example: Nandi et al., 2009; Schweitzer, Melville, Steel, & Lacherez, 2006). However, exposure to warfare and ensuing PTSD symptoms can lead to deteriorations in a wide range of health-related outcomes (Pacella, Hruska, & Delahanty, 2013; Palgi, 2015) which persist and can even be amplified with age (Solomon et al., 2014). Older victims of trauma and those who suffer from PTSD following warfare may exhibit worse physical health (Glaesmer, Brähler, Gündel, & Riedel-Heller, 2011). Higher PTSD levels are also associated with harmful health-related behaviors (Vlahov et al., 2002) and less health-promoting behaviors (see Lee & Park, 2018). Exposure to warfare can also impact more positive aspects of mental health, such as life satisfaction (Besser & Neria, 2009). A fuller exploration of

the social environment's protective role should therefore encompass a wide array of health-related outcomes of warfare exposure and PTSD symptoms, including mental health, physical health and health-related behaviors.

The current study is based on a sample of community-dwelling older adults in Israel, who were asked about exposure to warfare-related events during the 2014 Gaza-Israel conflict (a.k.a. Operation Protective Edge). Since 2001, the population in southwestern Israel has been exposed to recurrent bouts of missile attacks from the Gaza-Israel border. The 2014 conflict was initiated following a growing surge of such rockets firing into Israel and it lasted from July 8th, 2014 until a cease fire was declared in August 5th, 2014. During the conflict, Hamas fired approximately 4,600 mortars and rockets that reached most parts of Israel (Chorev, 2014), such that over 70% of the Israeli population were living within rocket range (Hoffman, Shrira, & Grossman, 2015). In all, 72 Israelis were killed in the conflict, including 67 soldiers and five civilians (Chorev, 2014). Many Israeli adults were further exposed to the events through excessive news consumption during the conflict, a consumption of televised traumatic images that could have possible adverse effects to their well-being (Palgi, Shrira, & Hoffman, 2017).

Based on the literature, this investigation aims to assess the protective role of social connectedness among older adults exposed to traumatic events during the 2014 Israel-Gaza conflict. The first study hypothesis is that older persons who were exposed to traumatic events during the conflict will be in a worse mental and physical health and will engage to a lesser degree in health-related behaviors. These outcomes are expected to be worse among exposed older adults who suffer from PTSD symptoms. Secondly, it is hypothesized that this negative influence will be moderated by social connectedness, such that adults who are more socially

connected will show smaller health-related declines following warfare exposure or when suffering from PTSD symptoms.

METHOD

Participants and Procedure

The current study used cross-sectional data from the Israeli component of the Survey of Health, Ageing and Retirement in Europe (SHARE-Israel), a survey of persons aged 50 and older (Litwin, 2009). It is collected as part of a panel survey in over 20 European countries including Israel, which focuses on community-dwelling adults aged 50 and above and their spouses of any age (Börsch-Supan et al., 2013). SHARE is based on a generic questionnaire applied in all participating countries and collected by means of a computer-assisted personal interview (CAPI). The survey also includes a drop-off supplement – a leave behind paper-and-pencil questionnaire that each country can modify to explore unique topics of interest that are not included in the generic SHARE questionnaire (Litwin, 2009). SHARE-Israel received ethical approval by the Institutional Review Board (IRB) of the Hebrew University of Jerusalem.

Israel joined SHARE in 2005 and so far, carried out four waves of data collection. Data for the current study was taken from the fourth Israeli wave, collected in 2015. This wave was chosen due to its implementation of a unique drop-off questionnaire, which addressed exposure and reaction to potentially traumatic events during the 2014 Israel-Gaza conflict. Moreover, this was the first wave of SHARE-Israel to measure personal social networks. The current study utilized the drop-off questions, the social networks measure from the main SHARE questionnaire and additional items from the main questionnaire.

A total of 2,035 respondents participated in the fourth wave of SHARE-Israel, out of which 1,810 (89%) filled the drop-off questionnaire. The current analysis included only respondents who filled the drop-off instrument, were aged 50 and above at the time of the interview, were interviewed about their social networks and who did not report being diagnosed with Alzheimer's disease, dementia, organic brain syndrome, senility or any other serious memory impairment. Thus, the total analytic sample numbered 1,557 respondents.

We conducted an attrition analysis comparing those who completed the drop-off to those who did not. This was done by creating a dummy variable which was coded as 1 for completing the drop-off and using bivariate difference analyses with various socio-demographic and health variables. t-tests were conducted with continuous variables and χ^2 tests for categorical variables. Effect sizes were assessed using φ, Cramer's V, and Cohen's *d* for χ^2 and t tests, respectively. Small, medium, and large effects were considered for values of 0.1, 0.3, and 0.5 respectively for φ and Cramer's V, and for values of 0.2, 0.5, and 0.8, respectively, for Cohen's *d*. Respondents who completed the drop-off were more likely ($p < .05$) to be younger (Cohen's $d = 0.26$) and to have more years of education (Cohen's $d = 0.28$). They were more socially connected (Cohen's $d = 0.20$), rated their health as better (Cohen's $d = 0.28$), had less mobility limitations (Cohen's $d = 0.42$) and were more likely to engage in health behaviors ($\varphi = 0.12$). They did not differ in terms of gender, depressive symptoms or life satisfaction.

Measures

Exposure to the 2014 Israel-Gaza conflict

Exposure to warfare events during the 2014 Israel-Gaza conflict was assessed through a list of twelve occurrences which respondents might have undergone. They were asked to indicate, regarding each event, whether they have experienced it between June and August 2014. The events listed included injuries and physical danger to self and to a close other, damage or danger of damage to one's personal property or workplace, exposure to people who were injured, disruption of one's daily routine for a week or more, or being forced to leave one's house for a week or more. Table 1 displays the frequencies of exposure to the various traumatic events in the study sample.

Participants who reported exposure to any of these events were directed to the 4-item SPAN measure of PTSD symptoms (Meltzer-Brody, Churchill, & Davidson, 1999). SPAN has been shown to be as sensitive as longer measures of PTSD (Brewin, 2005). Respondents were asked to rate their symptoms during the past week in relation to the 2014 conflict on a scale of 0-4, ranging from "Not at all" to "Extremely". The scale had good internal consistency ($\alpha = .81$). A cutoff score of 5 was used to determine PTSD (Meltzer-Brody et al., 1999). Participants were thus divided into three categories – "No trauma" if the respondents did not indicate experiencing any warfare-related event during the 2014 conflict, "Trauma without PTSD" if they experienced at least one event but were not classified as having PTSD and "Trauma and PTSD" if they reached the threshold for PTSD.

Social connectedness

Social networks were measured in SHARE using a name generating inventory, which maps individuals' subjective personal networks by asking them with whom they discussed important matters in the preceding 12 months (Schwartz, Litwin, & Kotte, 2017). Name generating inventories provide a unique opportunity to directly map individuals' personal social

networks. They provide a more accurate account of people's social environment, compared to more traditional indirect methods, insofar as they provide a list of the closest people based on the individual's subjective perspectives. The current study used a summary scale to aggregate the different dimensions of the social networks and provide a single measure of social connectedness. Such a single measure provides a simple means of capturing several aspects of the social networks and provides a general sense of being embedded in "rich" social networks (For more details about the scale of social connectedness see: Litwin & Stoeckel, 2015). The name generator inventory asks respondents to list up to seven persons with whom they talk about "important matters" and to provide additional information about the relationship with them. The summary scale was comprised of four main characteristics of the social network: a count of the persons cited; a count of the persons cited with weekly or more contact; a count of the persons cited with very or extremely close emotional closeness and a count of different types of relationships within the network. The first three characteristics were scored as follows: 0 = 0, 1 = 1, 2 = 2/3, 3 = 4/5, and 4 = 6/7 persons cited. The fourth measure counted the number of different relationship categories [(a) spouse, (b) other family, including children, (c) friend, and (d) other] that were present in the network (0–4). These measures were summed to create a scale ranging of 0-16, which was then collapsed to create the final scale of 0-4. This was done following the procedure used by the authors of the scale (Litwin & Levinson, 2017; Litwin & Stoeckel, 2016). Higher scores on the scale indicate higher levels of social connectedness. It had good internal consistency in the current sample ($\alpha = .92$).

Health

The study assessed several indicators of mental health, physical health and health-related behaviors. Mental health was assessed with depressive symptoms and life satisfaction, which

represent negative and positive aspects of mental health. Depressive symptoms were assessed via the Euro-D scale for late-life depression (Prince et al., 1999). The scale is composed of 12 "yes" or "no" questions about symptoms experienced in the past month, such as feeling depressed or a loss of interest. The scale has a range of 0-12 and a minimum of ten completed items was required for using the score, such that scores with 10–11 complete items were interpolated. This measure had good internal reliability in the current sample (Kuder-Richardson = .74). Life satisfaction was made up of a single probe – "how satisfied are you with your life?" (George, 2010). Responses ranged from 0 to 10.

Physical health was assessed using subjective and objective indicators. Subjective health was measured by a self-rating of one's health, on a scale of 1 ("Excellent") to 5 ("Poor") (Börsch-Supan et al., 2013). The scores were reverse-coded such that a higher score indicated better perceived health. Objective health was measured using a count of mobility, arm function, and fine motor limitations (range: 0–10) (Angelini, Brugiavini, & Weber, 2009). This measure had good internal reliability in the current sample (Kuder-Richardson = .86).

Health-related behaviors were assessed by physical activity and alcohol consumption. A single summary variable was created to indicate engaging in the two health behaviors. It was coded as 1 for participants who engaged in a moderate or vigorous activity at least once in the preceding month, and who did not drink six or more units of alcohol on one occasion in the last three months. It was coded as 0 for participants who did not engage in physical activity, those who consumed excessive amounts of alcohol, or those who did not engage in activity and consumed excessive amounts of alcohol.

Covariates

Several socio-demographic covariates were also considered in the main analyses due to their known associations with health in old age (George, 2010; Shrira, 2014). Age was used as a continuous variable. Gender was coded as 1 (men) and 2 (women). Education was measured as years of education.

Statistical Analysis

First the investigation described the characteristics of the study sample. Next, it examined the bivariate links of these characteristics with the three categories of trauma ("No trauma", "Trauma without PTSD", "Trauma and PTSD"). ANOVAs were carried out to explore the associations with the continuous covariates and ANCOVAs, controlling for the covariate, were used for the continuous independent and dependents variables. The false discovery method was used to correct for multiple comparisons (Benjamini & Hochberg, 1995). χ^2 tests were used for categorical and dummy variables. Effect sizes were assessed for these bivariate tests using φ, Cramer's V, and η^2 for χ^2 and ANOVA test, respectively. Small, medium, and large effects were considered for values of 0.1, 0.3, and 0.5 respectively for φ and Cramer's V, and for values of 0.01, 0.06 and 0.14, respectively, for η^2.

The final stage of analysis used structural equation models (SEMs) to examine the association of warfare events and PTSD with health and the moderation of social connectedness. Estimation was performed with a weighted least squares means and variance adjusted (WLSMV) estimator, to account for the binary endogenous variable of health behaviors (Beauducel & Herzberg, 2006). First, SEM was used to test the direct effects of trauma on health. The

categorical variable of trauma exposure was dummy coded. Two dummy variables were created – the first coded as 1 for "trauma and no PTSD" and 0 for the other two categories, the second coded as 1 for "trauma with PTSD" and 0 for the two other categories. Such coding meant that when entered into the models, the reference category for these two variables was "no trauma exposure".

Second, a model testing the interaction of social connectedness and trauma was constructed. In these models, mental health was modeled as a latent variable based on depressive symptoms and life satisfaction. Physical health was a latent variable based on self-rated health and mobility limitations, and health behaviors were entered into the models as a manifest variable. The models controlled for age, gender and education. Significant interactions were probed by examining the simple slopes of trauma and PTSD one SD above and below the mean level of social connectedness (Figueiras, Domenech-Massons, & Cadarso, 1998). For each model, fit indices were also examined to determine model fit, including the comparative fit index (CFI), the standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA) with accompanying 90% confidence intervals (CIs). Adequate fit was indicated by CFI values above .95, SRMR values lower than .05 and RMSEA values below .08 (Hooper, Coughlan, & Mullen, 2008). Analyses were conducted using R version 3.4.4, and the SEMs were examined with the package Lavaan (Rosseel, 2012).

RESULTS

Table 1 shows the frequency of experiencing the different types of warfare-related events in the 2014 Gaza-Israel conflict. About a quarter of the sample had their daily routine disrupted for about a week or more, and almost a fifth reported that someone close to them was in danger

of physical injury. Other relatively prevalent experiences, reported by over ten percent of the sample, were being in danger of personal injury, having one's personal property in danger of damage and being exposed to people who were injured. Out of the sample, 207 (13%) reported experiencing one event, 98 (6%) reported two occurrences of warfare-related events and 255 (16%) reported three or more occurrences.

[Insert Table 1 about here]

Table 2 presents descriptive statistics for the study variables. It shows that 65% of the participants did not experience any occurrence related to the 2014 Gaza-Israel conflict. About a quarter (23%) experienced at least one occurrence but did not have PTSD and 12% fit the criteria for PTSD. The mean age was 69, women made up 58% of the participants and they had about 13 years of education.

The average score on the social connectedness scale was 2 (range: 0-4), indicating intermediate average levels of social connectedness. The participants reported 2.5 depressive symptoms on average and rated their life satisfaction as 7.8. They indicated that their health was "Good" (3 out of 5) and that they had 1.7 mobility limitations. The majority (77%) engaged in health behaviors – they were physically active in the last month and did not report excessive alcohol consumption of six units or more in the past three months.

Table 2 also displays bivariate analyses of the study variables in relation to warfare exposure and PTSD. All the variables were found to vary by the different trauma categories. People who were exposed to the 2014 warfare events, and particularly those who developed

PTSD symptoms, were older, more likely to be women and had more years of education. They also were more socially connected, had more depressive symptoms, lower life satisfaction, lower self-rated health, more mobility limitations and were less likely to engage in health behaviors. After adjusting for multiple tests using the false discovery rate method (Benjamini & Hochberg, 1995), the F values remained significant (.004 for all the tests).

[Insert Table 2 about here]

Next, a SEM analysis was carried out. First, SEM examined the main effects of trauma and social connectedness on mental health, physical health and health behaviors, controlling for age, gender and education. The model provided good fit to the data (χ^2/df = 3.78, p < .001, CFI = .98, RMSEA = .05, 90% CI [.04, .06], SRMR = .03). Worse mental health (indicated by lower values on the latent variable) was seen among people who were older (β = -.26, p < .001), who were women (β = -.16, p < .001) and who had less years of education (β = .22, p < .001). Individuals exposed to warfare events had worse mental health if they had PTSD symptoms (β = -.27, p < .001) and if they did not develop such symptoms (β = -.16, p < .001), compared to persons not exposed to warfare events. Mental health was not associated with social connectedness (β = -.05, p = .16). Worse physical health (indicated by lower values on the latent variable) was found among persons who were older (β = -.43, p < .001), who were women (β = -.10, p < .001) and who had less years of education (β = .30, p < .001). Those who experienced warfare but did not develop PTSD symptoms had worse physical health compared to persons not exposed to traumatic events (β = -.13, p < .001). Worse physical health was also seen among those who developed PTSD symptoms, compared to persons not exposed to warfare events (β = -

.25, $p < .001$). Worse physical health was also related to higher social connectedness (β = -.08, $p < .05$).

Less engagement in health behaviors (indicated by lower values of the variable) was seen among persons who were older (β = -.20, $p < .001$) and who had less years of education (β = .22, $p < .001$), while no gender differences were found (β = .05, $p < .18$). Experiencing warfare without PTSD symptoms was related to less health behaviors, compared to persons not exposed to traumatic events (β = -.22, $p < .001$). Developing PTSD symptoms was also related to less engagement in health behaviors, compared to persons not exposed to traumatic events (β = -.18, $p < .001$). Less health behaviors were related to lower social connectedness (β = .09, $p < .05$).

The second SEM added an interaction between social connectedness and trauma (Table 3). The model provided good fit to the data (χ^2/df = 3.22, p < .001, CFI = .99, RMSEA = .04, 90% CI [.02, .05], SRMR = .03). The results indicated that social connectedness moderated the negative effect of warfare exposure on health. In relation to mental health, a significant interaction was found with PTSD symptoms but not for warfare exposure without PTSD symptoms. Similarly, social connectedness had a significant interaction with PTSD symptoms in relation to physical health. Social connectedness also emerged as a moderator between health behaviors and warfare exposure, both with PTSD symptoms and without such symptoms.

Next, the interactive effects were explored by examining the simple slopes of trauma and health for individuals with social connectedness that was 1 SD below the mean (social connectedness = 1) and 1 SD above the mean (social connectedness = 3). Among persons with low social connectedness, PTSD symptoms were related to lower mental health (β = -.42, $p < .001$), lower physical health (β = -.34, $p < .001$) and less health behaviors (β = -.45, $p < .001$) compared to persons not exposed to warfare events. Among individuals with high social

connectedness, the associations between PTSD symptoms and health were weaker, albeit still significant, for mental health (β = -.23, $p < .001$) and physical health (β = -.22, $p < .001$). This association was no longer significant in relation to health behaviors (β = -.06, $p = .23$).

The interaction effect of warfare exposure without PTSD symptoms, in relation to health behaviors, was similarly analyzed. Among individuals with low social connectedness, having exposure to warfare events, without PTSD symptoms, had a stronger association with less health behaviors (β = -.31, $p < .001$) in comparison to those reporting higher social connectedness (β = -.12, $p < .05$).

We conducted a supplementary analysis to assess how social connectedness moderates the influence of trauma exposure without considering PTSD and the influence of PTSD without considering trauma exposure (Supplementary table 1). In this analysis we entered two interactions with the social connectedness scale – one with having PTSD and one with being exposed to warfare events. The model had good fit to the data (χ^2/df = 2.35, p < .001, CFI = .99, RMSEA = .03, 90% CI [.02, .05], SRMR = .03). Both interactions were significant in predicting health behaviors, such that having higher social connectedness was related to having a weaker association between health behaviors and PTSD or exposure to warfare events. The analyses further showed significant interactions of social connectedness with having PTSD, but not with exposure to warfare events, in predicting mental health. The interactions were not significant in predicting physical health.

[Insert Table 3 about here]

DISCUSSION

The current study examined the protective role of social connectedness against health impairments associated with warfare events. To that end, it employed a composite scale of social connectedness as a moderator of exposure to warfare events during the 2014 Israel-Gaza conflict. In line with the first hypothesis, experience of warfare events during the conflict, especially when resulting in PTSD symptoms, was related to worse mental and physical health and to lower engagement in health behaviors. In support of the second hypothesis, social connectedness moderated this association. That is, persons who were more socially connected experienced less health impairments associated with warfare exposure. Among persons with high social connectedness, warfare exposure was not associated, or weakly associated, with health disparities. On the other hand, persons that lacked close social connections and were exposed to warfare events, particularly those reporting PTSD symptoms, were in worse health compared to those who were not exposed to warfare events.

Social connectedness emerged as an important protective factor in the context of warfare events in later life, in line with the Conservation of Resources theory (Hobfoll et al., 2006) and the buffering hypothesis (Cohen & Wills, 1985). The protective role of social connectedness was particularly pronounced among adults who suffered from PTSD symptoms following the warfare events. The protective role was found in relation to a wide range of health indicators - mental health, physical health and health behaviors. Thus, the current study expands previous research, which focused on the protective effect of social connectedness in relation to negative mental health (Nandi et al., 2009). Moreover, these findings are particularly novel in relation to older adults exposed to warfare. They suggest that following warfare-exposure in late life, social ties are highly important and should be maintained and enhanced, even in the face of possible social

losses of later life. The social measure used in the current study encompasses several aspects of the social networks, and may indicate that social connectedness is important due to various benefits. These benefits can include social support and, as suggested by Charuvastra and Cloitre (2009), a sense of safety through the presence of stable, reliable interpersonal connections.

Consistent with the first hypothesis, the study found that exposure to warfare and terror among older adults is related to worse health. These results provide a unique opportunity to show such adverse effects in several health domains in a single study sample. This underscores the deleterious effects of warfare exposure and particularly that of PTSD symptoms among older adults, a finding particularly noteworthy as over a third of the sample was exposed to such events. Policy-makers and practitioners should be aware of the wide-spread implications of exposure in times of warfare among the older population, even among persons who did not suffer physical injuries and who may be harder to detect by official agencies.

One unexpected finding was that among individuals without warfare exposure, social connectedness was related to worse mental health and worse physical health. This was indicated by the negative simple slopes of social connectedness with mental and physical health under the condition of no trauma exposure (Table 3). This finding may be explained by higher connectedness being related to more support received from the close environment. Perhaps among exposed persons, this help was necessary in mitigating the adverse effects of warfare. The bivariate analyses showed that persons who developed PTSD also had higher social connectedness, and this might indicate that having symptoms of PTSD led to a recruitment of ties to help their coping. Such support could manifest in talking more often about one's feeling, encouragement to go to physicians and mental health specialists, support in engaging in health behaviors and a lower need to drink alcohol to deal with one's mental health issues. Thus,

although social ties did not prevent PTSD symptoms, they might have been mobilized in response to these symptoms and deterred further health declines. Among persons not exposed, receiving more help might similarly indicate mobilization as a result of worse health (Dunbar, Ford, & Hunt, 1998). That is, relatives and friends may have provided more contact because their older relatives were in poor mental and/or physical health. Further research is needed to clarify these findings. In particular, longitudinal data, that will be available in future waves of SHARE, can help better understand the consequences of higher social connectedness. Studies using such data might examine whether persons receiving help due to poor health will eventually show improved health and well-being.

The current findings should be viewed in light of the study's limitations. One limitation stems from the cross-sectional study data, which prohibits clear conclusion about causality. The association between warfare-exposure and worse health is interpreted as reflecting the adverse influence of warfare, an interpretation supported by previous causal research (Benyamini, Ein-Dor, Ginzburg, & Solomon, 2009; Solomon et al., 2014). However, there is also a possibility that individuals in worse health were more prone to experience events as traumatic. An additional limitation concerns the measurement of social networks several months following the 2014 Gaza-Israel conflict. The social ties measured in the study, therefore, may reflect older adults' social connections during the attacks or social relationships that transformed in response to the events (Kaniasty & Norris, 2000; Weinberg et al., 2017). Some support for the latter possibility comes from our finding that persons who suffered from warfare events were more socially connected, suggesting that these improved ties may reflect increased support following the events. The current results nevertheless highlight the importance of social connectedness in

relation to warfare-exposure, and future research may make a more detailed analysis that separates social ties during and after warfare.

Another possible limitation is that some of the warfare events inquired by the survey (a list appears in Table 1), such as moving for a week, are considered to be stressful events and not traumatic events (American Psychiatric Association, 2013). However, we note that during the 2014 conflict most of Israel's inhabitants were under missile threat (Chorev, 2014). Therefore, even events such as moving, which may not be considered traumatic under normal circumstances, may indeed be considered as potentially traumatic if they take place due to missile threats. It is also important to note that the bivariate analyses showed higher warfare exposure among individuals with more years of education. Although we controlled for years of education in the analyses, it is possible that there were other related demographic features, beyond those that we assessed, that may have additionally contributed to these different patterns.

The current study explored social connectedness in general. Future studies may delve deeper into this topic by investigating religion or religiosity as a possible means of social connection (Salsman, Brown, Brechting, & Carlson, 2005). In SHARE-Israel the information about religiosity is asked only of a small minority of the sample who participate for the first time, thus we could not examine this issue. Further investigations may incorporate religiousness into the study of the protective role of social connectedness.

To sum, the current study demonstrated the protective role of the close social network in the context of warfare events in old age. The moderating effect of social ties emerged as particularly important due to their influence of a wide range of health domains. Clinicians working with the older population should be aware of the positive outcomes of having close social connections in the context of warfare exposure. They may encourage their patients to

strengthen their social relationships and spend time with close others, as a means of coping with such adverse events. This is particularly relevant for practitioners working with older adults who suffer from PTSD symptoms. Moreover, the study's findings may encourage practitioners to actively detect older persons who were exposed to traumatic events in the context of warfare, as these persons may not easily reach out and ask for assistance.

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TABLE 1. Frequencies of Exposure Types

Exposure Type	**N (%)**
You were personally injured	9 (0.6)
A person close to you was killed	23 (1.5)
A person close to you was injured	25 (1.6)
You were not personally injured, but you yourself were in danger of physical injury	237 (15.3)
A person close to you was in danger of physical injury	289 (18.7)
There was damage to your personal property (e.g., home, car)	19 (1.2)
There was no actual damage, but there was danger of damage to your personal property (e.g., home, car)	245 (15.9)
There was damage (whether physical or resulting from disrupted activity) to your place of work or business	25 (1.6)
There was no actual damage, but there was danger of damage to your place of work or business	90 (5.8)
You were not personally injured, but you were exposed to people who were injured	162 (10.5)
Your daily routine was seriously disrupted for a week or more	393 (25.4)
It was necessary to leave your home for a week or more	26 (1.7)

Note. The total number of respondents ranged from 1,543 to 1,552 in the various items.

TABLE 2. Descriptive Statistics for the Study Variables and Bivariate Associations with Trauma and PTSD

Variable	Total sample	No trauma	Trauma without PTSD	Trauma and PTSD	Difference test and effect size
Trauma					
No trauma	968 (65%)				
Trauma without PTSD	347 (23%)				
Trauma and PTSD	177 (12%)				
Age	69.03 (9.15)	68.45 (9.07) [a]	69.21 (9.12)[a]	71.71 (9.02)[b]	F (2, 1,489) = 9.79***, η^2 = 0.01
Gender (women)[1]	900 (58%)	555 (57%)	189 (54%)	120 (68%)	χ^2 (2) = 8.92*, Cramer's V = 0.08
Years of education	12.76 (4.24)	12.08 (4.38)[a]	14.02 (3.86) [b]	13.58 (3.45) [b]	F (2, 1,388) = 30.25***, η^2 = 0.04
Social connectedness scale	2.04 (1.01)	1.79 (0.93)[a]	2.44 (1.01) [b]	2.62 (0.86) [b]	F (2, 1, 335) = 92.78***, η^2 = 0.12
Depressive symptoms	2.48 (2.39)	2.05 (2.35) [a]	2.81 (2.15) [b]	3.98 (2.30) [c]	F (2, 1, 363) = 65.94***, η^2 = 0.07
Life satisfaction	7.84 (1.84)	7.96 (1.78) [a]	7.89 (1.82) [a]	7.11 (1.99)[b]	F (2, 1, 341) = 16.88***, η^2 = 0.02
Self-rated health	2.98 (1.11)	3.10 (1.10) [a]	2.96 (1.09) [a]	2.32 (1.01)[b]	F (2, 1, 380) = 48.91***, η^2 = 0.05
Mobility limitations	1.65 (2.52)	1.36 (2.31) [a]	1.71 (2.49) [a]	3.06 (3.11)[b]	F (2, 1, 385) = 43.39***, η^2 = 0.05
Health behaviors (yes)[1]	1,194 (77%)	781 (81%)	245 (71%)	118 (67%)	χ^2 (2) = 25.24***, Cramer's V = 0.13

Note N = 1,557; Means that do not share letters significantly differ from each other in a post-hoc Bonferroni test. *p < .05; ***p <.001.

[1] For factor variables, the percentages were derived by dividing the number of respondents in the reference category, shown in parentheses, by the total number of respondents in that column. For example, in the column "Total sample", women comprised 58% of the total sample. In the column "No trauma", women were 57% of those who did not experience any traumatic event.

Small, medium, and large effects are considered for values of 0.1, 0.3, and 0.5 respectively for φ and Cramer's V, and for values of 0.01, 0.06 and 0.14, respectively, for η2. The analyses for the main effects are ANOVAs controlling for age, gender and education

TABLE 3. SEM Predicting Mental Health, Physical Health and Health Behaviors (N = 1,274)

	Mental health			Physical health			Health behaviors		
Variable	**β**	**SE**	***p***	**β**	**SE**	***p***	**β**	**SE**	***p***
Age	-0.26	0.01	0.000	-0.42	0.01	0.000	-0.19	0.01	0.000
Gender (women)	-0.16	0.07	0.000	-0.10	0.05	0.000	0.06	0.08	0.146
Years of education	0.22	0.01	0.000	0.30	0.01	0.000	0.22	0.01	0.000
Trauma without PTSD[a]	-0.18	0.19	0.021	-0.22	0.13	0.001	-0.41	0.24	0.000
Trauma and PTSD[a]	-0.52	0.29	0.000	-0.40	0.20	0.000	-0.64	0.39	0.000
Social connectedness scale	-0.09	0.04	0.039	-0.12	0.03	0.001	-0.05	0.06	0.381
Trauma without PTSD[a] X Social connectedness scale	0.04	0.08	0.635	0.12	0.05	0.108	0.26	0.10	0.012
Trauma and PTSD[a] X Social connectedness scale	0.28	0.11	0.005	0.17	0.07	0.041	0.54	0.16	0.000
R^2	0.250			0.397			0.175		

Note. [a] Reference: No trauma exposure; mental health and physical health were modeled as latent variables.

An additional SEM was conducted to examine the R-squared of the dependent variables predicted by the covariates alone and calculated how much additional variance was explained by the main variables and interactions in the final analyses. For mental health, there was an increase of 9.5% from the model with the covariates alone to a model with the main effects (from 0.155 to 0.250), for physical health this increase was 8.0% (from 0.317 to 0.397) and for health behaviors the increase was 7.5% (from 0.100 to 0.175).

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