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Subjective Age and Health in Later Life: The Role of Posttraumatic Symptoms

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Abstract

Objectives: We examined: (a) long-term effects of war-related trauma and captivity on posttraumatic stress symptoms (PTSS), physical health, and subjective age; and (b) the moderation effect of PTSS and health on subjective age among ex-prisoners of war (ex-POWs) and war veterans.

Method: Israeli veterans of the 1973 Yom Kippur War (mean age 57 years), including 111 ex-POWs and 167 matched veterans were assessed for subjective age, war-related PTSS, and health-related measures (physical symptoms, somatization, health-risk behaviors, and self-rated health).

Results: Controlling for age, ex-POWs endorsed higher subjective age than controls, and ex-POWs with posttraumatic stress disorder (PTSD) endorsed higher subjective age than ex-POWs and controls without PTSD. PTSS and health measures besides health-risk behaviors predicted subjective age. Significant interactions were found between PTSS and each health measure, suggesting that health only predicts subjective age for those reporting high PTSS.

Discussion: PTSS appear to be implicated in the link between health measures and subjective age in later life, pointing to the long-term effect of captivity and war-induced traumatic distress on aging.

Key Words: Captivity—Posttraumatic stress symptoms—Physical health—Subjective age

Extreme traumatic experiences such as war captivity have been shown to be involved in acceleration of aging, via biological (Epel et al., 2004), psychosocial (Shrira, Palgi, Ben-Ezra, & Shmotkin, 2011), and health indicators (Solomon et al., 2014). This study assesses trauma-induced aging, through the prism of subjective age, which is the personal experience of how old one feels (Barak & Schiffman, 1981). Research indicates that exposure to stress early in life is implicated in an older subjective age (e.g., Foster, Hagan, & Brooks-Gunn, 2008). We examine whether past traumatic experiences of captivity, and health and mental health following combat and captivity, are associated with an older subjective age in later life.

Posttraumatic stress disorder (PTSD) is a psychiatric condition that can ensue following exposure to a traumatic event (American Psychiatric Association, 2013). Not all of those exposed to traumatic experiences go on to develop PTSD, yet many trauma survivors suffer from varying degrees of posttraumatic stress symptoms (PTSS; e.g., Shalev, 2009). War captivity is recognized as one of the most extreme traumatic experiences, which usually follows in the heels of the traumas sustained in battle. Captivity entails severely distressing, deliberate, man-made trauma, and is therefore considered to have more pathogenic outcomes than other traumatic events (i.e., natural disaster). Captivity exposes prisoners of war (POWs) to recurrent and inescapable psychological and physical torture, often persisting for a long time.

An established body of longitudinal research on ex-POWs has pointed to the wide range of detrimental
outcomes of war captivity even many years after repatriation, most prominently PTSD (e.g., Eberly & Engdahl, 1991), depression (e.g., Page, Engdahl, & Eberly, 1991), poorer physical health (e.g., Page & Brass, 2001), higher morbidity (e.g., Nice, Garland, Hilton, Baggett, & Mitchell, 1996), and instances of long-term effects on psychological and emotional well-being (Park, Kaiser, Spiro III, King, & King, 2012). Research on the present sample of Israeli ex-POWs of the 1973 Yom Kippur War has also demonstrated the diverse outcomes of captivity, including impairments in pain regulation (Defrin, Ginzburg, Mikulincer, & Solomon, 2013), increased levels of suicidal ideation (Zerach, Levi-Belz, & Solomon, 2013), and marital problems (Zerach, Greene, Ein-Dor, & Solomon, 2012). Ex-POWs from the present sample also had higher mortality rates, and reported greater deterioration in self-rated health (SRH) and an increase in reported health-related conditions, compared with controls (Solomon et al., 2014). These latter health effects were mediated by PTSD and depressive symptoms, and increased with age. Studies indicate that besides mortality and overall physical health outcomes, PTSD among ex-POWs is associated with a higher risk for developing age-related diseases, including coronary heart disease, autoimmune conditions, and dementia (e.g., Creasey et al., 1999). Thus, vulnerabilities of trauma survivors often emerge during, or serve to accelerate, old age, as PTSS compound upon the losses and challenges of the aging process.

In addition to the relationship between traumatic stress and health outcomes, health deterioration has been linked to a reigniting of PTSS among elders (Solomon & Ginzburg, 1998). For example, Holocaust survivors who were diagnosed with cancer revealed higher emotional distress, compared with cancer patients with no traumatic backgrounds, and compared with healthy Holocaust survivors (Peretz, Baider, Ever-Hadani, & De-Nour, 1994). Similarly, aging Holocaust survivors who endorsed high PTSS showed the most distress when faced with cancer, compared with Holocaust survivors with fewer PTSS, and with a comparison group with no Holocaust experiences (Hantman, & Solomon, 2007). Thus, health stressors in old age may beget a reactivation of past traumatic experiences.

**Time Perception Among Trauma Survivors**

Beyond physical and health processes, this work also considers self-perceptions of age as a concomitant of traumatic sequelae. Research on perceived aging involves subjective age, which is one’s personal evaluation of one’s own age. Subjective age represents an important dimension that adds to that of chronological age, as it has been found to correlate with personal, physical, and social outcomes in old age (e.g., Spuling, Miche, Wurm, & Wahl, 2013). In many studies, subjective age was a more reliable correlate of physical and mental health than chronological age (e.g., Demakakos, Gjonca, & Nazroo, 2007), which has led researchers to suggest that subjective age is in certain ways independent of chronological age (Barak & Schiffman, 1981). Research has shown that earlier in life, people tend to perceive themselves as older than their actual age, a trend that shifts around midlife, at which point people tend to report a lower subjective age compared with their chronological age (e.g., Westerhof & Barrett, 2005). Feeling younger than one’s chronological age is related to well-being, health, and functioning (e.g., Boehmer, 2007) and reduces the risk for mortality (Kotter-Griühn, Kleinspehn-Ammerlahn, Gerstor, & Smith, 2009), whereas a subjective age that is higher than one’s chronological age predicts higher mortality (Uotinen, Rantanen, & Suutama, 2005). These links between subjective age and health outcomes in later life suggest that subjective age may be an important pathway for linking PTSS and health in the aging process.

Studies focusing on the effects of trauma on subjective age are quite scarce, to our knowledge. It has been shown that young girls who had experienced sexual abuse reported an older subjective age (Turner, Runts, & Galambos, 1999). In a more recent study, the loss of one’s mother during childhood was associated with an older subjective age in adulthood (Schafer, 2009). In the same vein, combat veterans with PTSD reported a higher subjective age than controls (Solomon, Helvitz, & Zerach, 2009). Thus, subjective age appears to be an important indicator that can contribute to the understanding of the reciprocal connections between PTSD and the aging process.

Based on the research reviewed previously, there appears to be a growing need to better understand how traumatic experiences influence aspects of aging. Although sparse, research suggests that subjective age is a compelling indicator of accelerated aging and should be investigated over time following exposure to traumatic stress (Schafer & Shippee, 2010). Although the mental and physical health outcomes of war captivity have been the subject of ongoing research in past years, there is a dearth of research on subjective age indicators among aging populations that have been exposed to complex trauma such as captivity. To contribute to the previous literature on the subject, this study examines increases in subjective age in order to elucidate the associations among exposure to extreme trauma, PTSS, and later-life health outcomes.

**Hypotheses**

We hypothesized that (a) ex-POWs will report a higher subjective age and poorer health compared with controls, (b) ex-POWs with PTSD will report a higher subjective age and poorer health compared with ex-POWs without PTSD and controls without PTSD, (c) poorer health will be associated with a higher subjective age, and (d) this association will be moderated by PTSS, such that poorer health will be more strongly associated with subjective age for those who suffer from more PTSS.
Method

Recruitment and Procedure
This research is part of a longitudinal study spanning several decades, on the consequences of war and captivity among Israeli ex-POWs of the 1973 Yom Kippur War. This study used only data from the 2008 (T3) wave, as it was the only wave to include measures of health and subjective age.

The study was approved by the Israeli Defense Forces and by the Tel Aviv University Institutional Review Board. Participants were contacted by phone, and after explaining the purpose of the study, they were invited to participate. Participants filled in questionnaires at their homes or in other locations of their choice. Before administering the questionnaires, all participants signed an informed consent form.

Participants

Ex-POWs
A total of 111 participants, who had served in the Israeli Army land forces during the 1973 Yom Kippur War and were captured either on the Syrian front or on the Egyptian front, were interviewed in 2008. The POWs in both Syria and Egypt were similarly subjected to intense isolation and physical and psychological torture during captivity.

Controls
A total of 167 combat veterans of the same war, who were sampled from the Israel Defense Forces computerized database, participated in the study. This group was matched with the ex-POWs on personal and military variables, including age, education, marital status, and ethnic background, as well as military rank, assignment, and military unit, and their scores on performance prediction tests consisting of personality and intelligence measures that were administered before being drafted to the military.

The groups did not differ in age, education, religiosity, or income. The average age in both groups was 57 (standard deviation [SD] = 5), and average years of education was 14 (SD = 4). Most participants in both groups rated their income as “above average,” with 30% of the participants rating their income as “much higher than the average.” Most participants defined themselves as secular (62.2%), were married (91%), and were currently working (57.2%).

Measures

Background measures
Participants were interviewed regarding sociodemographic characteristics, including their age, marital status (whether they were married, single, divorced, separated, or widowed), years of education, religiosity (whether they were secular, traditional, or religious), income (much below average, below average, average, above average, and much above average), and employment in the past year (unemployed, part-time, or full-time work).

Posttraumatic symptoms
The PTSD inventory (Solomon et al., 1993) was used for the assessment of combat-related posttraumatic symptoms. The questionnaire consisted of 17 statements, corresponding to Diagnostic and Statistical Manual of Mental Disorder (DSM)-IV-TR criteria for PTSD. Respondents were asked to rate each statement according to the frequency in which they experienced the described content during the last month, on a 4-point scale ranging from 1 “never” to 4 “very often.” The total score for the scale was found to have high convergent validity when compared with diagnoses based on structured clinical interviews (Solomon et al., 1993).

Health Measures

SRH
SRH was assessed by a single-item question: “How would you define your physical health status in general?” Responses were given on a 5-point scale (1 “excellent” to 5 “bad”). The answers were coded so that higher scores represented better health. SRH is a widely used tool in health studies, with an independent contribution to prospective health outcomes, including mortality (Idler & Benyamini, 1997) and major chronic diseases (Latham & Peek, 2013).

Number of health problems
Participants were presented with a checklist of 35 health problems and requested to mark each problem from which they suffer. The list was based on health problems that have commonly been observed in previous studies of war veterans (Ohry et al., 1994). The list included allergies, ulcer, heart disease, chest pains, diabetes, weight changes, back pain, headaches, joint pain, memory problems, fatigue or weakness, and conditions typically associated with aging, such as cancer and bone fractures. The score was computed based on the total number of conditions checked.

Health-risk behaviors
Participants were also presented with a checklist of four health-risk behaviors they began engaging in since the war: alcohol consumption 3–4 times a week or more, smoking, drug usage 1–2 times a week or more, and regular use of...
medications. Participants were asked to indicate for each behavior whether they had ever engaged in it, when it began, whether the habit or behavior had stopped, and if so, how long ago. The list was based on common behaviors shown to be associated with PTSD symptoms that could present a health risk (Benyamini & Solomon, 2005; Ohry et al., 1994). The score was computed based on the total number of health-risk behaviors endorsed as habits still continuing in the present.

### Somatization

This subscale is one of the nine subscales of the Symptoms Checklist-90-R (SCL-90-R; Derogatis, 1977). The somatization subscale is composed of 12 items tapping physical symptoms that may be a form of physical distress in relation to underlying negative affect, and often have no discernible medical explanation (e.g., numbness, nausea, dizziness). The respondents are asked to indicate on a 5-point scale (0–4) the degree to which they had experienced each symptom over the past 2 weeks. The average score reflects the respondent’s level of somatization symptoms. The SCL-90-R was found to have good validity and reliability (Derogatis, 1977). Cronbach’s α for the somatization subscale was .86.

### Subjective age

Drawing on Barak and Schiffman’s (1981) subjective age measure, and adapted from a previous study (Solomon et al., 2009), subjective age was assessed by five statements concerning subjective perceptions of age: (a) Felt age: “I feel as though I am … ,” (b) Age appearance: “I look as though I am … ,” (c) Behavior age: “I act as though I am … ,” (d) Interests age: “My interests are mostly those of a person … ,” and (e) Vitality age: “I feel vital as though I am … ,” compared with one’s age group. Answers were given on a three-point scale (1–3) ranging from younger than, same age as, to older than one’s age. Our analyses were initially based on the separate items. In subsequent analyses, the average score for the five items was used as a composite subjective age score, with a higher score reflecting a higher subjective age compared with one’s chronological age. Although these items are categorical, we referred to the combined scale as a quantitative score. Cronbach’s α for this scale was .83.

### Results

#### Hypothesis A

For the first hypothesis that ex-POWs will report a higher subjective age and poorer health than controls, we examined differences between the two groups on each item of the subjective age scale using Chi-square tests. As hypothesized, ex-POWs and controls significantly differ on each subjective age scale item (χ² (2) ranged between 22.79, p < .001, and 10.08, p < .01), with ex-POWs reporting an older subjective age than their chronological age. The analyses included several cells with expected values lower than five. We therefore ran the analyses a second time, after collapsing the subjective age categories into two (younger than my age versus same or older than my age). The results did not change and remained significant, except for one subjective age item which became marginally significant: χ² (1) ranged between 16.78, p < .001 for felt age, and 3.74, p = .05 for vitality age. Looking over the specific subjective age items, the largest group differences were found for felt age and age appearance, whereas the extent of group differences in reference to chronological age regarding feeling vital, age interests, and acting one’s age were smaller.

Detailed comparisons are presented in Table 1 between three groups: (a) ex-POWs with PTSD, (b) ex-POWs without PTSD, and (b) controls, as PTSD appeared to be a substantial correlate of subjective age. As there were only five participants in the control group who met the symptom criteria for PTSD, we did not use this small number as comparison data. Chi-square tests for each item revealed a significant relationship between study group by PTSD and subjective age for each item: χ² (4) ranged between 48.12, p < .001, for felt age, and 16.87, p < .01, for interests age. As can be seen in Table 1, most controls and ex-POWs without PTSD reported feeling younger than their ages, whereas many of the ex-POWs with PTSD reported feeling at their current age, and they were the largest group among those who reported feeling older than their age. The distributions of responses in the study groups across the other subjective age items were similar. These significant differences were replicated for all items when the analyses were run again with subjective age items divided into two categories instead of three: χ² (2) ranged between 25.59 for felt age, p < .001, and 7.03, p < .05, for vitality age.

#### Hypotheses B and C

We tested the univariate associations between the composite subjective age score and the other study measures. As can be seen in Table 2, a higher subjective age score was significantly correlated with lower education, income, and employment, as well as with greater PTSS, physical symptoms, and somatization, more health-risk behaviors, and poorer SRH. All correlations ranged between |r| = .20 and |r| = .52, all ps < .01. Contrary to our expectations, the subjective age score was not correlated with chronological age (r = .04, not significant) and controlling for chronological age resulted in partial correlations that were essentially identical to the zero-order correlations reported previously. Additionally, t-tests showed no significant differences in subjective age by marital status, across study groups (married compared with others, i.e., divorced, single, or widowed; t(266) = −0.13, p = .89).

To compare the two study groups on subjective age scores, we conducted analysis of covariances, controlling for chronological age. We also compared the study groups divided by PTSD as in the previous Chi-square analyses. Results revealed a main effect for group for subjective age,
after controlling for chronological age, with ex-POWs reporting a higher subjective age (F(1, 275) = 24.55, p < .001), as well as a main effect for PTSD groups (F(2, 267) = 19.55, p < .001). Post-hoc tests with a Bonferroni correction revealed that ex-POWs with PTSD reported significantly higher subjective age than the other two groups (veterans and ex-POWs without PTSD; p < .001). Table 3 displays the means, SDs, and F values for each analysis.

We also compared the study groups on health measures (Table 3). Results revealed significant group differences on all health measures, for both group types. Post-hoc tests with a Bonferroni correction revealed that ex-POWs reported significantly poorer health than controls. Additionally, ex-POWs with PTSD reported significantly poorer SRH and more physical symptoms than ex-POWs without PTSD (ps < .001). The latter also reported poorer SRH and more physical symptoms than controls (ps < .001). Ex-POWs with PTSD reported more somatization than ex-POWs without PTSD, and more health-risk behaviors compared with controls (p = .003), and with ex-POWs without PTSD.

Hypothesis D

In order to examine Hypothesis D, that there would be a moderation effect of PTSS on the associations between health and subjective age, we performed a series of hierarchical regression analyses, separately for each of the four health variables and their interactions with PTSS, predicting subjective age, controlling for chronological age. All of our predictors were mean-centered prior to conducting these analyses. Step 1 included chronological age, PTSS, and each of the four health variables separately, and Step 2 included the two-way interaction term between PTSS and a health variable. Significant interactions were probed using the Hayes’ (2012) PROCESS computational macro.
Table 4 presents the regression coefficients and model summary $R^2$. As could be expected in light of the zero-order correlations, chronological age was unrelated to subjective age and PTSS were significantly related to subjective age ($\beta$s ranged between .14, $p = .03$, and .38, $p < .001$, depending on the health variable entered in the same step in the regression model). Controlling for age and PTSS, when SRH, somatization, or physical symptoms were added to the model, they were found to be significantly related to subjective age. The only exception was the nonsignificant association of health-risk behaviors with subjective age ($\beta = .09$, $p = .13$).

The two-way interaction in Step 2 was significant for all the interaction terms involving PTSS and health. We probed these interactions by computing their conditional effects at 1 SD below and 1 SD above the mean of the moderator, PTSS. These interactions are visually depicted in Figure 1. Generally, for each of the health measures, its association with subjective age is strong for those with a higher level of PTSS and weak or non-existent for those with a low level of PTSS. Figure 1A shows that compared with those with less PTSS at 1 SD below the mean, the negative relationship between SRH and subjective age was stronger among those with more PTSS. As can be seen in Figure 1B, the significant positive relationship between somatization and subjective age was evident only among those with more PTSS. Additionally, the positive relationships between physical symptoms and subjective age and between health-risk behaviors and subjective age were strong and significant among respondents whose PTSS were at a higher level. As can be seen in the interactions presented in Figure 1C and D, for those with fewer PTSS, these relationships were weaker and in the opposite, negative direction. These results support the hypothesis that PTSS moderate the relationship between health and subjective age.

### Discussion

This study set out to examine how war captivity was related to PTSS, physical health, and subjective age, 35 years following the war. In addition, we examined whether PTSS moderated the relationship between health and subjective age among these veterans. Our findings reveal that ex-POWs report a higher subjective age, lower SRH, and higher rates of health conditions, above and beyond chronological age, compared with a matched control group of veterans. In

<table>
<thead>
<tr>
<th>Group</th>
<th>Ex-POWs with PTSD (N = 96)</th>
<th>Ex-POWs without PTSD (N = 69)</th>
<th>Controls without PTSD (N = 106)</th>
<th>F(2, 267) (η2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective age</td>
<td>M 1.89* SD 0.57</td>
<td>M 1.62* SD 0.36</td>
<td>M 1.50* SD 0.37</td>
<td>19.55*** (.13)</td>
</tr>
<tr>
<td>SRH</td>
<td>2.20* 0.89</td>
<td>3.09* 1.08</td>
<td>3.54* 1.02</td>
<td>47.31*** (.27)</td>
</tr>
<tr>
<td>Somatization</td>
<td>1.47* 1.03</td>
<td>0.48* 0.53</td>
<td>0.30* 0.48</td>
<td>69.50*** (.35)</td>
</tr>
<tr>
<td>Physical symptoms</td>
<td>8.82* 3.7</td>
<td>5.50* 3.2</td>
<td>3.04* 2.96</td>
<td>79.29*** (.38)</td>
</tr>
<tr>
<td>Health-risk behaviors</td>
<td>1.24* 0.79</td>
<td>0.88* 0.81</td>
<td>0.75* 0.84</td>
<td>9.81*** (.07)</td>
</tr>
</tbody>
</table>

Notes. SD = standards deviation; POW = prisoners of war; PTSD = posttraumatic stress disorder; SRH = self-rated health.
Means with different superscripts (a, b, and c) are significantly different at the $p < .001$ level, according to post-hoc tests with a Bonferroni correction.

**p < .01. ***p < .001.

**Table 4. Hierarchical Multiple Regression Analyses Predicting Subjective Age With Chronological Age, PTSS, Health Measures, and the Interaction Between PTSS and Health**

<table>
<thead>
<tr>
<th>Predicting variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SRH</td>
<td>Somatization</td>
<td>Physical symptoms</td>
<td>Health-risk behaviors</td>
</tr>
<tr>
<td>β</td>
<td>.01</td>
<td>.03</td>
<td>.02</td>
<td>.03</td>
</tr>
<tr>
<td>PTSS</td>
<td>.14</td>
<td>.21**</td>
<td>.31***</td>
<td>.38***</td>
</tr>
<tr>
<td>Health measures</td>
<td>-.43***</td>
<td>.30***</td>
<td>.15*</td>
<td>.09</td>
</tr>
<tr>
<td>Step 2</td>
<td>-.23***</td>
<td>.64**</td>
<td>.25***</td>
<td>.18**</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.58 (.33***)</td>
<td>.50 (.25***)</td>
<td>.49 (.24***)</td>
<td>.45 (.20***)</td>
</tr>
</tbody>
</table>

Notes. PTSS = posttraumatic stress symptoms; SRH = self-rated health.
Ns ranged from 269 to 275. Table depicts a series of regression analyses where in each, Step 1 included age, PTSS, and one of four different health measures, and Step 2 included one of four respective interactions between PTSS and each health variable.

*p < .05. **p < .01. ***p < .001.
addition, the ex-POWs in this study who met PTSD symptom criteria had significantly higher levels of subjective age and health conditions, and lower levels of SRH, when compared with ex-POWs without PTSD. Furthermore, we found that poorer SRH and worse self-reported health conditions were associated with a higher subjective age, and these relationships were stronger for those who endorsed more PTSS.

Our finding that war captivity that ensues in higher PTSS was associated with higher subjective age and poorer age-related health outcomes, corresponds with previous findings that military trauma has been linked to lower health in different domains of physical health, a link that was mediated by PTSD (Friedman & Schnurr, 1995), and that veterans diagnosed with PTSD reported an older subjective age compared with veterans without PTSD (Solomon et al., 2009). This suggests that mental health difficulties as a reaction to traumatic stress (captivity) are associated with later life increased subjective age and health problems, risks that may be suggestive of accelerated subjective aging among ex-POWs.

People who suffer from PTSS are more likely to experience negative emotions and self-perceptions, such as hopelessness, for instance, which has been associated with an increased risk of cardiovascular disease and mortality, mediated by specific biological trajectories (Pollitt et al., 2005). Such psychological conditions may therefore also contribute to older physical and mental age identities, and to a sense that one cannot cope well with the challenges that come with age. Conversely, positive beliefs such as optimism have been shown to aid in stress management and to lower the biological response to stress (Taylor et al., 2008). Furthermore, recent studies have revealed that optimism attenuated health declines associated with negative self-perceptions of aging (Wurm & Benyamini, 2014) and that positive perceptions of aging may protect against effects of health decline over the long-term (Sargent-Cox, Anstey, & Luszcz, 2014). The absence of such positive buffers and beliefs, a characteristic of high levels of PTSS, may lead to higher stress-related reactivity when one is faced with the distress of the normal aging process, or when one must cope with physical ill-health. Indeed, a recent study of combat veterans demonstrated that those who currently suffered from PTSS reported greater distress following cancer (Jahn, Herman, Schuster, Naik, & Moye, 2012). Taken together with the present findings, it may be that the biological and mental toll that a heightened stress response elicits may also result in higher subjective age.

There appears to be a complex interplay between PTSS and lowered health in chafing the beneficial gap usually found between chronological and subjective age identity later in life. Although we did not measure the extent of the gap between chronological and subjective age, and therefore are limited in making subtle distinctions regarding the age group respondents were referencing when making self-appraisals of their age identity, our findings indicate the broad finding that the maintenance of a younger subjective age is compromised among ex-POWs with PTSD. Furthermore, we found initial indications of a differential responsiveness to traumatic experience over time across the facets of subjective age, as felt age and age appearance revealed much higher differences between the study groups, compared with the other subjective age measures. Although beyond the scope of this work, the latter pattern
of differences between the subjective age items merits a further examination in future research on the subject.

It can be argued that an accurate, or older, subjective age is not necessarily a negative psychological indicator, but rather a more precise perception of one's aging process. Although indeed less realistic, feeling younger than one's age is a psychosocial resource (Westerhof & Barrett, 2005) that is based on certain mechanisms such as a selective social comparison process (i.e., to others from one's age cohort who are in worse condition), and a comparison to the negative societal perceptions of aging—a contrast that enables most people to feel younger than their chronological age past midlife and to even see their own aging process in a more positive light. Thus, realistic or overestimated perceptions of one's age may be a form of failure of the protective buffer of certain detrimental effects on well-being in later life (i.e., Shirira, Bodner, & Palgi, 2014).

Holding negative self-perceptions of aging is associated with lower physical and mental health in midlife and old age (Kwak, Ingersoll-Dayton, & Burgard, 2014; Wurm & Benyamini, 2014), and it may be the case that for ex-POWs, these regulation mechanisms that maintain a younger age identity are undermined by health problems and by past and present trauma-related distress. Although previous studies have underscored the effects of health problems on subjective age, this does not diminish the contribution of PTSS to subjective age alongside that of health.

As hypothesized, we also found that poorer health was associated with higher subjective age, and that this association was moderated by PTSS: That is, the association was stronger as PTSS levels were higher. Studies reveal that health perceptions remain relatively stable throughout young adulthood, and begin to decrease at midlife and onwards (McCullough & Laurenceau, 2004). It can be assumed that people who have not undergone major traumatic events maintain high functioning in the first half of life, and their self-perceived health is relatively intact, as is their age identity. For people who suffer from PTSS, however, SRH is already lower at a younger age, and takes time to restore itself. Thus, the combination of traumas and their sequelae are reflected in poorer health at midlife (Benyamini, Ein-Dor, Ginzburg, & Solomon, 2009), which may lead to a subjective feeling of accelerated aging, as compared with one's peers. The extreme trauma of captivity leads to chronic physical and mental problems, which can further deplete psychological and physical resources. This may explain why relatively early on in life, ex-POWs with high PTSS have trouble maintaining self-perceptions of health and youthfulness, as stress erodes one's mental, physical, and even social coping reserves in a manner that can in turn accelerate subjective aging (Schafer & Shippee, 2010). It appears that when taken together, PTSS and health problems that start to increase at midlife can lead to an older subjective age.

Another possible explanation relates to the effect of older age on health outcomes, as well as a superimposing effect of PTSS in later life. Earlier traumatic events impede the traumatized individual's adjustment to the demands and challenges of old age (Shmotkin, Shirira, & Palgi, 2011). In such modes of “embattled survival” one is continuously grappling with past traumatic events, a confrontation that is exacerbated in later life. For some, age-related stressors may even bring about a delayed reactivation of traumatic stress (Shmotkin et al., 2011), as evinced in studies of Holocaust survivors who face cancer (Peretz et al., 1994). Indeed, it may be that a late-life negative spiral for adaptation played a role in our finding that PTSS levels exacerbated the health-subjective age connection.

Certain limitations to this study should be regarded. First, our main outcome measure, subjective age, was only measured in the last wave of the study, and our data analyses were cross-sectional. We therefore could not assess long-term change in subjective age as related to stress and health, or alternative paths of influence. For example, an older subjective age at the outset might have been a risk factor for health problems and heightened PTSS, and not merely an outcome. A second limitation relates to the characteristics of the present sample, as we did not have a comparison group of non-POW veterans who met PTSD criteria. This limited the conclusions we could draw regarding subjective age among a population similar to the ex-POWs in our sample, which should be examined in future research. Although the groups were matched on several military, combat, and background variables, the current data prevent us from being able to examine such a group as too few participants in the control group met criteria for PTSD symptoms over time. This may reflect differences between the groups, as previous work based on these data has shown that 30 years after the war, 29.9% of ex-POWs met PTSD criteria, whereas only 1.9% of the controls did (Dekel, Solomon, Horesh, & Ein-Dor, 2014). This disparity between the groups in PTSD may stem from Israeli norms regarding military service and is closely tied to the next research limitation.

A third limitation regards the present sample's unique cultural and political setting, which is saturated in on-going war and political conflict. Unlike veterans from other nationalities, the present sample has by now been exposed to an accumulation of adverse events. Israeli returning soldiers might continue to serve in the military after exposure to the trauma of war and captivity, whereas some even go on to fight in subsequent wars. Serving in the Israeli military is considered a normative experience, and it may be the reason why so few participants in our comparison group reached a PTSD diagnosis, in spite of having participated in battle. This continued exposure to adversities of war makes it difficult to extrapolate the current study's results to other countries, where participation in war is usually a one-time event that ends with repatriation.

A fourth limitation relates to our measure of subjective age. Because of questionnaire constraints, our measure was a 3-point scale that requested participants to rate their
subjective age in reference to their chronological one. Such an ordinal assessment confines possible variation in subjective age and the validity of our measure. However, we did not rely on a single measurement of subjective age, but rather measured different facets of subjective age (Barak & Schiffman, 1981). Finally, our measures of medical and physical problems all relied on self-report, and not on biological measures or medical examination. Thus, we can only speak of the association between subjective age and perceived health. We relied, however, on diverse reports of health and physical status, repeating our findings for each of these health measures.

To conclude, this is one of few studies to focus on the relationship between past traumatic experiences and PTSS, perceived health and subjective age in later life. Our findings reinforce the notion that the sequelae of complex trauma are far-reaching, as they endure over time into the aging process, and carry unique implications for health and self-perceptions of age among those who suffer from high PTSS. The present results underscore that interventions aimed at tackling subjective age, especially for the purpose of minimizing health declines, should also account for PTSS among older adults. Future research comparing the changes to subjective age over time, between people who have experienced severe traumatic events and those who have not, could further elucidate the interrelationships between PTSS, health, and subjective age, and the different ways in which each influences the other among trauma survivors.

References


