

What doesn't kill you makes you feel older: lifespan adversity and its association with subjective age among former prisoners of war

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ABSTRACT

Background: Subjective age (SA) is an indicator of aging that has been empirically associated with health impediments and hindered longevity. Studies show that adverse life events may result in relatively older SA, but have not addressed the differential contribution of life events across the lifespan and the course of posttraumatic psychopathology on the SA of aging survivors of extreme trauma.

Objective: Filling this gap, the current study explored the differential contribution of (1) adverse experiences in various life-stages and (2) trajectories of posttraumatic stress disorder (PTSD) to the prediction of SA in a sample of former prisoners-of-war as they enter old age.

Method: A cohort of Israeli former prisoners-of-war of the 1973 Yom Kippur War ($N = 103$) was assessed at four points throughout four decades after the war. A linear hierarchical regression was utilized to assess the contribution of negative life events during childhood, participation in other wars, combat exposure, suffering in captivity, life events since the war and the trajectories of PTSD for predicting SA 42-years post-repatriation.

Results: Lifespan adversity explained 50% of the variance in SA, with trajectories of PTSD making the largest contribution, followed by life events since the war. Negative life events in childhood added to the explained variance only when PTSD trajectories were accounted for. Exposure to combat, participation in additional wars and the severity of specific experiences during captivity did not reach significance, though the latter marginally contributed to the explained variance ($p = .069$).

Conclusions: This study demonstrates the importance of considering the prolongation of posttraumatic psychopathology together with life adversities and their differential implications when addressing SA after extreme trauma. The findings suggest that early life adversity may be a latent factor that increases vulnerability to posttraumatic premature aging processes.

Lo que no te mata, te hace sentir más viejo: adversidad a lo largo de la vida y su asociación con la edad subjetiva entre ex prisioneros de guerra

Antecedentes: La edad subjetiva (ES) es un indicador de envejecimiento que se ha asociado empíricamente con problemas de salud y longevidad difícil. Estudios muestran que los eventos de vida adversos pueden resultar en una ES relativamente mayor, pero no han evaluado la contribución diferencial de los eventos de vida en la esperanza de vida y el curso de psicopatología postraumática en la ES de sobrevivientes de trauma extremo en etapa de envejecimiento.

Objetivo: Para llenar este espacio, el presente estudio exploró la contribución diferencial de, a) experiencias adversas en varios estadios de vida y b) trayectorias de trastorno de estrés postraumático (TEPT) en la predicción de ES en una muestra de ex prisioneros de guerra en edades avanzadas.

Método: se evaluó una cohorte de israelíes ex prisioneros de guerra de la Guerra Yom Kippur de 1973 ($N = 103$) en cuatro puntos a lo largo de cuatro décadas tras la guerra. Se utilizó una regresión jerárquica para evaluar la contribución de eventos de vida negativos durante la infancia, participación en otras guerras, exposición a combate, sufrimiento en cautiverio, eventos de vida desde la guerra y las trayectorias de TEPT para predicción de ES 42 años post-repatriación.

Resultados: La adversidad a lo largo de la vida explicó el 50% de la varianza en ES, con trayectorias de TEPT haciendo la mayor contribución, seguidas por eventos de vida desde la guerra. Eventos de vida negativos en la infancia se agregan a la varianza explicada sólo cuando las trayectorias de TEPT fueron consideradas. Exposición a combate, participación en guerras adicionales y la severidad de experiencias específicas durante el cautiverio no alcanzaron significancia, aunque esto último contribuyó marginalmente a la varianza explicada ($p = .069$).

Conclusiones: este estudio demuestra la importancia de considerar la prolongación de la psicopatología postraumática junto a adversidades en la vida y sus implicaciones

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关键词

战争创伤; 囚禁; 负性生活事件; 老龄化进程; 早衰

HIGHLIGHTS

- Higher subjective age is a known indicator of premature aging.
- Lifespan adversity explained 50% of the variance in subjective age of former prisoners-of-war.
- Trajectories of PTSD made the largest contribution to subjective age, followed by posttrauma life events.
- Early life adversity created a latent vulnerability to posttraumatic premature aging processes.
- Objective indicators of captivity severity (i.e. combat exposure, weight loss) did not significantly contribute to subjective age in older adulthood.

diferenciales al evaluar la ES después de trauma extremo. Estos hallazgos sugieren que adversidades tempranas en la vida pueden ser un factor latente que aumenta la vulnerabilidad a procesos de envejecimiento prematuro.

“没有杀死让你感觉更老”：前战俘生命周期逆境与其主观年龄的关系

背景：主观年龄（SA）是衰老的指标，它与健康障碍相关并且影响长寿。研究表明负性生活事件可能会导致相对较老的SA，但还不清楚生命周期中生命事件和创伤后精神病理病程中对经历极端创伤的老年幸存者SA的不同影响。

目的：为了填补这一空白，目前的研究探讨了a) 不同生命阶段的负性经历和b) 创伤后应激障碍（PTSD）的轨迹，对进入晚年的前战俘样本中SA的不同预测力。

方法：1973年赎罪日战争（Yom Kippur War）的以色列前战俘队伍（N = 103）在战争结束后的四十年中分四个时间点进行了评估。利用线性层次回归来评估童年时期负性生活事件，参与其它战争的经历，战争暴露，囚禁的痛苦，战后的生活事件和PTSD轨迹来预测遣返后42年SA。

结果：生命周期逆境解释了50%的SA方差，PTSD的轨迹贡献最大，其次是战后的生活事件。童年时期的负性生活事件仅在控制PTSD轨迹时才增加对方差解释量。暴露于战斗，参与额外战争以及被囚期间特定经历的严重程度并没有达到显著，尽管后者略微促成了解释的方差（ $p = .069$ ）。

结论：这项研究表明，有必要考虑创伤后精神病理学的延长以及生活逆境对极端创伤后的SA时的不同影响。研究结果表明，早年生活逆境可能是一个潜在因素，增加了创伤后早衰过程的易感性。

1. Introduction

It is common to speak of daily hassles as events that make one grow older more rapidly. Supporting this folk notion, a large body of literature indicates that life stress is indeed associated with several biological premature aging processes (Epel et al., 2004; Miller, Chen, & Parker, 2011). Hence, the concept of *premature aging* denotes aging-related processes such as biological, psychological and functional decline that manifest at an earlier age than in the general population (Martin, 2007). Among other stressors, studies underscore the role that cumulative adversity (Ferraro & Shippee, 2009) and the aftermath of traumatic events, most notably psychopathological responses such as posttraumatic stress disorder (PTSD; Lohr et al., 2015), may play in processes of premature aging.

Premature aging processes do not, however, only affect objective measures, but may also manifest in subjective experiences. One such subjective measure concerns the manner in which individuals perceive their age, as either relatively older or younger, a phenomenon long recognized as *subjective age* (SA) (Barak & Stern, 1986; Kotter-Gruhn, Kornadt, & Stephan, 2015). Empirical research indicates that in most individuals subjective and chronological ages are not concurrent. Whereas younger people tend to perceive themselves as older than their chronological age, around midlife this trend typically reverses and individuals tend to view themselves as younger than they actually are (Montepare, 2009; Rubin & Berntsen, 2006). Arguably, the change in personal age perceptions is related to negative age stereotypes, stigmas and age-related fears (Weiss & Lang, 2012). Moreover, younger SA is related to several markers of successful aging, such as better physical

health, longer life expectancy (Westerhof et al., 2014), better cognitive functioning (Stephan, Caudroit, Jaconelli, & Terracciano, 2014) and better mental health (Keyes & Westerhof, 2012). Therefore, the preservation of a relatively younger SA is considered salubrious, whereas premature increments are considered to be deleterious.

Evidently, adversity may not only cause people to age biologically, but also to feel older than their chronological age (Schafer, 2009). Nevertheless, the question remains whether all adversities are equal, or are some adversities more prominent than others in fostering such processes? This question gains impetus in the aftermath of extremely traumatic experiences, such as war and war captivity, which may be the most taxing in this respect. To adequately address fluctuations in SA it is imperative to adopt a lifespan perspective, as different stages in life give rise to different discrepancies between chronological age and SA (Montepare, 2009). Thus, in the case of trauma-induced aging processes, it is important to consider the pre-traumatic, peri-traumatic and posttraumatic eras and the adverse life events they entail, but also account for the victims' developmental stage, which in the current study is the transition to old age.

To understand such long-term processes, we conducted a 24-year longitudinal investigation among former prisoners-of-war (ex-POWs), accounting for stressful life-events throughout the veterans' lives from childhood to the early phases of old age. Captivity frequently entails severe physical torture and psychological abuse and humiliation. Such events often result in deep emotional scars (Herman, 1992), and have been shown to elicit dire long-term mental health consequences, such as PTSD (Solomon, Horesh, Ein-Dor, & Ohry, 2012). In the current study we investigated the relation between life events

and the ex-POWs' SA. A review of the literature below addresses that which is already known concerning the relation between life stress, psychopathology and SA, thus underscoring the necessity of the current investigation at the crossroads of psychotraumatology and aging.

1.1. Trauma, life events and subjective age

To date there are only a handful of studies that have investigated the association of psychological trauma and SA, all suggesting that trauma in different life stages is associated with worse (i.e. relatively older) SA. For example, it was found that maternal death during childhood was associated with an older SA in adulthood (Schafer, 2009). Similarly, it was shown that girls who experienced sexual abuse in childhood felt significantly older in their adolescence than their peers who did not experience abuse (Turner, Runtz, & Galambos, 1999). Among veterans, studies have shown that those with PTSD reported older SA than veterans without PTSD (Solomon, Helvitz, & Zerach, 2009). Moreover, previous cross-sectional research, including the current sample, revealed that 35-years after the war ex-POWs reported older SA than comparable veterans who were not held captive, and the manifestation of PTSD exacerbated this effect (Avidor, Benyamini, & Solomon, 2014).

Nevertheless, there are considerable individual differences between trauma survivors regarding premature aging. This may be related to the fact that trauma is not an insulated experience and does not occur in a vacuum, but is embedded in a person's life history that may be replete with factors that may be related to SA. The trauma literature has long recognized that negative life events prior to trauma may be associated with the reactions to later traumatic experiences in various ways (Ruch, Chandler, & Harter, 1980).

From a vulnerability perspective, prior negative life events may deplete a person's coping resources and thus be associated with higher vulnerability post-trauma (Hobfoll, 1989). Possibly, this only matters for life events of a certain magnitude while lesser ones do not create heightened negative consequences (Ruch et al., 1980). The vulnerability perspective has been supported by empirical research. In particular, studies have found that childhood or early life events may increase vulnerability to symptom manifestation in the advent of later life traumas (van der Kolk, 2014). Some empirical research has also investigated the role of life events occurring after the target traumatic event and found that the trauma created a vulnerability whereby later non-traumatic negative life events may trigger psychopathology (Glaser, van Os, Portegijs, & Myin-Germeys, 2006).

In contrast, the resilience or 'stress inoculation' perspective (Meichenbaum & Novaco, 1985) proposes that prior life stress operates as an immunizing factor for

adjustment difficulties. As stress becomes familiar, a coping repertoire for difficult situations is developed and a sense of mastery over past adversity is created. As the proverb suggests, it was demonstrated that what does not kill us may in fact make us stronger and more resilient (Seery, Holman, & Silver, 2010). Prior empirical studies typically report a U-shaped pattern, indicating that a history of some lifetime adversity, as opposed to either none or many adversities, predicts better adjustment, indicated by less PTSD symptoms, global distress, low functional impairment and higher life satisfaction after additional trauma (Ruch et al., 1980; Seery et al., 2010). Notwithstanding, SA as well as other markers of premature aging have been widely uninvestigated in this context.

Adding to the external stressors associated with the traumatic event, it is increasingly realized that the emerging psychopathology (i.e. PTSD) may be a stressor itself and may burden the psychobiological system (McFarlane, 2010). From a longitudinal perspective, however, it is well-established that PTSD is a dynamic condition that follows a highly complex and fluctuating course over the trauma survivor's lifespan. Specifically, there are four different symptom trajectories: chronic (i.e. relatively stable high symptomatology), delayed onset (i.e. low symptomatology followed by a significant increment and stability), recovered (i.e. high symptomatology followed by significant decrease and stability) and resilient (i.e. stable low symptomatology; Bonanno et al., 2012). Previous studies with the present population have, for instance, identified relatively high rates of chronic and delayed onset PTSD trajectories (Solomon et al., 2012), which may be of special relevance regarding the SA of older trauma survivors. Thus, when evaluating age perception in relation to life course stressors, it may be valuable to also consider the longitudinal course of PTSD symptomatology.

The present exploratory longitudinal investigation examined both prospectively and retrospectively the relative contribution of various life events for ex-POWs' SA in the transition to old age. Specifically, the contribution of (1) negative childhood life events, (2) participation in other wars, (3) combat exposure, (4) subjective perceptions of captivity severity, (5) the course of PTSD symptom manifestation (i.e. PTSD trajectories) and (6) post-captivity negative life events, was investigated.

2. Methods

2.1. Participants and procedure

Israeli ex-POWs who participated in the 1973 Yom Kippur War were measured at four time points: 1991 (T1), 2003 (T2), 2008 (T3) and 2015 (T4).

According to Israel's Ministry of Defense, 240 soldiers from the Israel Defense Force land forces were captured during the Yom Kippur War. A total of 217 ex-POWs residing in Israel at T1 were approached, and 164 participated in the study. In T2, out of the ex-POWs from T1, 144 ex-POWs participated (10 could not be located/refused, six could not participate due to mental deterioration and four had died). In T3, we contacted ex-POWs who participated in T1, and while attrition took place, there was also an addition of participants. In T3, 183 ex-POWs participated (29 could not be located/refused, six could not participate due to mental deterioration and 20 had died). T3 included 109 ex-POWs who participated at T1, and 74 ex-POWs who did not previously participate. In T4, we approached all ex-POWs who had previously participated in any of the waves of data collection (T1-T3). In total, 158 ex-POWs took part in T4 (36 declined to participate, eight could not be located, five did not participate due to mental deterioration or other medical reasons, five were abroad and 30 had died). Of the 109 ex-POWs who participated in T3 almost all also previously participated in both T1-T2 and agreed to participate in T4. Only six refused to participate in T4. A total of 103 ex-POWs had valid data in all of the study's variables and across all four measurements. The age of the ex-POWs at T4 was $M = 65.1$, $SD = 4.3$, $min = 59$, $max = 80$.

2.2. Handling missing values

Considering the recommendations by Newman (2014), Enders (2001) and Schafer and Graham (2002), data were anchored to include only ex-POWs with valid data in the outcome measure, SA, which was assessed at T4 and had participated in all previous assessments (i.e. T1-T3).

2.3. Measures

2.3.1. Subjective age

Adapted from the SA measure by Barak and Schiffman (1981), SA was assessed by five items investigating subjective perceptions of age: felt age (*How old do you feel?*), age appearance (*How old do you think you look?*), behaviour age (*My daily activities are like someone who is aged ...*), interest age (*My areas of interest are like someone who is aged ...*) and 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. Answers on the five items were averaged and combined into a SA score yielding a continuous scale, with higher scores corresponding to a higher SA as compared to chronological age (Cronbach's $\alpha = .91$).

2.3.2. Negative childhood life events

Participants were asked at T1 to indicate whether they had experienced any of the following events by the age of 10: death of a parent, death of a sibling, parents' divorce, chronic disease that required hospitalization of the participant or a close other, major economic difficulties, major accident, disability of a sibling or any other difficult situation (with specification). The score was calculated as the number of adverse life events.

2.3.3. Participation in other wars

Participants were asked at T1 whether or not they had participated in any of the Israeli wars prior to the Yom Kippur War: The Sinai Operation (1956), The Six-Day War (1967), The War of Attrition (1969-1970) or any other military operation. Score was calculated as the number of wars.

2.3.4. Combat exposure

Stressors were assessed at T1 using a specially designed self-report questionnaire consisting of 21 items tapping the intensity of combat (e.g. *I saw a lot of dead soldiers, I found myself in a situation where I felt my life was at its end, I killed enemy soldiers*). Participants were asked the frequency of each battle experience on a four-point Likert scale ranging from 0 (*never*) to 3 (*very often*). A total score was calculated for each veteran, with higher scores indicating more severe exposure (for a more detailed explanation regarding the factor analysis and questionnaire, see Neria 1993 and Solomon et al. 2012).

2.3.5. Captivity severity

At T1 participants were asked to rate on a scale ranging from 1 (*I did not suffer at all*) to 5 (*I suffered very much*): (1) the severity of physical abuse, (2) the severity of psychological abuse and (3) humiliation. Additionally, participants' weight loss in captivity (as an indicator of deprivation) was assessed as a continuous variable indicating the number of kg lost during captivity. Each item was considered an adverse experience.

2.3.6. Posttraumatic stress disorder

PTSD symptoms were measured at all assessments using the PTSD Inventory (PTSD-I; Solomon et al., 1993). This is a self-report scale consisting of 17 statements corresponding to the PTSD symptoms listed in the DSM-III-R (American Psychiatric Association, 1987). In this study, the diagnosis of PTSD was determined according to DSM-IV (American Psychiatric Association, 1994) symptom criteria, and the changes between DSM editions were taken into account (Solomon & Horesh, 2007). Participants were asked to indicate whether they had the symptom in the past month, on a four-point scale ranging from 1 (*not at all*) to 4 (*I usually did*). For each participant, an answer

of 3 or above was considered a positive symptom endorsement. The PTSD-I has proven psychometric properties in terms of both high test-retest reliability and concurrent validity compared with clinical diagnosis (Solomon & Horesh, 2007). Reliability values for total scores were high at all assessments (Cronbach's α ranging from 0.78 to 0.96).

2.3.7. PTSD trajectories

Using data from the four measurements, the PTSD trajectories were assessed and empirically differentiated into three subgroups of participants: (1) 'chronic PTSD' – individuals who endorsed PTSD at all three measurements, (2) 'delayed PTSD' – individuals who did not meet criteria for PTSD in the previous measurement(s) but endorsed symptoms at later measurements and (3) 'resilience' – individuals who did not report PTSD at any of the measurements. We structured two dummy variables of interest: (1) to compare the chronic and delayed trajectory (coded as 1) vs. resilient (coded as 0) and (2) to compare the delayed onset trajectory (coded as 1) to chronic trajectory (coded as 0).

2.3.8. Post-war life events

Participants were asked about stressful life events they experienced between the end of the war and T3, and since T3 until T4. The measure is an adaptation of a scale used in previous studies of Israeli combat veterans (Horesh, Solomon, Zerach, & Ein-Dor, 2011). It includes 14 stressful experiences: bereavement, financial loss, threat of injury or death, severe motor vehicle accidents, criminal victimization, severe illness experienced by the veteran, severe illness experienced by a close person, divorce, criminal encounters with the law, war exposure, terror attack, sexual assault, substance abuse and 'other event'. The score indicates the total number of events.

2.4. Data analytic strategy

First, an analysis of Pearson correlations was conducted. Second, the contributions of adverse experiences over the lifespan as well as PTSD trajectories to SA were assessed in a hierarchical linear regression analysis. In the first step, childhood life events were inserted; in the second step, participation in previous wars was added; in the third step, combat exposure was added; in the fourth step, captivity severity variables were added (weight loss in kg, physical suffering, psychological suffering and humiliation in captivity); in the fifth step, life events since the war were added; and in the sixth step, we added the PTSD trajectories two dummy variables: (1) chronic and delayed PTSD trajectories (coded as 1) vs. resilient trajectory (coded as 0) and (2) chronic trajectory (coded as 1) vs. delayed PTSD trajectory (coded as 0). Using GPower 3.1, we calculated the required sample

size for the regression based on .80-power size, medium effect size of 0.30, p -value of .05 and 10 predictors. The required sample size was found to be 73 participants and thus our sample size of 103 ex-POWs is adequate.

Participants signed informed consent after receiving a detailed explanation of the study's aims and procedures. The study was approved by the Institutional Review Board of Tel-Aviv University.

3. Results

3.1. Descriptive statistics

Participants reported SA of $M = 3.28$ ($SD = 0.81$, range 1.33–4.67). The number of negative childhood life events was $M = .65$ ($SD = 0.82$; range 0–3). The highest prevalence was found for economic difficulties in the family of origin ($n = 18$), followed by chronic illness ($n = 8$), and death of a parent ($n = 6$), death of a sibling ($n = 4$), parental divorce ($n = 2$), severe car accident ($n = 1$), handicap of a sibling ($n = 1$), any other ($n = 2$). Participants took part on average in $M = 0.92$ other wars ($SD = 1.23$; range 0–5). Regarding combat exposure, they reported a severity of $M = 1.56$ ($SD = 0.66$; range 0.09–2.65). Weight loss in captivity range 5–90 kg, with $M = 19.21$ ($SD = 12.89$). Physical suffering, psychological suffering and humiliation in captivity range 0–5, with $M = 3.97$, 3.65 and 4.10 means ($SD = 1.36$, 1.25 and 1.11), respectively. The mean number of life events since the war was 5.68 ($SD = 5.39$; range 0–14). The participants most frequently reported bereavement ($n = 70$), followed by war exposure ($n = 52$), severe illness experienced by the veteran and/or a close person ($n = 15/n = 44$), threat of injury or death ($n = 29$), financial loss ($n = 19$), divorce ($n = 19$), severe motor vehicle accidents ($n = 12$), criminal victimization ($n = 7$), substance abuse ($n = 7$), another event ($n = 6$), terror attack ($n = 4$), criminal encounters with the law ($n = 1$) and sexual assault ($n = 1$). As for PTSD trajectories, 27.3% of the ex-POWs were resilient, 65% reported to a delayed onset of PTSD, whereby the onset most frequently occurred at T2 or T3, and 7.7% corresponded to a chronic trajectory (i.e. they fulfilled criteria of PTSD in all measurements).

Pearson correlation analysis revealed that SA was positively correlated with psychological ($r = .38$, $p < .001$) and physical ($r = .28$, $p = .004$) suffering in captivity, as well as with severity of humiliation in captivity ($r = .43$, $p < .001$), but not to weight loss ($r = .05$, $p = .61$). Life events in childhood ($r = -.03$, $p = .74$), participation in other wars ($r = -.05$, $p = .64$), combat exposure ($r = -.12$, $p = .21$) and life events since the war ($r = .13$, $p = .19$) were not correlated with SA. Chronological age was positively correlated with SA ($r = .33$, $p = .001$).

The regression model was significant, $F(10,92) = 11.19$, $p < .001$, $R^2 = 55\%$ and adjusted $R^2 = 50\%$ (see Table 1). The variables inserted in the first three steps did not contribute significantly to the explained variance in SA. The captivity severity variables (step 4) significantly added to the explained variance as humiliation in captivity positively predicted SA. Life events after the war (step 5) contributed significantly to the explained variance, as did PTSD trajectories (step 6). The comparison of chronic and delayed trajectories to the resilient trajectory was significant, suggesting that veterans with chronic and delayed trajectories of PTSD reported higher SA compared to resilient veterans. The chronic trajectory was also different from the delayed trajectory with the chronic trajectory being associated with higher SA. Moreover, when all variables were accounted for (step 6), the number of childhood life events became highly significant whereas they were not significant in previous steps. Both physical and psychological suffering measures were marginally significant, trending towards a positive association with SA, whereas participation in other wars was not associated with SA. No multicollinearity was found based on the VIF measure (range 1.00–2.54).

4. Discussion

This study examined the relative contributions of adverse and traumatic life events over the lifespan to ex-POWs' SA in older adulthood. The results indicated that several forms of adversity were related to SA. In the final analysis, findings indicated that more negative childhood life events and more negative life events post-repatriation significantly contributed to older SA. Also, the endorsement of specific trajectories of PTSD both contributed significantly to the prediction of SA and brought to the fore the otherwise latent contribution of childhood adversity. Specifically, endorsing a chronic trajectory of PTSD was related to older SA compared to endorsing a delayed-onset trajectory, and the latter was also related to older SA compared to the endorsement of a resilient trajectory. Interestingly, combat exposure and weight loss in captivity did not significantly contribute to SA, while subjective indicators of captivity severity (i.e. physical and psychological suffering in captivity, humiliation in captivity) demonstrated a marginal and limited contribution to SA variance. Participation in previous wars was unrelated to SA.

Considering whether life adversity promotes resilience or vulnerability (Seery et al., 2010) in regards to SA, though the results clearly support the latter, they also indicated that not all adversities are equal in

Table 1. Hierarchical regression to predict subjective age in T4 among ex-POWs.

	b	se	β	t	p	ΔR^2	ΔF	ΔP
Step 1								
Childhood life events	-.29	.86	-.03	-.33	.74	.00	.11	.74
Step 2								
Childhood life events	-.25	.86	-.03	-.29	.77			
Participation in other wars	-.37	.85	-.04	-.44	.66	.00	.19	.66
Step 3								
Childhood life events	-.25	.86	-.03	-.29	.77			
Participation in other wars	-.04	.90	-.00	-.04	.97			
Combat exposure	-1.43	1.23	-.12	-1.15	.25	.01	1.33	.25
Step 4								
Childhood life events	.89	.84	.10	1.06	.29			
Participation in other wars	-.89	1.14	-.10	-.78	.43			
Combat exposure	-.92	1.32	-.08	-.70	.48			
Weight loss in captivity	.56	1.99	.04	.28	.78			
Physical suffering in captivity	.44	1.18	.05	.38	.71			
Psychological suffering in captivity	.97	1.62	.09	.60	.55			
Humiliation in captivity	4.16**	1.75	.36**	2.38	.01	.20	6.18***	.000
Step 5								
Childhood life events	1.29	.79	.15	1.63	.10			
Participation in other wars	-1.89	1.09	-.22	-1.72	.09			
Combat exposure	.22	1.27	.02	.17	.86			
Weight loss in captivity	1.19	1.87	.08	.63	.53			
Physical suffering in captivity	.59	1.10	.07	.53	.59			
Psychological suffering in captivity	2.61	1.57	.25	1.66	.09			
Humiliation in captivity	4.08**	1.64	.35**	2.49	.01			
Life events since the war	3.53***	.92	.37***	3.88	.000	.11	14.77***	.000
Step 6								
Childhood life events	2.20***	.67	.25***	3.29	.001			
Participation in other wars	-.94	.94	-.11	-.99	.32			
Combat exposure	-.27	1.09	-.02	-.25	.80			
Weight loss in captivity	1.72	1.57	.12	1.09	.27			
Physical suffering in captivity	1.69^	.93	.20^	1.83	.07			
Psychological suffering in captivity	2.40^	1.32	.23^	1.81	.07			
Humiliation in captivity	2.41^	1.40	.21	1.72	.07			
Life events since the war	2.52**	.78	.26**	3.24	.002			
Chronic vs. delayed PTSD	4.74***	.78	.46***	6.04	.000			
Delayed and chronic PTSD vs. resilient	5.41***	1.17	.38***	4.61	.000	.22	22.78***	.000

Note: $\Delta F = F$ statistic of the change from previous step; $\Delta P = p$ value of the F change; ^ $p = .069$, * $p < .05$, ** $p < .01$, *** $p < .001$.

this respect. Overall, 50% of the variance in SA was explained by the various negative events participants experienced throughout their lives, suggesting that SA in aging trauma survivors is, to a great extent, a product of cumulative lifetime adversity. Our results, therefore, support the theoretical assumptions by Schafer (2009, p. 76), suggesting that, 'subjective age, like most processes in adulthood, does not materialize in an instant, but stems from lifelong, socially-embedded developmental experiences'. Nevertheless, the results illustrated the impact of stressors occurring at different stages across the lifespan, as well as the toll of chronic and delayed-onset trajectories of psychopathology.

Interestingly, PTSD trajectories made the strongest relative contribution to SA. Individuals who reported either chronic or late-onset PTSD reported older SA more so than resilient participants; this was more pronounced among ex-POWs with chronic PTSD than those with delayed PTSD. These findings support results from earlier cross-sectional studies indicating the effect of PTSD on SA (Avidor et al., 2014; Solomon et al., 2009). More importantly, they underscored the limited scope of such cross-sectional investigations in a twofold manner. First, the current findings revealed that the course and protraction of the posttraumatic psychopathology, rather than the anecdotal manifestation of symptoms or the exposure to the trauma per se, may more prominently underlie subjective processes of premature aging decades later. Secondly, accounting for the trajectories of PTSD brought to the fore the otherwise latent contribution of both childhood and post-war life events.

The deleterious ramifications that the prolongation of PTSD harbours for SA may be explained via social and physical processes. PTSD is an amalgamation of physical (e.g. insomnia, hyperarousal) and psychological (e.g. intrusive thoughts, alterations in cognitions and mood) symptomatology (American Psychiatric Association, 2013). From a social perspective, it is noteworthy that the deleterious effects that PTSD exerts on survivors' lives extends beyond the intrapersonal sphere and penetrates victims' daily interactions with loved ones, thus impairing their quotidian social functioning (Monson, Taft, & Fredman, 2009). Such social impediments may in themselves be stressful, and thus their prolongation may erode one's resources (Hobfoll, 1989, 2002) and undermine one's subjective juvenescence.

From a more physical perspective, in their totality, PTSD symptoms may act as a prolonged stressor that wears down both physiological (Pole, 2007) and psychological systems. This continuous stress culminates in an allostatic load (McEwen, 1998; McFarlane, 2010) that may impede functional abilities, deplete social and psychological resources, burden physical functioning and lead to premature senescence (Lohr

et al., 2015). As the current findings suggest, this process may include older age perceptions.

The number of negative life events over the lifespan made the second largest contribution to SA, with similar effects for childhood and posttrauma life events. Of particular interest is the fact that childhood life events made a significant contribution to SA only when PTSD trajectories were accounted for. In fact, the hierarchical regression analysis suggested that the significance of childhood life events increased almost with every added adversity. Thus, it is likely that adverse childhood life events created a latent vulnerability for premature aging that revealed itself in particular in the presence of prolonged PTSD, once again stressing the importance of considering the psychopathological outcome of trauma rather than predominantly focus on exposure. The findings support the theory of latent vulnerability (McCrary & Viding, 2015) which suggests that childhood adversity can result in measurable alterations in a number of neurobiological systems and are related to the increased risk of psychiatric disorders across the lifespan (McCrary, Gerin, & Viding, 2017). Our findings indicated that such vulnerability may extend to the domain of SA.

Alternatively, it may be argued that posttraumatic psychopathology is a catalyst for the re-evaluation and reinterpretation of past events, a process recognized as 'effort after meaning' (Brown, 1974). Humans are meaning-making creatures, and thus, undergoing traumatic and stressful events is accompanied by an iterative process of meaning-making, of which posttraumatic psychopathology and resilience are arguably inherent (Park, 2010). In cases wherein posttraumatic psychopathology dominates one's reality, one's lens of interpreting the world may shift towards the negative, and consequently past experiences may exert their toll retrospectively. This may account for the interplay between PTSD trajectories and past life-events during childhood and adulthood alike. Post-war negative life events also made a relatively strong contribution to SA without consideration of the trajectories of PTSD, suggesting that their effect on SA differs from that of negative childhood life events. One explanation for this difference may be in line with the vulnerability perspective (Ruch et al., 1980), whereby captivity resulted in a reduction of available psychological resources (Hobfoll, 1989). A body of literature has confirmed that life events occurring after trauma may impede readjustment (Mehlum & Weisaeth, 2002), increasing the risk for PTSD (Schnurr, Lunney, & Sengupta, 2004), and plausibly also for older SA. On the other hand, the stronger impact of post-war, as opposed to pre-war, life events may be explained by a recency effect, as recent life events are more potent pathogenic agents than remote events (Horesh et al., 2011).

5. Study limitations

Several limitations of this study should be noted. First, some information was gathered retrospectively and thus the possibility of a recall bias cannot be excluded, either because of selective memory or because of trauma-related unconscious denial or retrieval difficulties regarding traumatic events (McNally, 2003). Second, the sample size was relatively small. Notwithstanding, a power analysis indicated that it was adequate for the specific analyses conducted in this study. Nevertheless, future studies should replicate this investigation in larger samples. Third, the participants of this study were ex-POWs, and as such are representatives of a group of survivors that have undergone a specific and extreme trauma, which limits the generalizability of our findings. Finally, we did not assess all possible adverse experiences. We lack a measure of war experiences in childhood and did not assess domestic or sexual abuse in childhood. Sexual abuse in captivity was also not explored as we recognized in focus groups and clinical interviews that the issue was too sensitive for this population.

Notwithstanding the limitations, the current study is of importance due to the growing realization that premature aging and its chronic health-related manifestations are a major and costly public health challenge, and SA is a prominent indicator of such health risks (Westerhof et al., 2014). In the past decade, growing attention has been dedicated to the complicated link between exposure to stress and trauma and its implications for premature aging, biological (Epel et al., 2004) and subjective (Avidor et al., 2014). However, research is still lacking a comprehensive, empirically-grounded examination of the long-term implications of exposure to trauma and the psychological and physical responses to trauma in the aging processes. Future research should explore the effect of negative life events over the lifespan for SA in populations that did not suffer severe traumatization. Moreover, further research, especially prospective and longitudinal, would benefit from investigating the role of lifespan adversity with regard to indicators of premature aging other than SA (e.g. somatic complaints, cognitive decline, biomarkers).

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