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Wartime and Ukrainian Information Technology specialists' wellbeing: exploring the role of internal resilience resources

Iryna Kryazh & Victoria Kholmanova*

V. N. Karazin Kharkiv National University, Kharkiv (Ukraine)

Keywords

Subjective well-being
Personal resources
Belief in a just world
Existential fulfillment
Mediation analysis
Wartime impact

Abstract

The Russian invasion of Ukraine in 2022 has significantly impacted the subjective well-being of Ukrainian Information Technology specialists, challenging their internal resilience resources, such as belief in a just world and existential fulfillment. This exploratory study investigates how wartime conditions influenced these professionals' internal resources and subjective well-being. Two independent samples participated in two time points, 80 specialists in 2021, before the invasion (42.5% women; M = 35.33 years; SD = 7.77), and 77 in 2022, during wartime (48.05% women; M = 34.48; SD = 7.43). Moderation and mediation analyses were applied to examine the roles of personal belief in a just world, existential fulfillment, age, and gender. Findings reveal a considerable decline in subjective well-being and a weakening of internal resources, with the exception of the general belief in a just world. Age and gender as moderators modified changes induced by war in emotional discomfort and existential fulfillment, with decrease in the latter observed in two groups: women over 35 and men under 35. An increase in emotional discomfort was noted among women over 35. Mediation analysis showed that existential fulfillment and personal belief in a just world mediated the relationship between wartime stress and subjective well-being, as well as the effect of general belief in a just world on well-being. These results suggest that targeted support for maintaining existential fulfillment and personal belief in a just world may be essential for bolstering the well-being of Information Technology specialists under wartime conditions, particularly for vulnerable age and gender groups.

El bienestar de los especialistas en Tecnología de la Información ucranianos durante el tiempo de guerra: explorando el papel de los recursos internos de resiliencia

Palabras clave

Bienestar subjetivo
Recursos personales
Creencia en un mundo justo
Plenitud existencial
Análisis de mediación
Impacto de la guerra

Resumen

a invasión rusa a Ucrania en 2022 impactó el bienestar subjetivo de los especialistas en Tecnología de la Información ucranianos, desafiando sus recursos internos de resiliencia, como la creencia en un mundo justo y la plenitud existencial. Este estudio exploratorio investiga cómo las condiciones de guerra influyen en sus recursos internos y bienestar subjetivo. Participaron dos muestras independientes en dos momentos temporales, 80 especialistas en 2021, antes de la invasión (42.5% mujeres; M = 35.33; DT = 7.77) y 77 en 2022, durante la guerra (48.05% mujeres; M = 34.48 años; DT = 7.43). Se realizaron análisis de moderación y mediación. Se observó una disminución del bienestar subjetivo y recursos internos, con excepción de la creencia en un mundo justo. La edad y el género moderaron cambios inducidos por la guerra en el malestar emocional y realización existencial, disminuyendo esta última en dos grupos: mujeres mayores de 35 y hombres menores de 35. El malestar emocional aumentó en mujeres mayores de 35. El análisis de mediación mostró que la plenitud existencial y la creencia personal en un mundo justo mediaban la relación entre el estrés de la guerra y el bienestar subjetivo, y el efecto de la creencia general en un mundo justo sobre el bienestar. Estos resultados sugieren que el apoyo para mantener el cumplimiento existencial y la creencia personal en un mundo justo puede ser esencial para fortalecer el bienestar de estos especialistas en condiciones de guerra, particularmente para grupos vulnerables por edad y género.

* *Corresponding author:* Victoria Kholmanova. BezNazvy, 497, Stroine, Zakarpattya, 89331, Ukraine. v.kholmanova@gmail.com
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Information technology (IT) is one of the fastest-growing industries in the world, including in Ukraine. The IT sector employs highly educated professionals, and the competition for effective employees is fierce. For IT professionals, maintaining subjective well-being (SWB) is crucial for work efficiency (Boehm & Lyubomirsky, 2008; Oswald et al., 2015; Salas-Vallina et al., 2018). However, IT professionals often face cognitive and nervous overload (Huda et al., 2020), which leads to health problems (Padma et al., 2015) and a decrease in SWB (Mosquera & Soares, 2024). This problem becomes more complex when military conditions exacerbate existing stress, creating a need to study internal resources that support SWB during times of adversity. This paper addresses such internal resources as existential fulfillment (EF) and belief in a just world (BJW).

EF, as a personal resource, manifests in the ability of individuals to cope with themselves and their world (Längle et al., 2003), combating alienation and burnout while simultaneously promoting emotional well-being and life satisfaction (Längle, 2003a; Shumskiy et al., 2017). EF supports engagement in work under high workload conditions and is also involved in the healing mechanisms for people who have experienced traumatic events (Tomic & Tomic, 2011).

BJW, the belief that the world is a just place, helps individuals cope with negative experiences (Correia et al., 2023; Cui & Xie, 2022; Dalbert, 2001). Previous research identifies BJW as a significant predictor of SWB among IT employees (Kryazh & Kholmanova, 2021). BJW is a complex construct, with the most studied forms being general belief in a just world (GBJW) and personal belief in a just world (PBJW) (Dalbert, 1999; Lipkus et al., 1996). PBJW is more closely associated with subjective well-being, a positive future orientation, and stress-coping mechanisms such as forgiveness (Bartholomaeus & Strelan, 2019; Dzuka & Dalbert, 2002), while GBJW is linked to social dominance (Sutton et al., 2017). During the COVID-19 pandemic, PBJW showed a protective effect, mitigating hopelessness and contributing to perceived control (Kiral-Ucar et al., 2022).

In the context of existential approach, PBJW correlates with a sense of meaning in life (Bègue & Bastounis, 2003), which indicates its connection to EF. As internal resources, EF and PBJW support SWB, which becomes particularly important in the context of traumatic changes in life circumstances. The impact of life upheavals on SWB is refracted through EF, through the readiness to make sense of and integrate existential experiences while maintaining positive connections with the world. On the other hand, PBJW mitigates negative experiences, helps individuals cope with reality, and thus supports SWB.

In terms of the relationship between GBJW and SWB, it should be noted that recent studies point to PBJW as a mediator between GBJW and SWB (Kryazh & Baranov, 2022; Kryazh & Kholmanova, 2021). At the same time, it is important to consider the significance of GBJW for EF. The cognitive reappraisal of unjust events links GBJW to the processes of meaning-making, a critical component of EF (Wenzel et al., 2017). It is emphasized that GBJW, by contributing to a sense of order, control, and significance, can have existential benefits; however, when confronted with facts that contradict this belief, it may provoke an increase in death-thought accessibility, heightening vulnerability to existential threat (Roylance et al., 2014). This suggests that EF may act as a mediator between GBJW and SWB.

The military aggression by Russia against Ukraine, which began in 2022, has created conditions that critically test BJW and EF as internal resilience resources, confronting people with profound injustice and existential threats. While much of the research on the impact of war on civilians focuses on mental health and disruptions to SWB, the question of how personal resources such as EF and BJW change under the influence of war remains insufficiently studied.

This study examines whether the events of wartime have affected the SWB, BJW, and EF of IT professionals. Recent studies have shown a decrease in SWB as a reaction to Russia's invasion of Ukraine, not only among Ukrainian citizens but even among citizens of other countries (Pypenko et al., 2023; Seleznova et al., 2023). The negative consequences of the war were reflected in both the emotional and cognitive components of the SWB, manifesting themselves in a decrease in SWL (Tamilina, 2024) and an increase in signs of emotional discomfort (EmDisc) (Pypenko et al., 2023). Additionally, wartime events can undermine BJW (Fasel & Spini, 2014) and reduce EF (Längle, 2003b). However, when analyzing such differences, it is crucial not to overlook the gender and age characteristics of the respondents, as these largely determine the specific life circumstances through which the significance of war for an individual is revealed. Men are subject to conscription and may be called upon to defend their country with arms, while women face separation and the potential loss of loved ones (husbands and sons). The higher vulnerability of women to wartime stress has been noted in studies conducted at various times in different regions, including Ukraine (Chudzicka-Czupała et al., 2023; Neria et al., 2010; Pypenko et al., 2023; Zeidner & Ben-Zur, 1994).

Age also plays a key role: young people focus on identity formation and relationships, while middle-aged adults concentrate on productivity and family (Bishop & Keth, 2013). Ukrainian IT professionals in middle adulthood are generally experienced professionals with established reputations in the industry and high incomes (IT Cluster Lviv, 2023), which may contribute to a stronger sense of security compared to their younger colleagues. It should also be noted that unmarried young Ukrainian female IT professionals are more mobile and freer to choose their country of residence compared to their older married female colleagues. For the latter, leaving the country means physical separation from their husbands and adult sons, as martial law prohibits men of military age (18-60 years) from leaving Ukraine (Reuters, 2024). To differentiate between the two groups –young and mature IT professionals– the authors refer to Ukrainian law, which defines youth as individuals between the ages of 14 and 35 (Law of Ukraine "On Promoting Social Development and Establishment of Youth in Ukraine", 1993).

The present study

The present study aims: 1) to examine how wartime experiences affect beliefs in a just world (both personal and gene-

ral), existential fulfillment, and subjective well-being among Ukrainian IT specialists, considering the roles of age and gender; and 2) to explore how PBJW and EF mediate the impact of war and the effects of GBJW on subjective well-being.

It was proposed that war will reduce personal and general BJW, EF, and SWL, while increasing EmDisc (Hypothesis 1A). It is expected that the impact of the war in Ukraine on IT specialists' GBJW, PBJW, EF, SWL, and EmDisc will depend on the age (two age groups: under 35 years and older than 35 years) and gender of the respondents: a decrease in GBJW, PBJW, EF, SWL and an increase in EmDisc in 2021 compared to 2022 will be statistically significant in the group of women over 35 and in both age groups of men, but not in the group of women under 35 (Hypothesis 1B). PBJW and EF are expected to mediate the relationship between socio-political conditions (peacetime vs. wartime) and subjective well-being (Hypothesis 2A), as well as the relationship between general belief in a just world and subjective well-being of IT specialists (Hypothesis 2B).

Method

Participants

The study involved 157 respondents (46% women; $M = 34.9$ years; $SD = 7.6$) working in the IT sector of Ukraine. Of these, 51.2% were aged between 22 and 35 years. The study was conducted in two stages on two independent samples: in September 2021, during peacetime, and in November 2022, nine months after Russia's invasion of Ukraine. In the first stage, 80 employees were surveyed (42.5% women; $M = 35.33$ years; $SD = 7.77$), of whom 51.3% were under 35 years old. In the second stage, 77 employees were surveyed (48.05% women; $M = 34.48$ years; $SD = 7.43$), of whom 52% were under 35 years old.

Instruments

Subjective well-being. For measuring SWB, two instruments were used. To assess the cognitive component of subjective well-being, the *Satisfaction with Life Scale* (SWL) (Diener et al., 1985) was used, comprising five items (McDonald's $\omega = .82$). Participants were asked to rate each item on a seven-point Likert scale, ranging from 1 = *Totally disagree* to 7 = *Totally agree.* Sample items include: "Almost everything in my life is close to my ideal", "So far, I have achieved most of what I wanted in life", and "I would change almost nothing in my life".

To measure the emotional component of subjective well-being, *The Subjective Well-Being Scale* (Perrudet-Badoux et al., 1988) was used, consisting of 17 items (McDonald's $\omega = .94$) measured by a 7-point Likert scale, ranging from 1 = *Totally disagree* to 7 = *Totally agree*. High scores on this scale indicate a high level of EmDisc, while low scores indicate a high level of emotional component of SWB. Sample items: "Lately, I've been in a good mood" or "Sometimes I start to feel nervous for no apparent reason".

Belief in a just world. The *BJW Scale* (Dalbert, 1999) consists of 13 items measured by a 6-point Likert scale ranging from 1 = *Totally disagree* to 6 = *Totally agree*. The scale includes two subscales: PBJW, with 7 items (McDonald's $\omega = .92$) and GBJW, with 6 items (McDonald's $\omega = .84$). Sample items: "I believe that all in all, I deserve what happens to me", "I think that people try to be fair when making important decisions".

Existential fulfillment was measured using the *Fundamental Motivation Test* (Shumskiy et al., 2017), which consists of 30 items rated on a 4-point scale. This scale assesses how much a respondent's life corresponds to each statement, ranging from 1 = *Completely corresponds* to 4 = *Does not correspond at all*). In our study, we considered the overall EF score (McDonald's $\omega = .88$). Sample items include: "I have a reliable support system in life" and "Maintaining close relationships causes me difficulties and disappointments".

Data on the time of participation in the study, gender, and age group of each respondent were presented as nominal variables: stage (0 = peacetime 2021 September, 1 = wartime 2022 November), age (0 = from 22 to 35 years, 1 = older than 35), gender (0 = men, 1 = women).

Procedure

The study was conducted online using Google Forms. Invitations were posted in professional groups of Ukrainian IT companies on Facebook, LinkedIn, and Telegram. All responses were collected anonymously, and participants provided informed consent for the use of their data in the research. Data collection was conducted twice: in September 2021, during peacetime in Ukraine, and in November 2022, nine months after Russia's invasion of Ukraine. In 2022, after the full-scale invasion of Ukraine began, some IT specialists relocated to other countries seeking safety, but they remained employees of Ukrainian IT companies and maintained close ties to the country.

The study was approved by the Ethics committee of the Faculty of Psychology at V. N. Karazin Kharkiv National University 27-08-2021 (minutes of the meeting Nº 7).

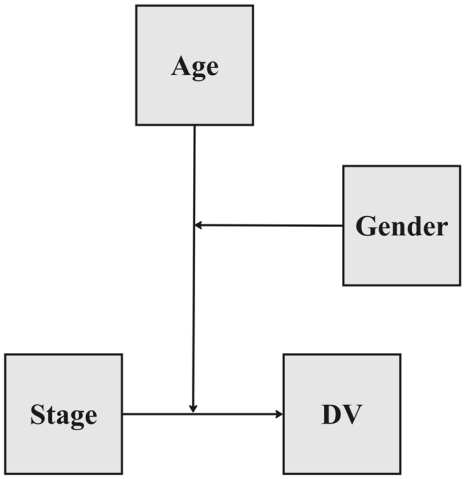
Analytical strategy

Hypotheses 1A and 1B were tested using the JASP (version 0.18.3), employing the PROCESS module. To assess the contribution of the independent variable p*eacetime vs. wartime* (independent variable *stage*) to each of the dependent variables studied, as well as to evaluate how this contribution changes depending on the age group (moderator *age*) and gender (moderator *gender*) of the respondents, a Hayes' Model 3 with two interacting moderators was tested for each of the five dependent variables (Figure 1).

For testing Hypotheses 2A and 2B, mediation analysis was conducted using module SEM of JASP (version 0.18.3). A path model with two predictors *stage* and GBJW, two mediators EF and PBJW, and two outcome variables EmDisc and SWL was tested (Figure 2). In accordance with hypothesis 2A, statistically significant paths a12 and a22 were expected, with statistically nonsignificant estimates of paths c12 and c22. Hypothesis 2B predicted statistically significant paths a11 and a21, with statistically nonsignificant path estimates c11 and c21.

Figure 1

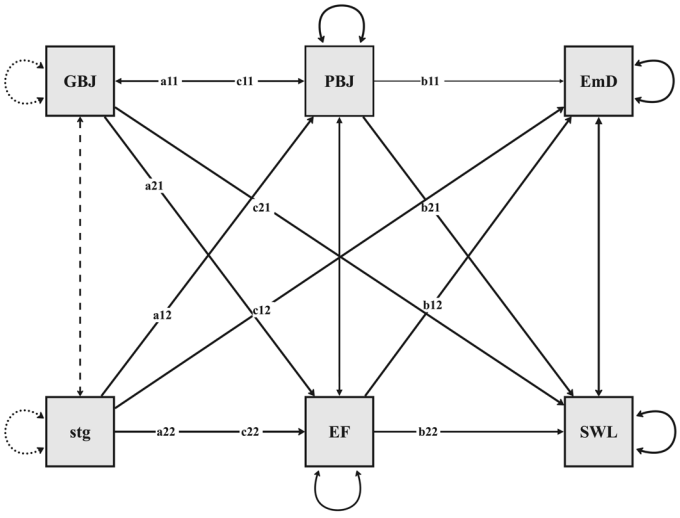
Hayes' Model 3



Note. Two interacting moderators. Legend and coding: Age: 0 = from 25 to 35 years, 1 = older than 35; Gender: 0 = men, 1 = women; Stage: 0 = peacetime 2021, 1 = wartime 2022; DV = dependent variable (models with GBJW, PBJW, EF, EmDisc, SWL were considered sequentially).

Figure 2

Mediation analysis model



To test the significance of the moderation and mediation effects, this study used a conventional *p*-value based on *z*-values and confidence interval (CI). To generate confidence CI, 5,000 bootstrap samples were used, following Hayes' recommendations (Hayes, 2017). Parameters were significant if the 95% CI did not include zero. The proportion of variance explained for each of the endogenous variables in the moderation and mediation models was also calculated.

Results

Moderation analysis

The results of the moderation analysis, conducted separately for each of the five studied variables, are presented in Table 1.

First, it should be noted that GBJW was the only variable that did not change in 2022 compared to 2021, even when considering potential moderation effects. SWL indicators were statistically significantly lower in 2022 compared to 2021 ($p = .011$) (Table 1). The dependence of this decrease on the variables age and gender and their interaction was not confirmed.

Statistically significant differences between the data obtained in 2022 and 2021 were also confirmed for PBJW, EF, and EmDisc. However, the effect of the moderator age on the influence of the independent variable stage on PBJW, the effects of the moderators age and gender on the influence of stage on EmDisc, and the interaction effects of age and gender on the influence of stage on EmDisc and EF were also confirmed. In such cases, it should be noted that the influence of the independent variable on the dependent variables applies only to

Table 1

Moderated moderation results (Process model = 3)

	Testing effects						
	stage →DV	age →DV	stage: age → DV	gender → DV	stage: gender →DV	stage: age: gender →DV	age: gender →DV
DV GBJW						*R² .06*	
Estimate	-0.47	-0.08	0.81	-0.21	0.65	-0.41	-0.31
SE	0.37	0.33	0.47	0.32	0.46	0.64	0.42
z-value	-1.27	-0.22	1.71	-0.62	1.41	-0.65	-0.7
p-value	.21	.82	.09	.53	.16	.52	.49
95%CI	-1.25	-0.72	-0.08	-0.83	-0.32	-1.75	-1.16
	0.32	0.53	1.75	0.39	1.62	0.82	0.57
DV PBJW			R² .09			*R² .12*	
Estimate	-1.24	-0.57	1.21	0.09	0.61	-0.72	0.08
SE	0.36	0.32	0.46	0.31	0.45	0.62	0.43
z-value	-3.41	-1.75	2.63	0.29	1.36	-1.17	0.18
p-value	<.001	.08	.009	.77	.18	.24	.86
95%CI	-2.13	-1.31	0.22	-0.57	-0.41	-2.03	-0.87
	-0.37	0.16	2.24	0.85	1.64	0.55	1.01
DV EF						R² .07	
Estimate	-0.87	-0.47	0.92	-0.44	0.66	-1.43	0.68
SE	0.37	0.33	0.47	0.32	0.46	0.64	0.44
z-value	-2.34	-1.49	1.94	-1.4	1.43	-2.25	1.57
p-value	.02	.16	.05	.16	.15	.03	.12
95%CI	-1.63	-1.08	-0.05	-0.93	-0.26	-2.72	-0.08
	-0.11	0.11	1.90	0.041	1.63	-0.23	1.5
DV EmDisc						R² .11	
Estimate	1.18	0.47	-1.33	0.19	-1.24	1.96	-0.32
SE	0.37	0.33	0.46	0.31	0.45	0.62	0.43
z-value	3.22	1.44	-2.87	0.6	-2.73	3.15	-0.75
p-value	.001	.15	.004	.55	.006	.002	.46
95%CI	0.46	-0.23	-2.28	-0.45	-2.14	0.73	-1.24
	1.84	1.14	-0.41	0.82	-0.35	3.23	0.59
DV SWL	R² .04					*R² .09*	
Estimate	-0.94	-0.28	0.9	0.03	0.72	-1.14	-0.02
SE	0.37	0.33	0.47	0.32	0.46	0.63	0.44
z-value	-2.53	-0.84	1.91	0.09	1.57	-1.81	-0.05
p-value	.011	.40	.06	.93	.12	.07	.96
95%CI	-1.76	-1	-0.21	-0.62	-0.37	-2.41	-0.98
	0	0.54	1.85	0.82	1.68	0.23	0.9

Note. Confidence intervals are bias-corrected percentile bootstrapped. Regular font indicates R² for statistically significant effects, *italic R²* is given in the case of non-confirmed moderated moderation stage:age:gender.

the data at the level of the moderator/interactions of moderators where this influence was confirmed.

The effect of the variable stage on PBJW differs depending on the age group ($p = .009$). During the war, IT specialists over the age of 35 are less convinced of a just world for themselves compared to their peers who participated in the study a year earlier during peacetime (Figure 3). A statistically significant decrease in PBJW is observed in the older age group for both women ($z = -3.41$, $p < .001$, CI [-2.05, -.36]) and men ($z = -2.34$, $p = .019$, CI [-1.17, -0.14]), unlike men and women in the younger age group.

A statistically significant interaction effect of stage:age was confirmed for EF ($p = .025$) and EmDisc ($p = .002$). Signifi-

Figure 3

PBJW in two age groups in 2021 and 2022

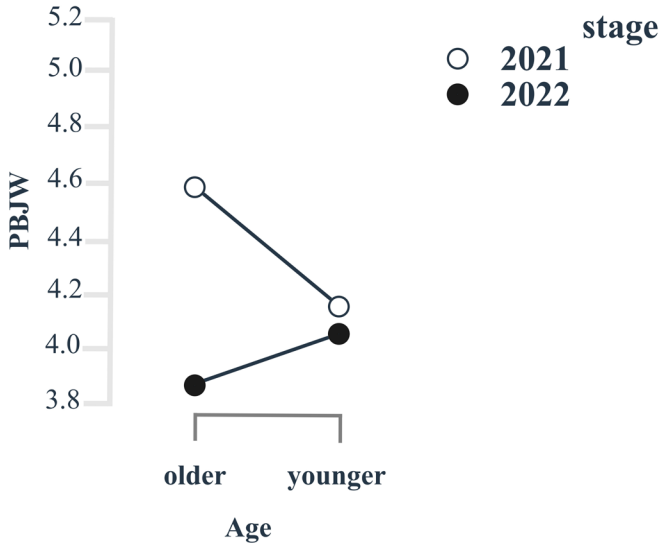
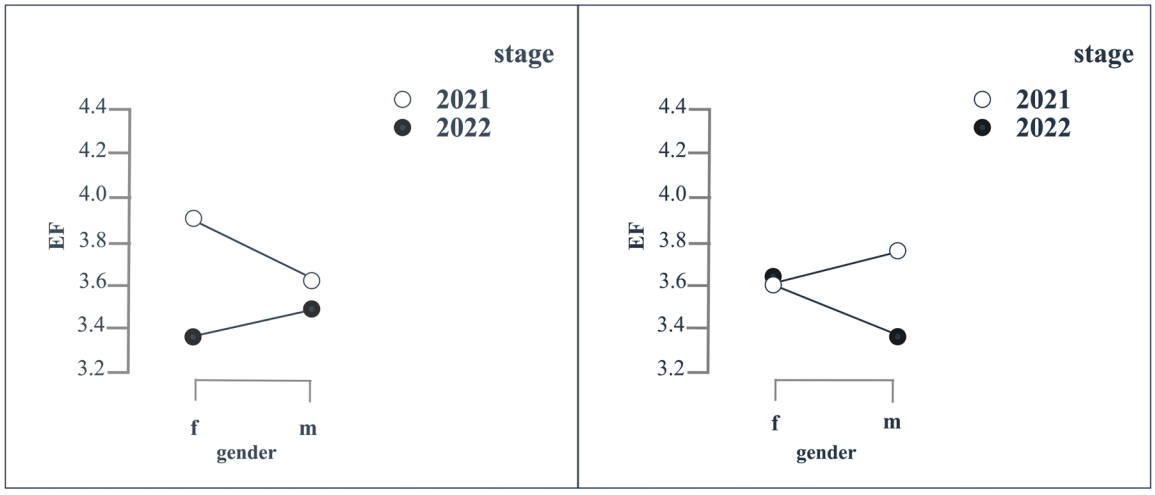


Figure 4

EF in groups of men and women within the older (left graph) and younger (right graph) age groups in 2021 (peacetime) and 2022 (wartime)



cant differences were found between EF indicators obtained in peacetime and wartime in the group of women over 35 years old (z = -2.34, p = .019, CI [-1.63, -.11]) (Figure 3, right) and in the group of men younger than 35 years old (z = -2.23, p = .026, CI [-1.31, -.11]) (Figure 4, left). Both groups experienced a decrease in EF during the war compared to peacetime, while such changes were not observed among their peers of the opposite gender.

Significant differences in the level of EmDisc were confirmed only for the group of older women, who experienced higher EmDisc in 2022 compared to 2021 (z = 3.22, p = .001, CI [.39, 1.82]) (Figure 5, left). Although a similar trend is observed in the group of younger men (Figure 5, right), the effect of "stage" on EmDisc in this group is not statistically significant (z = 1.80, p = .072, CI [-.08, 1.18]).

All the described models explain only from 6.9% to 11.9% of the total variance corresponding to the DV (Table 1), which indicates only a weak effect.

A closer look at war's impact on GBJW

The first aim of this study was to examine the effects of war on the variables studied. As shown above, belief in a just world does not appear to change overall during wartime; however, a closer look reveals nuanced shifts within these beliefs. Thus, the impact of war on BJW may not be as straightforward as it initially seems.

According to the research results, IT specialists maintained their GBJW in the fall of 2022, during the war, to the same extent as in 2021, during peacetime. To understand the stability of GBJW during wartime, which is necessary for the correct interpretation of the results of the moderation analysis, a comparative analysis (Mann-Whitney U test) of responses to all items of the GBJW scale obtained in 2021 and 2022 was additionally conducted. Significant differences, associated with stronger agreement during wartime in 2022, were found for only one statement from the GBJW scale: "I am convinced that in the

Figure 5

EmDisc in groups of men and women within the older (left graph) and younger (right graph) age groups in 2021 (peacetime) and 2022 (wartime)

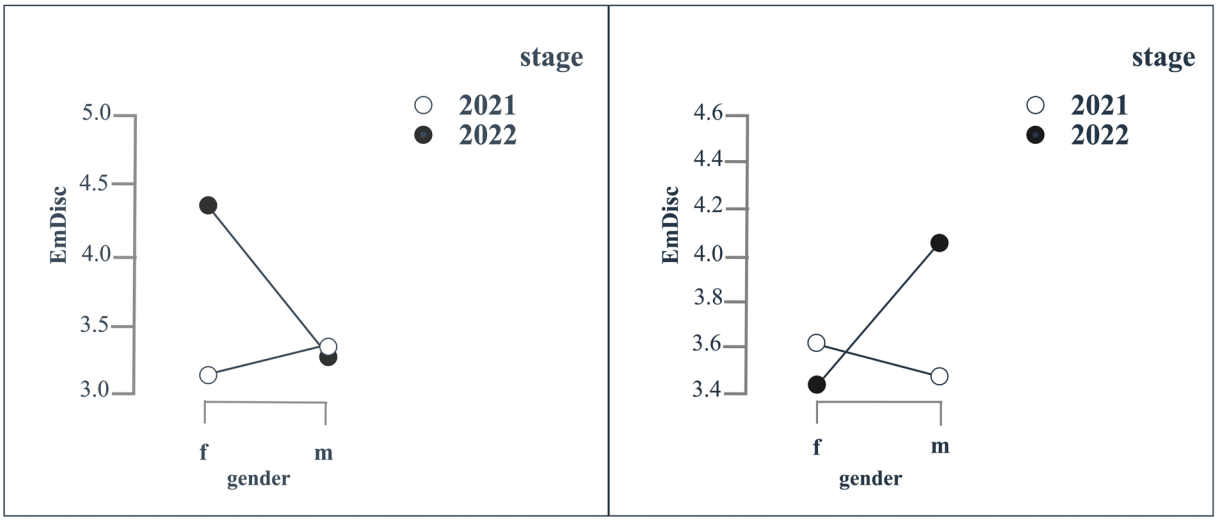
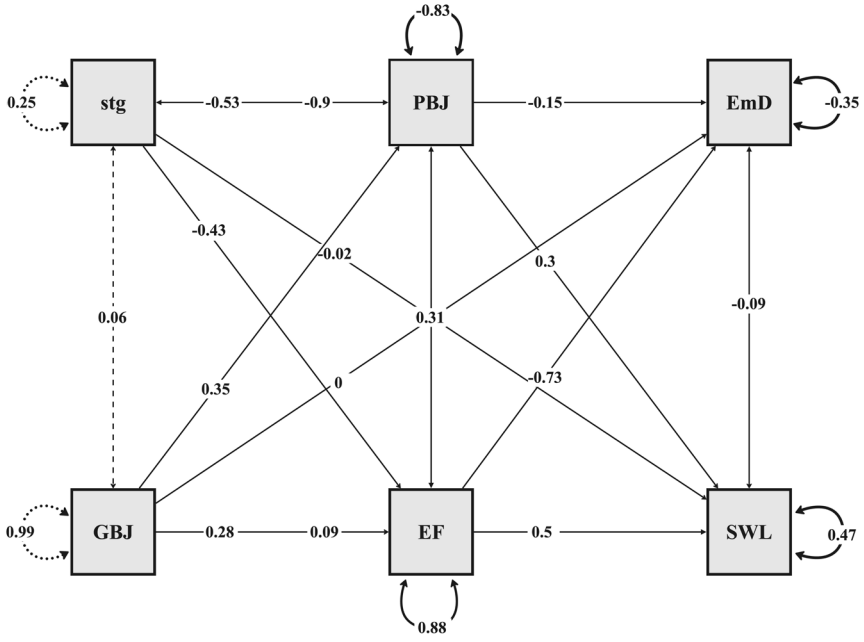


Figure 6

Mediation analysis: path plot with standardized estimates



Note. Path significance indicators are given in Tables 3 and 4. Designations: stg - stage, GBJ - GBJW, PBJ - PBJW, EmD - EmDisc.

long run people will be compensated for injustices" (M = 3.18 in 2021 and M = 3.82 in 2022; p = .003, effect size given by the rank biserial correlation .27).

Mediation model explaining the effects of wartime events and GBJW on subjective well-being

To test the hypotheses about PBJW and EF as mediators, mediating the contribution of the variables "stage: peacetime – wartime" and GBJW to subjective well-being, a mediation analysis was conducted with a model including two predictors ("stage" and GBJW), two mediators (PBJW and EF), and two outcomes (EmDisc and SWL) (Figure 6). The main results of the analysis are presented in Tables 2 and 3.

The direct effect of both "stage" and GBJW on EmDisc is non-significant (p = .35 and p = .96, respectively), and similarly, the direct effect of these variables on SWL is also non-significant (p = .84 and p = .15, respectively) (Table 2). The effect of the variable "stage" on each subjective well-being indicator (EmDisc and SWL) is mediated by PBJW and EF

Table 2

Mediation analysis results: direct effects

			Estimate	SE	z-value	*p*	95% Confidence Interval	
							Lower	Upper
stage	→	EmDisc	-0.09	0.1	-0.93	.35	-0.3	0.11
GBJW	→	EmDisc	-0.003	0.05	-0.05	.96	-0.11	0.1
stage	→	SWL	-0.02	0.12	-0.2	.84	-0.25	0.2
GBJW	→	SWL	0.09	0.06	1.45	.15	-0.04	0.22

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Table 3

Mediation analysis results: indirect effects

					Estimate	SE	z-value	*p*	95% Confidence Interval	
									Lower	Upper
stage	→	PBJW	→	EmDisc	0.08	0.04	2.2	.028	0.02	0.17
stage	→	EF	→	EmDisc	0.32	0.11	2.78	.005	0.11	0.53
GBJW	→	PBJW	→	EmDisc	-0.05	0.02	-2.39	.017	-0.12	-0.01
GBJW	→	EF	→	EmDisc	-0.21	0.06	-3.57	< .001	-0.33	-0.08
stage	→	PBJW	→	SWL	-0.16	0.06	-2.87	.004	-0.3	-0.07
stage	→	EF	→	SWL	-0.22	0.08	-2.68	.007	-0.39	-0.07
GBJW	→	PBJW	→	SWL	0.11	0.03	3.34	< .001	0.05	0.2
GBJW	→	EF	→	SWL	0.14	0.04	3.36	< .001	0.06	0.24

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

(all four paths are significant: "stage → PBJW → EmDisc", "stage → EF → EmDisc", "stage → PBJW → SWL", "stage → EF → SWL") (Table 3). Additionally, the relationship between GBJW and each subjective well-being indicator is mediated by PBJW and EF (all four paths are significant: 2GBJW → PBJW → EmDisc", "GBJW → EF → EmDisc", "GBJW → PBJW → SWL", "GBJW → EF → SWL") (Table 3).

The mediation analysis also indicates a positive relationship between the two mediators PBJW ↔ EF (Figure 6) (residual covariance .31, 95% CI [.14, .50], $p < .001$.

The proportion of variance explained by the four predictors stage, GBJW, PBJW, and EF considered together is 65% for EmDisc and 53% for SWL.

Discussion

The current study aimed to examine how SWB of Ukrainian IT specialists changes in response to the war and how these changes are related to war-related shifts in internal resources such as BJW and EF. The first objective was to test the hypothesis (Hypothesis 1A) that internal resources and SWB weakened during wartime. It was also assumed that these changes would be related to the gender and age of the respondents, being evident in the groups of women and men over 35 years old, and in the group of men younger than 35, but not in the group of younger women (Hypothesis 1B).

Hypothesis 1A received full support for SWL: nine months after Russia's invasion of Ukraine, the SWL of Ukrainian IT specialists decreased compared to pre-war levels. This overall decrease reflects the impact of war on the quality of life across the entire sample, indicating a general reduction in the cognitive component of subjective well-being. These changes were consistent across gender and age groups, that do not support Hypothesis 1B for SWL.

In 2022 compared to 2021, there was an increase in EmDisc and a decrease in EF and PBJW. The fact that the decrease in EF was observed only in women over 35 and men younger than 35 supports Hypothesis 1B about moderated moderation. However, the assumption of a decrease in EF during wartime in the older male age group was not confirmed. Similar results were obtained for EmDisc, the increase of which was statistically significant only in the older female age group, while in the group of younger men, there was a statistically insignificant trend towards an increase in EmDisc during the war. Thus, Hypothesis 1B is partially supported in relation to EF and EmDisc. The absence of war-related differences in EmDisc and EF in mature men indicates their higher resilience compared to their younger counterparts and female peers. During war, mature men retain readiness to face life's challenges and to find meaning in what was happening, which may be related to greater professional demand and a more stable career position compared to younger colleagues.

As expected, no statistically significant changes related to wartime were recorded among younger women in our study. The difference between the impact of wartime on women in the older and younger age groups can be explained by the family

roles of middle-aged women, who experience additional stress during wartime due to concerns about their husbands and sons, especially those serving in the military or those who may soon be drafted. Younger women may have fewer social constraints and be more mobile, moving from dangerous regions of Ukraine to safer places or even other countries (UN Women, 2022).

Out of the two beliefs in a just world, the decrease in 2022 was confirmed only for PBJW. The effect of the war was moderated by age and was significant only among older respondents, both men and women. Hypothesis 1B did not receive support regarding gender as a moderator of age differences between wartime and peacetime indicators. PBJW indicators in peacetime and wartime did not differ in either of the younger groups –male and female–. This can presumably be explained by the stronger skepticism of young people towards justice issues, as they did not demonstrate a strong PBJW even during peacetime.

GBJW in wartime 2022 did not differ from the indicators obtained in peacetime 2021, regardless of the gender and age of the respondents. Thus, hypotheses 1A and 1B were not supported in relation to GBJW. Moreover, GBJW has rather strengthened in terms of future compensation for suffering, which may indicate a shift in the meaning of GBJW from belief in immanent justice to belief in ultimate justice (Maes, 1998). Such a shift helps to maintain faith in the world as a just place while avoiding the known drawbacks of GBJW, such as victim blaming and the justification of immoral actions (Bègue & Bastounis, 2003; Hafer & Rubel, 2015; Hafer & Sutton, 2016; Lerner, 1998; Khera, et al., 2014).

The second objective of the study was to clarify the role of GBJW, PBJW, and EF as internal resources supporting SWB. Hypotheses 2A and 2B, which proposed that the negative impact of the war on SWB, as well as the positive contribution of GBJW to SWB, would be mediated by EF and PBJW, were fully supported by the study results. Both mediators –EF and PBJW– are positively related to each other, prompting the question of their interaction and mutual influence. Given that an increase in life meaning contributes to the restoration of belief in a just world (Park et al., 2008), there may be a positive effect of EF on PBJW. On the other hand, considering the existential context of PBJW (Roylance, et al., 2014) and the closer relationship of EF with SWB, it can also be expected that PBJW's contribution to SWB is partially mediated by EF. These are suggestions that require further analysis to verify, but they highlight two potential targets for mental health programs in the context of wartime events. On one hand, this involves addressing potentially traumatic experiences as meaningful existential events that promote post-traumatic growth and reinforce belief in the benevolence and personal justice of the world. On the other, efforts at the organizational level could focus on creating a "zone of justice" that nurtures belief in personal justice, thereby aiding in the integration of existential experiences and supporting subjective well-being.

The results that clarify the importance of GBJW for maintaining well-being deserve special attention. Unlike all other variables studied, GBJW remained at pre-war levels in 2022. This result can be seen as indirect evidence supporting the notion of an implicit desire to maintain belief in a just world (Hafer & Rubel, 2015), in this case –presumably relying on the expectation that justice will prevail in the future–.

Confrontation with the injustice of war does not weaken but rather strengthens the hope for the restoration of a just world for all and for future compensation. This shift in the meaning of events towards future global justice facilitates the experience of connection with the world (EF) and supports the belief that the world will be just to the individual (PBJW). Thus, during wartime, the importance of GBJW as a resource for maintaining well-being increases.

Limitations and future research directions

The results described were obtained based on one professional group –employees of IT companies–. Unlike most Ukrainians, this group has a higher income level, is in demand both in Ukraine and abroad, has knowledge of English, and has the ability to work remotely. It is also worth considering the high social capital of IT specialists: they belong to developed networks of professionals where both technical and general topics are discussed. These communities are characterized by a high level of trust, as they inherit a culture of collaboration and mutual assistance in solving technically complex problems. However, it can be assumed that in this social category, subjective well-being decreases due to the inability to respond to the challenges of wartime in the usual way –through the realization of social capital, which can no longer solve global problems–. These characteristics make this group, all other things being equal, less vulnerable to the hardships of wartime. Therefore, it would be incorrect to extrapolate the results regarding the severity of the decline in SWB under the influence of wartime to the entire population of Ukraine.

The described study was conducted eight months after the start of full-scale military actions. During this time, the initial shock subsided, and adaptive forms of response and behavior developed in the changed conditions. The research reflections and conclusions are based on data from two cross-sectional studies and do not allow for capturing the complex dynamics of mental life from the very beginning of the war. However, conducting another cross-sectional study with an interval of more than a year will provide an opportunity to test and refine the models explaining the contribution of BJW and EF to subjective well-being.

From a practical perspective, the study results highlight women over 35 and young men under 35 as particularly vulnerable groups within the IT workforce, indicating that these demographics may require targeted psychological support. When designing organizational support programs, companies should consider tailored interventions that address the specific challenges faced by these groups. For women over 35, support could focus on managing accumulated stress and potential role strain, while programs for younger men might emphasize resilience-building and coping strategies suited to their career stage and life circumstances. Recognizing these distinct needs can help organizations create more effective, inclusive support structures that promote overall mental well-being and resilience among employees.

Conclusions

Out of the four hypotheses of the study, two were partially supported, and two received full support. It was found that only general BJW remained at the same level during the wartime of 2022 as in peacetime 2021, while changes in the other variables indicate a slight but statistically significant weakening of internal resources and a decline in subjective well-being. The war-induced changes in PBJW, EmDisc, and EF, which are related to the age and gender of IT specialists: overall, the most vulnerable groups are women over 35 and younger men. The impact of the war on SWB and the contribution of GBJW to SWB are fully mediated by EF and PBJW. The results of this study can be practically useful in developing targeted psychological support programs for Ukrainian IT specialists facing the hardships of wartime.

Author contributions

Conceptualization: I.K., V.K.
Methodology: I.K.
Data collection: V.K., I.K.
Formal analysis: I.K.
Writing – original draft: I.K., V.K.
Writing – review & editing: I.K., V.K.

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Declaration of interests

The authors declare that there is no conflict of interest.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author.

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Appendix

Table

Descriptive statistics and correlation matrix. Spearman's rho correlation coefficients are calculated based on 2021 data (n = 80, bottom left) and 2022 data (n = 77, top right)

	2021 *N* = 80		2022 *N* = 77						
Variable	Mean	*SD*	Mean	*SD*	PBJW	GBJW	EF	EmDisc	SWL
PBJW	4.36	.87	3.98	.79	1	.38***	.37***	-.45***	.57***
GBJW	3.24	.95	3.46	.91	.31**	1	.29*	-.3**	.28*
EF	3.71	.52	3.5	.62	.44***	.2	1.00	-.74***	.71***
EmDisc	3.41	1.02	3.65	.97	- .38***	-.2	-.85***	1	-.64***
SWL	4.35	1.14	3.98	1.2	.45***	0,32**	.57***	-.63***	1

Note. Correlation coefficients were significant at *$p < .05$, **$p < .01$, ***$p < .001$.