

Association Between the Time Spent on and Sources of the News of Russo-Ukrainian War and Psychological Distress Among Individuals in Poland and Ukraine: The Mediating Effect of Rumination

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Background: The Russo-Ukrainian War has resulted in massive social, economic, and psychological burdens worldwide. This study aimed to investigate the associations between time spent on the war-related news and psychological distress, including depression, anxiety, and post-traumatic stress disorder (PTSD) and the mediating effects of rumination on the associations in people residing in Poland and Ukraine.

Methods: This cross-sectional study recruited 1438 internet users in Poland and Ukraine, and collected data on levels of rumination, psychological distress, and the amount of time spent on and sources of the news of the Russo-Ukrainian War. Structural equation modeling with bootstrapping methods was used to evaluate the mediation effect. Multivariate linear regression was used to identify predictive effect of the source of the war-related news on psychological distress and rumination.

Results: The results showed a mediating effect of rumination on the association between the amount of time spent on the war-related news and psychological distress among participants in Poland ($\beta = 0.16$, $p < 0.001$) and Ukraine ($\beta = 0.15$, $p < 0.001$). Approaching the news from television was associated with rumination ($\beta = 0.607$, $p < 0.001$) and PTSD symptoms in Poland ($\beta = 2.475$, $p = 0.009$), while approaching news from the internet was associated with rumination in Poland ($\beta = 0.616$, $p = 0.001$).

Conclusion: The study identified the mediating effect of rumination and the associations of approaching the war-related news from television and the internet with mental health.

Keywords: Russo-Ukrainian war, rumination, psychological distress, mediation, time spent on the news of war

Introduction

Massive Impacts of the Russo-Ukrainian War on Mental Health

The Russo-Ukrainian War, which began in 2022, has had profound impacts on mental health of people involved in the war. The war has led to numerous deaths, displacement, and trauma, all of which have contributed to a significant burden on the public's mental health. The long-term consequences of war-related trauma on mental health have been well investigated by previous studies.¹ Psychological distress caused by wars can be extensive and result in acute stress reaction and posttraumatic stress disorder (PTSD), dissociative disorders,² anxiety and depressive disorders, behavioral disorders, substance abuse, and prolonged grief disorder.³ The impact of the Russo-Ukrainian War on mental health is already apparent, with 97.8% of Ukrainians reporting mental health deterioration.⁴ Internally displaced persons due to the Russo-Ukrainian War in Ukraine demonstrated a high prevalence of PTSD (32%), depression (22%), and anxiety (17%), highlighting the urgent need for mental health support.⁵ Another study, which included data from soldiers in Ukraine, also showed a heavy impact on mental health, including depression, distress, PTSD, and substance use.⁶ Furthermore, the Russo-Ukrainian War has placed a heavy burden on the mental health systems of not only Ukraine but also other nations.^{7,8} Regarding the multidimensional psychological impacts of the Russo-Ukrainian War, there are still some factors that have not been investigated, such as rumination. Rumination is defined as the recurrent thinking about negative concerns or upsetting experiences.⁹ It has been associated with various mental health problems, including mood disorders, anxiety disorders, and PTSD.¹⁰ Furthermore, evidence suggested that rumination might prolong existing negative thinking or mood, which could exacerbate preexisting mental illness.¹¹ As the conflict continues, those who have been affected by it are likely to continue to experience trauma and psychological distress. Moreover, the ongoing uncertainty and instability of the conflict may contribute to continued mental health problems. Therefore, further investigation of the mental health impact of the war is warranted.

The Role of the War-Related News in Mental Health

Exposure to the war-related news may increase the risk of mental health problems; moreover, media-induced war trauma can be substantially more extensive and multi-dimensional than war trauma experienced in person.¹² Several studies have discussed the psychological burden of the war-related news. For example, a previous study demonstrated the adverse impacts of exposure to war-related media on children's mental health.¹³ Another study that recruited Israeli television viewers showed that increased frequency of viewing the news about the war in Gaza was associated with anxiety, uncontrolled fear, physiological hyperarousal, sleeping difficulties, and fearful thoughts.¹⁴ The etiologies behind the psychological distress related to exposure to the news are complicated. A previous study showed that Israeli ex-prisoners of war who watched coronavirus 2019 disease (COVID-19) related news had higher odds of developing PTSD.¹⁵ It is therefore possible that exposure to disaster-related news can trigger or exacerbate symptoms of PTSD, leading to worsening outcome of mental health. On the other hand, exposure to traumatic images or videos content can lead to an increased psychological burden. Short video exposure regarding the 2021 Henan floods were positively associated with the increased level of anxiety, depression, and PTSD symptoms for those who were not exposed in person.¹⁶ Therefore, it is worthwhile to explore the detailed etiologies of the war-related news and its impact on mental health, such as time spent on the war-related news. In addition, the impacts of various sources of the war-related news on mental health is also uninvestigated. Elevated levels of anxiety related to COVID-19 were reported to be associated with receiving news of COVID-19 from both social and traditional media.¹⁷ However, whether the various sources of the war-related news have different impact on mental health deserves further investigation.

Aim of the Current Study

Although previous studies have explored psychological distress in wartime and its relations with exposure to the war-related news, several critical points remain uninvestigated. First, it is still unclear whether the amount of time spent on the news of the Russo-Ukrainian War was significantly associated with psychological distress in people residing in Ukraine and people of the countries neighboring to Ukraine, for example, Poland. Additionally, whether rumination

mediates the association between time spent on the war-related news and psychological distress is unclear. Second, the impacts of the sources of the news on psychological distress during the Russo-Ukrainian War has not been investigated.

To address these gaps in the literature, we conducted a cross-sectional online survey to explore the multi-dimensional psychological distress among people residing in Poland and Ukraine during the Russo-Ukrainian War. Specifically, our study aimed to explore the association among the amount of time spent on the war-related news, rumination about the Russo-Ukrainian War, and levels of anxiety, depression, stress, and PTSD symptoms. If the above associations were identified to be significant, we further tested the mediating effect of rumination on the association between the amount of time spent on the war-related news and psychological distress. Additionally, we explored the association between various sources of the war-related news and psychological distress and rumination.

Materials and Methods

Participants and Procedures

Data of this study were collected through a cross-sectional online survey conducted from March 8 to April 26, 2022 in Poland, Ukraine, and Taiwan.¹⁸ We recruited participants from the general population residing in Poland, Ukraine, and Taiwan during the initial stage of the Russo-Ukrainian War. However, we only included data from Poland and Ukraine in the current study because that we investigated the impact of rumination for Russo-Ukrainian War. We did not include participants in Taiwan because that they might be physically far away from Russo-Ukrainian War. Severity of rumination for participants in Taiwan may not be pronounced to be analyzed. Details of the recruitment process have been described elsewhere.¹⁸ In brief, we used digital advertisements on social media and Google Forms to host the online questionnaire. The initial page presented the goals, recruitment criteria, procedures of the study, and informed consent. Participants were included if they were 18 years old or above and agreed to participate in the survey. This study complied with the Declaration of Helsinki and was approved by the Institutional Review Board of SWPS University, Poland (WKEB76/03/2022). A total of 1438 participants were included in the current study, with 385 living in Ukraine and 1053 living in Poland. Among them, 323 (22.5%) of participants were males, and 1114 of participants were females. Regarding participants' age, most of them were around 22 to 30 years old ($n = 532$, 37%). The remaining details of demographic characteristics are listed in Table 1.

Table 1 Demographic Characteristics Among Participants in Poland and Ukraine

	Total (n = 1438)	Nationality		P
		Poland (n = 1053)	Ukraine (n = 385)	
Gender, n (%)				0.029^a
Male	323 (22.5)	252 (23.9)	71 (18.4)	
Female	1114 (77.5)	801 (76.1)	313 (81.6)	
Age, n (%)				
12~21 years	378 (26.3)	295 (28)	83 (21.6)	0.014^a
22~30 years	532 (37.0)	451 (42.8)	81 (21)	<0.001^a
31~40 years	235 (16.3)	157 (14.9)	78 (20.3)	0.015^a
41~49 years	177 (12.3)	111 (10.5)	66 (17.1)	0.001^a
50~59 years	65 (4.5)	32 (3)	33 (8.6)	<0.001^a
Above 60 years	51 (3.5)	7 (0.7)	44 (11.4)	<0.001^a
Education, n (%)				
None	0 (0)	0 (0)	0 (0)	—
Primary school	14 (1)	13 (1.2)	1 (0.3)	0.096 ^a
Secondary school (grades 7~9)	17 (1.2)	14 (1.3)	3 (0.8)	0.393 ^a

(Continued)

Table 1 (Continued).

	Total (n = 1438)	Nationality		P
		Poland (n = 1053)	Ukraine (n = 385)	
Secondary school (grades 10~12)	588 (40.9)	516 (49)	72 (18.7)	<0.001^a
College	0 (0)	0 (0)	0 (0)	—
University (bachelor)	346 (24.1)	206 (19.6)	140 (36.4)	<0.001^a
University (master or PhD)	473 (32.9)	304 (28.9)	169 (43.9)	<0.001^a
Employment, n (%)				0.037^a
Jobless	708 (49.2)	536 (50.9)	172 (44.7)	
On job	730 (50.8)	517 (49.1)	213 (55.3)	
Marital status, n (%)				
Single	433 (30.1)	334 (31.7)	99 (25.7)	0.028^a
Married	384 (26.7)	213 (20.2)	171 (44.4)	<0.001^a
Relationship with a significant other	539 (37.5)	461 (43.8)	78 (20.3)	<0.001^a
Divorced/separated	71 (4.9)	41 (3.9)	30 (7.8)	0.003^a
Widowed	11 (0.8)	4 (0.4)	0 (0)	0.006^a
Traumatic history, n (%)				0.228 ^a
No	1065 (74.1)	771 (73.2)	294 (76.4)	
Yes	373 (25.9)	282 (26.8)	91 (23.6)	
History of psychiatry illness, n (%)				0.003^a
No	816 (56.7)	535 (50.8)	281 (73)	
Yes	622 (43.3)	518 (49.2)	104 (27)	
Source of news about war				
Internet, n (%)				<0.001^a
No	313 (21.8)	196 (18.6)	177 (30.4)	
Yes	1125 (78.2)	857 (81.4)	268 (69.6)	
Television, n (%)				0.024^a
No	972 (67.6)	694 (65.9)	278 (72.2)	
Yes	466 (32.4)	359 (34.1)	107 (27.8)	
Radio, n (%)				<0.001^a
No	1235 (85.9)	876 (83.2)	359 (93.2)	
Yes	203 (14.1)	177 (16.8)	26 (6.8)	
Newspapers, n (%)				<0.001^a
No	1362 (94.7)	983 (93.4)	379 (98.4)	
Yes	76 (5.3)	70 (6.6)	6 (1.6)	
Time spent on the war-related news, mean (SD)	2.76 (1.17)	2.49 (0.98)	3.49 (1.32)	<0.001^b
Total DASS scores, mean (SD)	23.98 (13.7)	22.36 (13.74)	28.42 (12.57)	<0.001^b
Total IES-R scores, mean (SD)	36.71 (15.35)	35.01 (15.15)	41.36 (14.94)	<0.001^b
Rumination scores, mean (SD)	13.01 (2.36)	12.87 (2.40)	13.41 (2.23)	<0.001^b

Notes: ^aPearson's χ^2 test; ^bIndependent t test; Bolds: statistical significance.

Abbreviations: SD, standard deviation; DASS, Depression, Anxiety and Stress Scale; IES-R, Impact of Event Scale-Revised.

Measures

Time Spent on and Sources of the News of the Russo-Ukrainian War

We used one question to assess participants' time spent on the news of the Russo-Ukrainian War per day: "What is the average time spent on news related to the war in Ukraine crisis per day?". Participants responded to the question on a 7-point scale, including 1 = zero, 2 = up to one hour, 3 = one to two hours, 4 = three to five hours, 5 = six to eight hours, 6 = eight to ten hours, and 7 = more than ten hours. We also used one question to assess the sources that participants used to the news about war: "What is your preferred source of information about the war in Ukraine? (Multiple choice)". Participants can choose the answers as follows: internet, television, radio, and newspapers.

Rumination About the Russo-Ukrainian War

The questionnaire for assessing the level of rumination about the Russo-Ukrainian War was developed to identify how participants constantly felt regarding the war and estimated the conviction (injustice and insecurity) and emotion (anger and hopelessness) about the war. The four items were as follows: 1) I feel angry about the current war in Ukraine; 2) I feel injustice about the current war in Ukraine; 3) I feel insecure about the current war in Ukraine; and 4) I feel hopeless about the current war in Ukraine. The 4-point Likert scale was applied for each item as follows: 1 (not at all), 2 (rarely), 3 (sometimes), and 4 (nearly all the time). The sum of scores from each item will be analyzed in our study, and higher total scores indicated a greater rumination about the war. The questionnaire had acceptable reliability and construct validity in this study population, which was published previously.¹⁹

21-Item Depression, Anxiety and Stress Scale

To estimate the mood state of the participants in the past week with three dimensions (depression, anxiety, and stress), we used the Depression, Anxiety, and Stress Scale (DASS).²⁰ The DASS consists of 21 items, and each item was graded on a 4-point Likert scale from 1 (Did not apply to me at all) to 4 (Applied to me very much or most of the time). Higher total scores represented higher levels of depression, anxiety, and stress. Total scores of DASS represented for the sum of scores for each item, and we applied it in the further analysis. The DASS is reliable and has been well-validated in previous research.²¹ In addition, the DASS was also validated in our studying population.¹⁸

Impact of Event Scale–Revised

We used the 22-item Impact of Event Scale-Revised (IES-R)^{22,23} to measure the three dimensions of PTSD symptoms, including intrusion, avoidance, and hyperarousal. Participants reported the frequency of symptoms in the past week on a 5-point Likert scale ranging from 0 (not at all) to 4 (extremely). The sum of scores for each item formulate the total scores of IES-R, and higher total scores indicated higher levels of PTSD symptoms during the investigation period. The IES-R has been reported to have good reliability and validity in previous literature.^{24,25} Similar to DASS, the IES-R was also validated in our survey¹⁸.

Demographic Information

We collected the demographic information for all participants, including the participants' gender, age, educational level, employment status (employed or unemployed), marital status, and psychological traumatic history (yes or no).

Statistical Analysis

Descriptive analyses were conducted to summarize the demographic variables and each scale of the questionnaires. Independent t-tests and χ^2 tests were used to compare differences in continuous and categorical variables between participants living in Poland and Ukraine. A hypothesized model was developed to test the mediating effect of rumination on the association between time spent on the war-related news and psychological distress (Figure 1). Pearson correlation

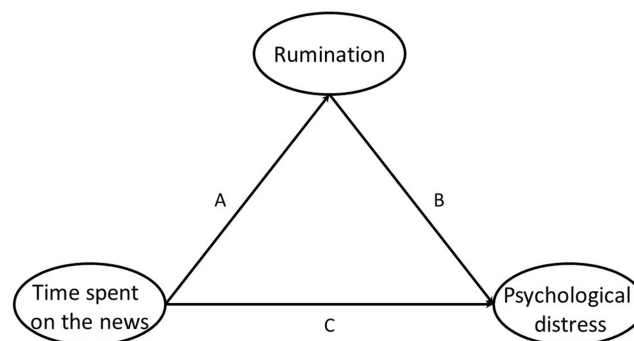


Figure 1 The conceptual model of mediating effect.

analysis was used to preliminarily examine the model of relations between measured variables, including time spent on the war-related news, the total scores of ruminations, the DASS, and the IES-R.

Two steps of structural equation modeling (SEM) were used in this study. First, confirmatory factor analysis was applied to verify the relations between latent variables and their indicators. The scores of DASS and IES-R served as indicators of the latent variable (psychological distress). Second, path analysis with maximum likelihood parameter estimation was applied to estimate the model adequacy and the mediating effect of rumination on the association between time spent on the war-related news and psychological distress.²⁶ Standardized estimates (β) were reported for the associative strength in the model. The bootstrapping method with 5000 samples was applied to calculate the 95% confidence intervals (CI) for β coefficients. A 95% CI of the coefficient that did not contain the null value (ie, 0) suggested that the estimated coefficient was statistically significant. The goodness of fit of each model was assessed by multiple indices, including the Comparative Fit Index ($CFI \geq 0.95$), Incremental Fit Index ($IFI \geq 0.95$), Tucker-Lewis Index ($TLI \geq 0.95$), Goodness of Fit Index ($GFI \geq 0.9$), Adjusted Goodness of Fit Index ($AGFI \geq 0.8$), Normed Fit Index ($NFI \geq 0.95$), Root-mean Square Error of Approximation ($RMSEA < 0.08$), and Standardized Root Mean Square Residual ($SRMR \leq 0.05$).^{26–29}

Additionally, we estimated the associations of the source of the war-related news with psychological distress and rumination. Multivariate linear regression was used to identify the predictive effects of source of the war-related news on the regression coefficients (β) for the psychological distress (scores of DASS and IES-R) and rumination. The β coefficients was adjusted for gender, age, educational level, marital status, employment status, history of psychiatry illness and history of traumatic events. To enter the analysis as a covariate, marital status was transformed into a dichotomous variable (0 = with partner, 1 = without partner). In addition, educational level and age were also transformed into continuous variables (educational level: 0 = none, 1 = primary school, 2 = secondary school as grades seven to nine, 3 = secondary school as grades ten to twelve, 4 = university, 5 = master or doctorate; age: 1 = 12–21 years, 2 = 22–30 years, 3 = 31–40 years, 4 = 41–49 years, 5 = 50–59 years, 6 = Above 60 years). When the 95% percentile confidence interval of a regression coefficient does not contain the null value (ie, 0), suggesting the variable is statistically significant. All tests were 2-tailed, and statistical significance was set at $P < 0.05$. All data were processed using SPSS version 23.0 for Windows (SPSS Inc., Chicago, IL).

Results

Descriptive Statistics and Comparisons of Time Spent on and Sources of the News, Psychological Distress and Rumination Between Participants Living in Poland and Ukraine

Compared to the participants in Poland, more of those in Ukraine were female (81.6% vs 76.1%, $p = 0.029$) and employed (55.3% vs 49.1%, $p = 0.037$). Regarding the sources of the war-related news, participants in Poland were more likely to use the internet (81.4% vs 69.6%, $p < 0.001$) and television (34.1% vs 27.8%, $p = 0.024$) to approach the news than those in Ukraine. In addition, participants in Ukraine spent more time on the war-related news (3.49 vs 2.49, $p < 0.001$) and had higher DASS (28.42 vs 22.36, $p < 0.001$), IES-R (41.36 vs 35.01, $p < 0.001$) and rumination (13.41 vs 12.87, $p < 0.001$) scores than those in Poland (Table 1).

Tests for the Mediation Model and Estimated Co-Efficient Paths

The correlation matrix indicated that all observed variables were significantly associated with each other (Table 2), demonstrating the adequacy of further path analysis.

Table 3 shows a significant association between time spent on the news and psychological distress via rumination among participants in Poland ($\beta = 0.16$, S.E. = 0.019, 95% CI = 0.13 to 0.191, $p < 0.001$), based on the product terms of the path from time spent on the news to rumination ($\beta = 0.261$, $p < 0.001$) and the path from rumination to psychological distress ($\beta = 0.612$, $p < 0.001$). These results confirm the mediating effect of rumination on the association between time spent on news of war and psychological distress. The SEM tested the mediation model, with estimated coefficient paths illustrated in Figure 2. Based on the model fit index, we found that the hypothesized

Table 2 The Correlation Matrix of Observation Variables Among Participants in Poland and Ukraine

Variables (Poland)	1	2	3	4
1. Time spent on the war-related news	-	0.261**	0.218**	0.209**
2. Rumination scores		-	0.416**	0.627**
3. Total DASS scores			-	0.679**
4. Total IES-R scores				-
Variables (Ukraine)	1	2	3	4
1. Time spent on the war-related news	-	0.301**	0.293**	0.331**
2. Rumination scores		-	0.474**	0.518**
3. Total DASS scores			-	0.781**
4. Total IES-R scores				-

Note: ** $P < 0.001$.**Abbreviations:** DASS, Depression, Anxiety and Stress Scale; IES-R, Impact of Event Scale-Revised.**Table 3** The Mediated Effect of Rumination on the Association Between Time Spent on the War-Related News and Psychological Distress Among Participants in Poland

Outcome variable: Rumination					
Predictors	β	SE	p	LLCI	ULCI
Time spent on the war-related news	0.261	0.029	<0.001	0.214	0.308
Outcome variable: Psychological distress					
Predictors	β	SE	p	LLCI	ULCI
Rumination	0.612	0.022	<0.001	0.576	0.648
Time spent on the war-related news	0.047	0.03	0.113	-0.002	0.098
Mediation of rumination					
Predictors ^a	β	SE	p	LLCI	ULCI
Time spent on the war-related news	0.160	0.019	<0.001	0.130	0.191

Note: ^aMediated by rumination to predict psychological distress.**Abbreviations:** LLCI, lower limit of bootstrapping 95% confidence interval; ULCI, upper limit of bootstrapping 95% confidence interval; β , standardized regression coefficient; SE, standard error.

model had an adequate fit for GFI (0.994), AGFI (0.938), IFI (0.99), CFI (0.99), TLI (0.942), NFI (0.99), RMSEA (0.095), and SRMR (0.0246).

Table 4 shows that among participants in Ukraine, in addition to the directly significant association between time spent on the news and psychological distress, time spent on the news was significantly associated with psychological distress via rumination ($\beta = 0.15$, S.E. = 0.027, 95% CI = 0.108 to 0.195, $p < 0.001$), based on the product terms of the path from time spent on the news to rumination ($\beta = 0.301$, $p = 0.001$) and the path from rumination to psychological distress ($\beta = 0.498$, $p < 0.001$). This demonstrates a mediating effect of rumination. The hypothesized model had an adequate fit for GFI (0.999), AGFI (0.995), IFI (0.998), CFI (0.999), TLI (0.998), NFI (0.996), RMSEA (0.0003), and SRMR (0.002).

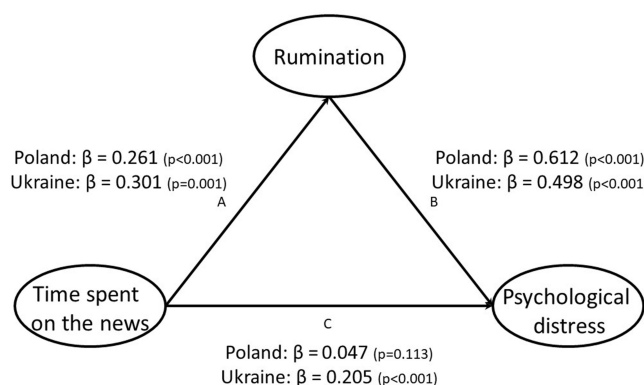


Figure 2 Final model of mediating effect.

Association Between Source of the War-Related News and Psychological Distress

The results of linear regression showed that in people residing in Poland participants, approaching the war-related news from the internet was significantly associated with rumination ($\beta = 0.616$; 95% CI = 0.27 to 0.96; $p = 0.001$). Additionally, approaching the news from television was significantly associated with higher scores of IES-R ($\beta = 2.475$; 95% CI = 0.62 to 4.33; $p = 0.009$) and rumination ($\beta = 0.607$; 95% CI = 0.32 to 0.89; $p < 0.001$). In Ukraine, a trend of association between approaching the news from the internet and higher scores of IES-R was found, but it was not statistically significant ($\beta = 2.772$; 95% CI = -0.38 to 5.92; $p = 0.074$) (Table 5). Moreover, the variance inflation factor (VIF) was applied to estimate the multicollinearity among all sources of information. The VIF for participants in Poland were 1.001 (internet), 1.003 (television), 1.049 (radio), and 1.024 (newspaper), respectively. The VIF for participants in Ukraine were 1.003 (internet), 1.081 (television), 1.100 (radio), and 1.021 (newspaper), respectively. All of value for VIF were less than 5, indicating less trend of multicollinearity.³⁰ The remaining details of collinearity diagnostics were listed in the [Supplementary Table 1](#).

Table 4 The Mediated Effect of Rumination on the Association Between Time Spent on the War-Related News and Psychological Distress Among Participants in Ukraine

Outcome variable: Rumination					
Predictors	β	SE	p	LLCI	ULCI
Time spent on the war-related news	0.301	0.046	0.001	0.218	0.368
Outcome variable: Psychological distress					
Predictors	β	SE	p	LLCI	ULCI
Rumination	0.498	0.047	<0.001	0.417	0.571
Time spent on the war-related news	0.205	0.052	<0.001	0.117	0.289
Mediation of rumination					
Predictors ^a	β	SE	p	LLCI	ULCI
Time spent on the war-related news	0.150	0.027	<0.001	0.108	0.195

Note: ^aMediated by rumination to predict psychological distress.

Abbreviations: LLCI, lower limit of bootstrapping 95% confidence interval; ULCI, upper limit of bootstrapping 95% confidence interval; β , standardized regression coefficient; SE, standard error.

Table 5 Associations of Source of the War-Related News with Rumination and Psychological Distress: Multivariate Linear Regression with Multiple Adjustment ^a

Participants in Poland	β	t	95% CI	p
DASS				
Internet	0.989	0.915	-1.13, 3.11	0.361
Television	0.311	0.349	-1.44, 2.06	0.727
Radio	-1.499	-1.329	-3.71, 0.71	0.184
Newspaper	1.239	0.734	-2.08, 4.55	0.463
IES-R				
Internet	0.811	0.705	-1.44, 3.07	0.481
Television	2.475	2.618	0.62, 4.33	0.009
Radio	0.776	0.647	-1.58, 3.13	0.518
Newspaper	2.571	1.434	-0.95, 6.09	0.152
Rumination				
Internet	0.616	3.480	0.27, 0.96	0.001
Television	0.607	4.165	0.32, 0.89	<0.001
Radio	0.189	1.020	-0.18, 0.55	0.308
Newspaper	0.248	0.891	-0.3, 0.79	0.373
Participants in Ukraine	β	t	95% CI	p
DASS				
Internet	1.223	0.907	-1.43, 3.87	0.365
Television	-1.203	-0.866	-3.93, 1.53	0.387
Radio	0.593	0.238	-4.30, 5.49	0.812
Newspaper	-3.634	-0.725	-13.49, 6.22	0.469
IES-R				
Internet	2.772	1.732	-0.38, 5.92	0.074
Television	-0.600	-0.363	-3.85, 2.65	0.717
Radio	-1.275	-0.430	-7.1, 4.55	0.667
Newspaper	-0.855	-0.143	-12.59, 10.89	0.886
Rumination				
Internet	0.217	0.916	-0.25, 0.68	0.360
Television	-0.263	-1.081	-0.74, 0.22	0.281
Radio	-0.363	-0.832	-1.22, 0.50	0.406
Newspaper	-0.474	-0.539	-2.21, 1.26	0.590

Notes: ^aAdjusted to gender, age, educational level, marital status, employment status, history of psychiatric illness, and history of traumatic events; Bolds: statistical significance.

Abbreviation: CI, Confidence interval.

Discussion

Mediating Effect of Rumination

The difference between people residing in Poland and Ukraine may be explained by the physical or psychological distance from the war. Moreover, we confirmed the significant associations between time spent on the war-related news and psychological distress, including depression, anxiety, and PTSD symptoms. Evidence suggests that increased time spent on social media is linked to adverse effects on mental health. For adolescents, increased time on social media is associated with worse mental health, including depression, anxiety, distress, inattention, and sleep problems.³¹ Other studies also confirmed the link between time spent on social media and anxiety as well as depression.³² In terms of the impact of the news about disasters, increased time spent on the news of COVID-19 was significantly associated with increased mental distress.³³ Our findings further extend the association to the war disasters, demonstrating an association between time spent on the war-related news and psychological distress.

Furthermore, we identified the mediating effect of rumination on the association between time spent on the war-related news and psychological distress. Although the clinical implication of rumination was reviewed,^{9–11} studies that examining the influences of time spent on the news or social media and rumination simultaneously on mental health are insufficient. Previous research showed that more frequent social media use to follow COVID-related news and posts was associated with symptoms of PTSD and was correlated with higher levels of rumination.³⁴ This evidence echoes our findings on the association between time spent on the war-related news and rumination. Together, we identified the mediating effect of rumination on the association between time spent on the war-related news and psychological distress, which requires further investigation to explore its underlying causes.

Source of the War-Related News, Psychological Distress, and Rumination

We found that receiving the war-related news from television was significantly associated with higher levels of rumination and PTSD symptoms among participants in Poland. Previous research has reported that elevated levels of worry and anxiety related to COVID-19 were associated with watching news of COVID-19 from traditional media, including television.¹⁷ However, we only found the significant associations of levels of rumination and PTSD symptoms with approaching the war-related news from television but not with newspapers or radios. It is possible that television provides vivid images or videos of traumatic events of war, which may have a greater impact on mental health than newspapers and radios. Additionally, the association between approaching the war-related news from television and psychological distress was not statistically significant among participants in Ukraine. Participants in Ukraine might receive the information regarding the Russo-Ukrainian War by multiple ways such as witnessing military medical mobilization, deaths and the destruction of property and receiving the information of the war from the friends and relatives living in the war zones or migratory refugees. The war-related news approached from television might have less impacts on psychological states for people residing in Poland and Ukraine.

We also found that receiving the war-related news from the internet was significantly associated with rumination for participants in Poland, and there was an insignificant trend between receiving the news from internet and PTSD symptoms among participants in Ukraine. Increased worry and anxiety related to COVID-19 were also associated with obtaining information about COVID-19 from the internet.¹⁷ Moreover, another study revealed that trusting the information of COVID-19 obtained from social media may exacerbate poor mental health, while trusting the information of COVID-19 obtained from traditional media may have stress-buffering effects.³⁵ Our results are consistent with these findings of previous studies, demonstrating the association between approaching the war-related news from the internet and rumination or PTSD symptoms. Like television, the internet provides information with images or videos of war, which may have a greater impact on mental health compared to the news from radio or newspaper. However, further research is needed to clarify the etiologies of the different sources of the war-related news and their impacts on mental health.

Limitations

We acknowledge several limitations of this study. First, although online surveys are a useful method for targeting participants during an emergency crisis, there is a possibility of selection bias because that internet users may not be representative of the population. Second, the cross-sectional design of this study limited our ability to identify the temporal relationships among the variable examined within the mediation model. Third, we only assessed source of information for Russo-Ukrainian War with internet, television, radio, and newspaper. Other potential sources of information might not be identified, such as personal phone calls, emails, and in person communications with others. Finally, the measurement of rumination about the Russo-Ukrainian War would have benefitted from additional dimensions of assessment to further extend the implications of our findings.

Conclusions

This study found that rumination mediated the association between time spent on the news of the Russo-Ukrainian War and psychological distress, including depression, anxiety, and PTSD symptoms, for participants in Poland and Ukraine. Additionally, watching the war-related news on television was associated with PTSD symptoms and rumination among participants in Poland, while approaching the war-related news from the internet was significantly

associated with rumination for participants in Poland. Early intervention for rumination, anxiety, depression, and PTSD symptoms is crucial for individuals experiencing the heavy burden of war, such as cognitive restructuring, imaginal exposure, and trauma-focused therapy.³⁶ Given the significant association between watching the news of war and multiple psychological distresses, authorities should consider implementing appropriate policies for media reporting on wars. Further research is necessary to understand the underlying causes and effects of media reporting on crises such as war.

Data Sharing Statement

Due to the nature of this research, the participants did not agree for their data to be shared publicly, so supporting data are not available.

Informed Consent

Informed consent was obtained from all participants included in this study.

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