War and Subjective Wellbeing: An Analysis of WWII and the Ukraine-Russia War

by

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Abstract

War dismantles the lives of civilians across the world. The psychological effects can be expansive and the influence that these events have on life satisfaction carry across time (Kijewski, 2020) and direct impact (Veronese and Pepe, 2020). The existing literature analyses the influence of war on life satisfaction, utilizing both country-level and individual-level survey data (see Coupe and Obrizan, 2023 for a summary of this literature). In this thesis, I will contribute to this literature through a replication of the works of Kijewski (2020) and Djankov et al. (2016), who investigate the influence of WWII experience on happiness. Despite these studies using a similar methodology and a shared dataset, they come to opposing conclusions. Replication of these studies allows a comparison of their findings to explore the factors influencing the different conclusions. This thesis builds on this by using a more recent survey conducted in 2022 by the European Commission to analyze the impact of the ongoing war between Russia and Ukraine on life satisfaction in Europe. This model adds a temporal and geographical dimension, revealing the indirect effects that the more current war has inflicted on the happiness of individuals residing outside the conflict zone. The results of these studies underscore the sensitivity of conclusions to specific methodological choices, primarily variable specification, and inclusion criteria. In general, this study challenges the notion that experience with war, whether it be 60 years ago or ongoing, has a true and significant impact on the wellbeing of European citizens.

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1 Introduction

There are many 'objective' ways to measure the impacts of a war and conflict such as the cost of damaged infrastructure, military spending, declining public health, or the number of victims injured or killed. This allows the broad, objective impact of war to be understood. For example, Stiglitz and Blimes (2012) estimated the monetary and macroeconomic costs of the Iraq and Afghanistan wars. Viscusi (2019) used statistical measurements of the value of injury and a life to estimate the impact of health losses from wars in countries such as Iraq, Vietnam, and Afghanistan. Arunatilake et al. (2001) discussed the direct costs of military and other government expenditure and the indirect costs of lost earnings from the ethnic conflict in Sri Lanka. All these impacts are objective and create a tangible idea of the devastation that wars produce.

Although these objective costs are important to understand, it is just as important to delve into the interplay between subjective wellbeing (happiness, life satisfaction)[1] and war. The social costs of war from death, displacement, disability, and psychological effects offer a broader perspective on the repercussions of war.

Relatively little is known about how war impacts an individual's wellbeing. Frey (2011) found little evidence on the topic as historically few surveys that included questions on subjective well-being also included war-related questions. Researchers are hindered by this unavailability of individual survey data. This is now improving, however, as many war-affected countries are beginning to employ regular surveys that include questions on both happiness and war. The ease of deploying these surveys is improving through digital technology and the compilation of and access to this data is becoming increasingly straightforward (Coupe & Obrizan, 2023). Since Frey (2011), the literature exploring the relationship between war and happiness has developed both in quantity and in range, largely due to the number of now-available large-

[1] Subjective well-being is the scientific term in psychology for an individual's evaluation of her experienced positive and negative affect, happiness, or satisfaction with life. They are separable constructs, and the precise terminology will be used whenever empirical research is cited. In accordance with the literature, happiness, subjective well-being, and life satisfaction are used interchangeably throughout this paper unless stated otherwise.

scale individual surveys from around the world that include questions about both life satisfaction and conflicts, such as the Gallup World Poll or the Eurobarometer survey.

There are three recent articles that analyze the relationship between war and life satisfaction. Kijewski (2020) uses data from the 2010 Life in Transition II survey, a survey with respondents from 34 countries to study how life satisfaction is impacted by being injured or having parents or grandparents injured or killed during the Second World War (WWII), 60 years after the war itself occurred. Using the same dataset, Djankov, Nikolova and Zilinsky (2016) analyze the impact of corruption on life satisfaction and include data about WWII as a control variable. Kijewski (2020) finds a significant effect of WWII experience on happiness, while Djankov et al. (2016) find an insignificant effect. Obrizan (2019) uses the 2016 Life in Transition III survey and looks at the impact of more recent country wars on life satisfaction. He finds that the probability of happiness is reduced when a respondent has direct experience with these recent wars. Note that Obrizan (2019) does not include a WWII variable in his regressions, while Kijewski (2020) and Djankov et al. (2016) do not include direct experience with recent wars.

These three studies require closer examination to see exactly where the differences in their conclusions come from, and if changing the specifications of their regression analysis will affect their conclusions. As part of this thesis, I will therefore attempt to replicate these three studies.

Replication is important as it provides a pathway to breaking down the elements of a statistical analysis to facilitate a thorough examination of the regression process (Duvendack, Palmer-Jones and Reed, 2017; Burman, Reed and Alm, 2010). When studies use the same datasets and similar analysis but come to different conclusions, replications can be undertaken to investigate the drivers of the contrasting conclusions, allowing the settlement of the scientific debate about the analysis in question. This stands as my first contribution to the literature of the impact of war on happiness. The three studies I replicate focus on the impact of direct experience with past wars on life satisfaction. To contrast with the direct long-term effects analyzed in these studies, my thesis will also look at the impact of the current Ukraine war on the happiness in countries that are not directly impacted by the war.

There are a few studies that have covered the impact that the Ukraine war has had on happiness in Ukraine itself. For example, Coupe and Obrizan (2016) examined the effects of the war on the happiness of Ukrainian civilians over time. Perelli-Harris et al. (2022) analyzed the gap between the subjective wellbeing of those who were internally displaced by the war in Ukraine and the residents of areas where the displaced people resettled. Gokmen and Yakovlev (2018) assessed the effect of the Ukraine-Russian conflict on the wellbeing of minorities in Russia, finding it to have a negative and significant effect on the happiness of Ukrainians living in Russia.

As far as I know, no paper has yet estimated the impact of the war in Ukraine on other countries in Europe. Europeans have had ample exposure to the war in Ukraine. The war has dominated press headlines for months, millions of Ukrainian refugees have moved all around Europe, people have grappled with fear about the war spreading, and European economies have been greatly impacted by the conflict. Studying how these more indirect effects have influenced happiness in Europe will be my second contribution to the literature on the impact of war on happiness.

The rest of the thesis is structured as follows. Section 2 discusses the literature on replication and on the impact of war and happiness. Section 3 introduces the methodology and datasets to be used and Section 4 outlines the results of the replication analysis. Section 5 discusses these results. Section 6 sets out the background and literature of the Ukraine-Russia war while Section 7 states the datasets and methodologies used in this section. Section 8 lays out the results and Section 9 discusses these results. Section 10 concludes.

2 Literature Review

2.1 General War and Happiness Literature

This section draws from an existing literature review conducted recently by Coupe and Obrizan (2023).

War can be defined in many ways and is often subjective in definition. There are several ways to estimate the overall impact of war on happiness using information such as military spending (Zhang et al., 2015), GDP fluctuations (Clark and Senik, 2011), or the number of casualties (Viscusi, 2019). Our definition of war will focus on civil wars and wars between countries, conflicts that are of a relatively long length of time and large-scale.

Turning to the other side of the coin, the causes and nature of happiness have been studied for centuries. Researchers from a vast range of disciplines have been attracted to this area of research with over 80,000 articles published over the past 30 years on happiness (Stavrova, 2019). Easterlin (1974) pioneered this topic within economics, and interest in the measurement and analysis of happiness has since gained traction. Frey and Stutzer (2002) stressed that happiness is an important consideration for economists as it plays a role in so many areas of society from formulating policy to understanding institutional conditions.

Happiness is a difficult concept to define and there is consequently large variation in how it is currently defined, captured, and used. For example, neuroscientists use brain scans and blood samples (Luo et al., 2015), psychologists use facial recognition and body language observations (Gunes and Piccardi, 2007). Jim Allen, author and associate professor at State University of New York, describes happiness as involving "doing some kind of cognitive evaluation of how well your life is going broadly, as opposed to an emotional feeling at the present moment" (Patenaude, 2018). Some economists focus on indicators such as the ratio of frequent positive affect to infrequent negative affect (Lyubomirsky, Sheldon and Schkade, 2005), average country happiness (Veenhoven, 2012), and some take data about how people spend their time and experience their lives and rate these experiences[2] (Kahneman et al., 2004). In contrast to Matanov and Giacco et al. (2013) who focus on specific domains of life, this paper will measure self-reported life satisfaction. The measurement methods utilized in this study draw inspiration from existing literature. Because happiness is a conscious state of mind, it can be measured by surveys, an increasingly common practice in the literature (Spruk & Kešeljević, 2016). For instance, Coupe and Obrizan (2023) make use of a survey that asks

[2] This study takes life experiences and the mean ratings of the following affect descriptors for each experience: positive, negative, competent, impatient, and tired.

respondents whether they consider themselves a happy person. Gokmen and Yakovlev (2018) use the question 'To what extent are you satisfied with your life in general at the present time?' on a 1 to 5 scale. The survey question 'All things considered, how satisfied are you with your life as a whole these days?' is measured on a 10-point scale and used by Guriev and Zhuravskaya (2009).

There are a number of reasons why happiness research is essential. Hayo and Seifert (2003) explain that wellbeing is often a key target of economic policy and the happiness of individuals in a country largely influences their support for market economy and democracy. It is also important to understand the relationship between subjective and objective indicators of well-being, of which economists have historically only used objective measures. Academics have determined that although happiness is said to be a subjective experience, it can be measured objectively (Helliwell, 2012; Veenhoven, 1991, 2001). This recognition sets the precedent for self-reported happiness to be used as a direct measure of utility. In classical economic theory, individuals are assumed to be rational by constantly striving to maximize their expected utility[3] (Gunby and Coupe, 2023). While directly measuring utility poses challenges, researchers have shown that related measurable factors can effectively serve as proxies for utility. Absolute income was often used but has since been criticized for being too narrow and ignoring important wellbeing factors. Clark et al. (2008) provides confirmation that this self-reported subjective wellbeing is a reliable and valid direct measure of utility at an individual level.

While both the general concepts of war and happiness present a rich and expansive literature, their intersection proves more limited in scope. Welsch (2008) is one of the first empirical studies to argue that the social costs of war can range from mental anguish to empathy for survivors. He analyzed utility through both income and self-reported subjective wellbeing metrics to find that the number of conflict victims and the change in this number over time have significant impact on wellbeing. Spruk & Kešeljević (2016) find "large and significant

[3] Utility is often defined in economics as the total satisfaction or benefit derived from consuming a good or service. Rational choice theory outlines that people strive to maximise this utility throughout their life via the choices they make. See https://www.investopedia.com/terms/u/utility.asp#:~:text=In%20economics%2C%20utility%20is%20a,strive%20to%20maximize%20their%20utility for more information.

detrimental effects of domestic conflict on subjective well-being" from the individuals that experienced civil conflict from the 139 countries in the study[4]. Romanov et al. (2012) focused on Intifada, the Palestine-Israel conflict of 2000, assessing the impact of Palestine's terrorism on Israeli happiness. They argued that terrorism can have both direct and indirect effects on happiness, challenging the conventional belief that terrorism demoralizes a population as they find high levels of life satisfaction in cities that suffer more from terrorism. In the aftermath of this conflict, Van Praag et al. (2010) investigated the Second Lebanon war's impact on life satisfaction, income, and war experience in both Jewish and Arab populations in Israel. Their findings revealed a positive impact on Arabs, diminishing during the hostilities, while the Jewish population experienced minimal effects during the war, but a temporary positive influence afterward. Van Praag et al. (2010) also highlighted the expectation that individual's life satisfaction during a conflict will depend largely on the level of personal risk associated with living in a conflict zone. Morina et al. (2018) explored the impact of war exposure on civilians' physical health through trauma response and somatic symptoms, while Lai & Thyne (2007) examined social wellbeing and stability, specifically investigating shifts in education levels resulting from civil war experience.

These studies find a large range of conclusions from different regression models, data sources, and statistical methods. One way to understand what drives the substantial variation in these conclusions is doing a replication of such studies.

2.2 Replication

Replication is often defined as the process of repeating a study's procedure and observing if the prior result is found when tested again (Nosek and Errington, 2020). To test these prior results, various procedures, methods, and protocols are followed to ensure that the outcomes of the repeated experiments are reasonably comparable. Controversy and debate about the definition of replication has resulted in a distinction being drawn between direct and conceptual replication (Porte, 2013). Direct, or approximate, replication involves repeating the original study closely in most respects and introducing one or more changes in the variables to gain a new finding, all whilst maintaining comparative power between the two studies. This

[4] The Conflict Encyclopedia was used to construct this civil war experience variable, based on Uppsala Conflict Data Program. See Spruk & Kešeljević (2016) for more information.

is the replication style I will be using in this thesis. Conceptual replication concerns the researcher intending to check a certain outcome in the study's findings, while not necessarily using the original experiment's exact method, protocol, or procedures. In addition, Nosek and Errington (2020) suggest that replication needs only two things to be true: that outcomes consistent with a prior claim increase confidence in the claim, and outcomes inconsistent with a prior claim decrease confidence in the claim.

Academics are becoming increasingly concerned about the prevailing replication crisis that is evident across the scholarly literature. A 2016 survey by Nature revealed that more than 70% of researchers have tried and failed to reproduce another scientist's experiments, 52% of researchers agreeing that there is a significant 'crisis' of reproducibility (Baker, 2016). This crisis has prompted various hypotheses from academics across diverse literature to explain its origins. Some researchers have found that reproducibility success is prevented by problematic methodologies and unrealistic assumptions (Fabrigar et al., 2020), while other scholars advocate for a radical overhaul of outdated replication practices. A commonly agreed-upon cause of this crisis stems from inadequate incentive structures, contributing to biases in the publication of scientific results (Page, Noussair and Slonim, 2021). Höffler (2017) highlights the issue that only a few journals currently enforce their policies in a way that encourages replication studies, proposing potential improvement through initiatives like the Peer Reviewers' Openness Initiative[5]. Duvendack et al. (2017) identify four common reasons why this crisis persists: hypothesizing after results are known, 'p-hacking', data error or fraud, and publication bias. They underscore the reluctance of the field of economics to embrace replication, contributing to a lag in its adoption compared to other research areas.

I use replication in this thesis, taking similar studies that come to different conclusions and reproducing them to scrutinize the process that each author chose to use. This helps to analyze how results were found by applying independent changes to the replication process.

Replication studies often incite a wider discussion about the drivers of statistical findings and how specificities can influence overall results. Researchers have a degree of flexibility when

[5] Peer Reviewers' Openness Initiative. 2017. See https://www.opennessinitiative.org/ for more information.

making decisions about their statistical process, and comparing these choices can develop insights into why outcomes may be different when applied. A body of literature is dedicated to studying the decision pathways of multiple researchers when tasked with using a dataset to arrive at a conclusion, often called 'many analysts' research. I use these concepts and apply them when comparing the processes of the authors I replicate the studies of.

2.3 Many Analysts

When researchers first enter their data analysis stage, they are faced with choices to make about their process. The specific combination of these choices leads to a result that may not be the same as if another pathway was followed. Aschwanden, King, and Method (2015) discuss that these choices can range from the number of observations to include, to deciding which factors to control for. These decisions are made routinely and are sometimes unreported[6]. Because there is no one correct or defined way to proceed, this creates an increasing problem of transparency and replication success.

This set of decisions is commonly named 'researcher degrees of freedom'[7]. This body of literature focuses on studying variation in the hundreds of decisions made in the process of analysis to see how much these change the existing scientific consensus. Huntington-Klein et al. (2021) take a 'many analysts' approach, taking multiple researchers with the same dataset and tasking them with answering the same research question. Fourteen replications were undertaken without the sharing of methodologies, all leading to "starkly different conclusions". Similarly, using the same dataset and research question, Silberzahn et al. (2018) gathered 29 teams of 61 analysts to study whether soccer referees are more likely to give red cards to dark-skin-toned compared to light-skin-toned players. Whilst more open discussion was employed in this study, the teams presented different results[8] due to the variation in the choice of covariates and statistical models. This prompted much discourse between teams as

[6] This is somewhat inevitable as authors often face length limitations for their papers, so a full and explicit explanation of these choices could be unfeasible even if replication code is available. See Huntington-Klein et al. (2021) for more information.

[7] This concept refers to the flexibility often inherent in the scientific process, from hypothesis generation, designing and conducting a research study to processing the data and analysing as well as interpreting and reporting results. Due to a lack of precisely defined theories and/or empirical evidence, multiple decisions are often equally justifiable. See https://forrt.org/glossary/researcher-degrees-of-freedom/ for more information.

[8] 69% of teams found a significant positive relationship $p < 0.05$, and 31% of teams found a nonsignificant relationship. No team reported a significant negative relationship.

they shared each of their decisions. There are many other studies that have used this 'many analysts' approach that reveal that analytic choices can indeed influence the outcome of a study (see Hoogeveen et al. (2022); Breznau et al. (2022); Azcel et al. (2021); Dutilh et al. (2019); Schweinsberg et al. (2021); Bastiaansen et al. (2020); van Dongen et al. (2019); Landy (2020)).

In this thesis, I effectively conduct a 'real-life' many analysts' project: the three studies I replicate here all used the same data source to study how wars affect happiness. I will then investigate how the different choices by the authors lead to vastly different conclusions.

3 Data and Methodology

3.1 Data

The Life in Transition Survey (LiTS) is a nationally representative survey conducted by the European Bank for Reconstruction and Development and the World Bank in 2006, 2010 and 2016 focusing on post-communist countries. For my analysis, I use the second wave of the survey, the 2010 Life in Transition II which collected data from 39,000 households in thirty-five countries. For comparison purposes, this survey wave included five western European countries (France, Germany, Italy, Sweden, United Kingdom) and Turkey. The data collection process involved a two-step random selection approach. The first step included the random selection of households, followed by a second step of random selection within those households.

3.2 Methodology

Table 3 outlines the methods and variables used in the regressions of Kijewski (2020) and Djankov et al. (2016).

Due to the multi-level structure of the data, Kijewski (2020) uses a Mixed-Effects Multilevel regression model with Random Intercepts for her analysis[9]. Djankov et al. (2016), in contrast,

[9] This method was chosen with the intention of accounting for within-country correlations and ensuring that the variance in the dependent variable caused by the country and individual level can be separated.

choose to use OLS supplemented with survey weights to ensure the data is representative at the country level.

The dependent variable is a commonly used indicator of subjective well-being, a variable illustrating overall satisfaction with life. Kijewski (2020) derives life satisfaction from the 2010 LiTSII survey question: 'All things considered, how satisfied or dissatisfied are you with your life as a whole these days?' with answers on a scale from 1 to 10, a continuous variable where '1' is completely dissatisfied and '10' is completely satisfied. Djankov et al. (2016) use the question 'All things considered, I am satisfied with my life now' with a scale from 1 (strongly disagree) to 5 (strongly agree). These were both re-coded into a binary variable, those responding 'strongly agree' or 'agree' into '1' as satisfied and all other answers into '0' as dissatisfied.

War experience is the primary variable of interest in this analysis. For this variable, Kijewski (2020) chose the question: 'Were you, your parents or any of your grandparents physically injured or killed during the Second World War?' which takes on the value of '1' if true, and '0' otherwise[10]. Djankov et al. (2016) decided to use the questions: 'Were you, your parents or any of your grandparents physically injured or killed during the Second World War?' and 'Did you, your parents or any of your grandparents have to move as a result of the Second World War?' where they assigned a value of '1' if the individual answered 'yes' to either of them, and '0' otherwise.

In addition to these primary independent variables, the authors' regressions contain several control variables. First are the variables commonly related to life satisfaction. Across the literature, age is found to have a u-shaped relationship with life satisfaction[11], so Kijewski

[10] Kijewski notes that this question is broad due to its inability to separate personal experiences and the experiences of parents or grandparents. Kijewski also determines that the cross-sectional data runs the risk of misinterpreting correlation for causation. To alleviate these concerns about omitted variable bias and non-random selection, several hierarchical models are estimated that include various confounding factors to control for their influence on both life satisfaction and war experience.

[11] The u-shaped curve that Kijewski (2020) found to have with happiness states that young people and older adults are higher in wellbeing than those in their mid-life (The Economist, 2010). See https://www.economist.com/christmas-specials/2010/12/16/the-u-bend-of-life for more information about this concept.

(2020) chooses to employ both year of birth and a squared term of age from respondents over the age of 18. Djankov et al. (2016) similarly include age and a squared term of age for those individuals over the age of 18.

Gender as a binary variable is also included, Kijewski (2020) coding male as '0' and female as '1' and Djankov et al. (2016) coding female as '0' and male as '1'. Kijewski (2020) adds marital status as a categorical variable with N*ot Married*, *Married*, *Divorced*, *Separated*, and *Widowed* whereas Djankov et al. (2016) create a variable that takes the value of '1' if the respondent is married and '0' otherwise.

Kijewski (2020) creates a continuous variable for education, measured by the respondent's highest level of learning (e.g. High School Diploma). Djankov et al. (2016) construct respondent education by first omitting *No Degree/No Education* as the base category, then grouping those holding a primary education into *Secondary Education*, lower education and upper secondary education into *Some post-sec education* and tertiary education, bachelor's degree or more and master's degree or PhD into *University or more.* Each of these variables is binary, denoted as '1' if the respondent holds that level of education and '0' otherwise. Both Kijewski (2020) and Djankov et al. (2016) also include respondent's father's level of education as total years of full-time education.

A set of dummy variables characterizes personal unemployment, Kijewski (2020) designating '0' as E*mployed*, '1' as U*nemployed* and '2' as *Not in the labour market*. Djankov et al. (2016) group the people who answered 'yes' to employed in the last 12 months with the value of '1', and those who answered 'no' to employed as '0'. Additionally, Kijewski (2020) includes a categorical variable of the individual's occupational class that follows the ISCO-08[12], stating categories of '1' *Managers*, '2' *Professionals*, '3' *Clerical support workers*, '4' *Service and sales workers*, '5' *Skilled agricultural, forest and fishery workers*, '6' *Plant and machine operator assemblers*, '7' *Transport and communications*, '8' *Building and related trade workers*, '9'

[12] This variable follows the International Standard Classification of Occupations; an International Labour Organization classification structure for organizing information on labour and jobs. It is part of the international family of economic and social classifications of the United Nations. See https://www.ilo.org/public/english/bureau/stat/isco/isco08/ for more information.

Crafts and related trade workers, ’10’ *Not in the labour market* and ’11‘ *Not identified or no occupation reported*.

For both Kijewski (2020) and Djankov et al. (2016), a variable describing subjective health assessment is included and assessed on a scale from 1 to 5, 1 being ‘very bad’ health and 5 being ‘very good’ health. Religion is included in Kijewski (2020) as '1’ if the respondent participates in church or other religious associations and ‘0’ otherwise. Similarly, civic activity is described as involvement of any voluntary association or group, labelled ‘1’ for some involvement and ‘0’ for no involvement.

In Djankov et al. (2016), the variable *Income* is created from participants' self-reported assessment of their relative economic position using the question ‘Please imagine a ten-step ladder where on the bottom, the first step, stand the poorest 10% people in our country, and on the highest step, the tenth, stand the richest 10% of people in our country. On which step of the ten is your household today?’ A ladder of 1 to 10 is provided to answer from. Djankov et al. (2016) also created a transition country control variable and grouped all Eastern European[13] or transition countries into ‘1’, ’0’ otherwise.

Lastly, Kijewski (2020) includes the control variables of population size, life expectancy, GDP per capita and general unemployment, all standardized and averaged from 2008 to 2010. Djankov et al. (2016) include variables using primary sampling unit (PSU) geographical data drawn from municipal reports, following the analysis of Nikolova and Marinov (2015). These include the longitude, latitude, and altitude coordinates of each of the respondents.

3.3 Drawbacks of the Data

A number of limitations were encountered when using these datasets. For example, take one of the main questions that ask about war experience: ‘Were you, your parents or any of your grandparents physically injured or killed during the Second World War?’ This question groups grandparents, parents, and the individual together, not allowing for separation between the demographics. Therefore, one cannot test for direct or indirect war experience, making more

[13] Of the countries in the study, the omitted countries from the East Europe variable are France, Italy, Germany, Sweden, Turkey, and the United Kingdom.

specific conclusions difficult to obtain. Secondly, the data is cross-sectional, so I cannot yet analyze any changes of these impacts over time.[14]

4 Results

4.1 Replication

Kijewski (2020) finds that war experience is negatively related to life satisfaction, the estimated coefficient of the war variable being –0.084 and significant at the 1% level. Djankov et al. (2016) find that war experience has no effect on life satisfaction where the estimated impact is –0.008 and insignificant.

Following the variable construction and methodology as described in the two papers, I attempt to replicate these author's results.

The individual-level results are presented below. Table 1 shows a side-by-side comparison of Kijewski's (2020) original results and my replication results. Table 2 displays Djankov et al. (2016) original results and the replication results. For each table, the left-hand side displays the original results, and the right-hand side shows the replication results of the model using the author's exact data and variable specifications. These replication results can be seen to closely mirror the original findings, confirming the robust nature and validity of the initial results.

It is important to note that the coefficients and standard errors of the original in comparison are not strictly the same as in the replication as it is often impossible for a replication to produce the exact figures as the original. These discrepancies can be caused by variation in statistical software, variable definitions, or other methodological choices. Rather than

[14] Further limitations of datasets from surveys that include war-specific data are outlined by Coupe and Obrizan (2023). These authors note that in many datasets, sample selection bias may occur as these types of surveys are more frequently carried out in wealthier countries. War more often occurs in poorer countries and increases the difficulty in carrying out surveys in these countries, making them more likely to have data missing for the years the war has taken place. Furthermore, the higher the intensity of a war in an area, the less likely there is survey data for that area.

determining the replication a failure because the numbers do not exactly align, it is more useful to compare the outcome of the replication. A successful replication is one that produces a similar outcome to inform a conclusion, not necessarily of the exact same result[15].

Several factors can contribute to the disparities between the initial model and the replication model. One important driver of these deviations lies in the differences between the number of observations after cleaning the data and arranging the regression model. Kijewski (2020) produced a final model with 25,618 individuals from thirty-four countries after cleaning the data of missing values. However, the number of observations in the corresponding replication comes to 25,791 after cleaning the data. Djankov et al. (2016) has only 24,836 observations, whilst the number of observations in the replication of Djankov et al. (2016) is 25,508. These unequal observations account for a significant differential component between the two models and their replications, potentially affecting their subsequent outcomes.

Differences may also arise from the decisions authors make while constructing the variables utilized in the regression analysis. Authors decide the composition of each variable, what they include, exclude, and how to format it within the regression. The absence of comprehensive information about these decisions can account for variations in the number of observations between the original regression analysis and the replication, or differences in how variables were constructed.

Significant variations are observed in both the sign and magnitude of the results between the original results and the replications. Kijewski's (2020) regression and replication results finds an estimated coefficient of -0.473 for the unemployed and 0.091 for those not in the labour market, which undergoes a change in the replication to -0.850 and -0.389 respectively, while remaining significant at the 1% level. Additionally, GDP per capita displays differences, 0.649 and significant at the 1% level in the original results, and -0.022 and insignificant in the replication.

[15] See *Reproducibility and Replicability in Science* by the National Library of Medicine at https://www.ncbi.nlm.nih.gov/books/NBK547524/ for more about assessing replicability.

Table 1: Kijewski (2020) Original and Kijewski (2020) Replication Results

Individual-level predictors	
War experience	−0.084*** (0.028)
Moved because of war	
Year of birth	0.041***(0.004)
Age squared [1]	0.840*** (0.077)
Female	0.081*** (0.025)
Marital status (ref. never married)	
Married	0.276*** (0.035)
Divorced	−0.306*** (0.053)
Separated	−0.319*** (0.091)
Widowed	−0.115** (0.053)
Education	0.145*** (0.100)
Father's level of education	0.032*** (0.003)
Employment status(ref. employed)	
Unemployed	−0.473*** (0.046)
Not in the labor market	0.091* (0.052)
Occupational status (ref. manager)	
Professional	−0.248*** (0.069)
Clerical support worker	−0.112 (0.078)
Services and sales worker	−0.344*** (0.070)
Agriculture, forestry and fishery worker	−0.420*** (0.085)
Plant and machine operators and assemblers	−0.378 (0.320)
Transport and communications	−0.361*** (0.090)
Building and related trades workers	−0.436*** (0.080)
Crafts and related trades workers	−0.342*** (0.089)
Not in the labor market	−0.476*** (0.078)
Unidentified or no occupation reported	−0.349*** (0.101)
Health status	0.497*** (0.015)
Religious participation	0.173*** (0.049)
Civic participation	0.367*** (0.038)
Country-level predictors	
GDP per capita [1]	0.649*** (0.175)
Unemployment [1]	−0.052 (0.090)
Population [1]	−0.058 (0.089)
Life expectancy [1]	−0.064 (0.159)
Constant	−77.871 (8.479)
Residual variance, context-level	0.170 (0.043)
Residual variance, individual-level	3.347 (0.030)
AIC	103,835.6
N (Individual/context)	25,618/34

Individual-level determinants of life satisfaction, replication

	Dependent variable:
	Life Satisfaction
War Experience	-0.082***
	(0.027)
Year of Birth	0.042***
	(0.004)
Age Squared	0.820***
	(0.074)
Female	0.103***
	(0.025)
Married	0.295***
	(0.034)
Divorced	-0.301***
	(0.054)
Separated	-0.311***
	(0.092)
Widowed	-0.118**
	(0.054)
Education	0.146***
	(0.010)
Father's Level of Education	0.032***
	(0.003)
Unemployed	-0.850***
	(0.073)
Not in labor market	-0.389***
	(0.067)
Professionals	-0.308***
	(0.069)
Clerical support worker	-0.168**
	(0.079)
Services and sales worker	-0.421***
	(0.070)
Agriculture, forestry and fishery worker	-0.519***
	(0.085)
Plant and machine operators and assemblers	-0.502
	(0.318)
Transport and communications	-0.398***
	(0.090)
Building and related trades workers	-0.532***
	(0.079)
Crafts and related trades workers	-0.467***
	(0.089)
Not in the labor market	-0.424***
	(0.100)
Unidentified or no occupation reported	-0.494***
	(0.015)
Health status	0.157***
	(0.050)
Religious participation	0.377***
	(0.038)
Civic participation	0.00003***
	(0.00001)
GDP per capita	-0.022
	(0.015)
Unemployment	-0.000
	(0.000)
Population	0.023
	(0.039)
Life Expectancy	-78.370***
	(8.958)
Observations	25,791
Akaike Inf. Crit.	105,113.500
Bayesian Inf. Crit.	105,366.400
Note:	*p<0.1; **p<0.05; ***p<0.01

Table 2: Djankov et al (2016) Original and Djankov et al (2016) Replication Results

Health		0.186***
		(0.014)
Married		0.130***
		(0.016)
Age		−0.025***
		(0.003)
Age^2		0.000***
		(0.000)
Male		0.045**
		(0.021)
Secondary education		0.023
		(0.052)
Some post-sec education		0.040
		(0.057)
University or more		0.100*
		(0.054)
Income		0.217***
		(0.012)
Employed		0.023
		(0.022)
Father's education		−0.001
		(0.004)
Affected by war		−0.008
		(0.022)
Eastern Europe		−0.457***
		(0.123)
Corruption, subjective		
Effort/ intelligence		
Government performance		
PSU geographic characteristics		✓
Observations	34	24836
R^2	0.551	0.224

Individual Results with LiTS 2010 data, replication

	Dependent variable:
	Satisfaction
Health	-0.074***
	(0.006)
Married	0.063***
	(0.010)
Age	-0.012***
	(0.002)
Age Squared	0.0001***
	(0.00002)
Male	0.0005
	(0.010)
Secondary education	0.027*
	(0.016)
Some post-sec education	0.001
	(0.019)
University or more	0.037**
	(0.019)
Income	0.073***
	(0.003)
Employed	0.001
	(0.011)
Fathers Education	0.004***
	(0.001)
Affected by war	0.001
	(0.010)
Eastern Europe	-0.190***
	(0.012)
Latitude	0.012***
	(0.001)
Longitude	0.001*
	(0.0003)
Altitude	0.0001***
	(0.00002)
Constant	-0.021
	(0.065)
Observations	25,508
Akaike Inf. Crit.	53,494.610
Note:	*p<0.1; **p<0.05; ***p<0.01

More noteworthy differences are found between Djankov et al. (2016) original and replication results. In the original results, the gender coefficient is 0.045, changing to 0.005 in the replication. Similarly, the education coefficient is 0.04 in original and 0.001 in replication for post-secondary education, and 0.1 in the original and 0.037 for university level in the replication. Although income is 0.217 in the original and 0.073 in the replication, it remains

statistically significant at the 1% level in both models. Likewise, *Affected by War* assumes a value of 0.001 in the replication compared to the original finding of -0.008, maintaining its insignificance. Other coefficients exhibit slight variations when compared to the replication results in the analyses of both Djankov et al. (2016) and Kijewski (2020), but these deviations are generally minor.

Overall, despite these differences, the basic model and overall findings of Kijewski (2020) and Djankov et al. (2016) are successfully replicated. Next, I will explore why the two studies came to different conclusions.

Table 3 presents the disparities in the original variables, methodologies, and outcomes between the two papers, providing an overview of the similarity in inclusion criteria and their subsequent impact on the dependent variable of life satisfaction. The green numbers indicate the variable's significance concerning life satisfaction, while the red numbers indicate no significant effect on life satisfaction[16]. The focal point of the analysis is the outcome of *War Experience.* The table illustrates that each of these studies reach opposing conclusions of the impact that *War Experience* has on life satisfaction: Kijewski (2020) finds that experience with war decreases life satisfaction by 0.084 points, significant at the 1% level, while Djankov et al. (2016) find that war has little or no influence on life satisfaction, reducing life satisfaction by -0.008 points.

When contradictory results arise from almost identical regressions, replication serves as a valuable tool to gain insight into the reasons for these differences. To do this, the first step is to analyze what sources of variation result in changes to the relationship between war and life satisfaction. This approach will analyze the implications of inclusion and alteration of variables in each of the models as designed by Kijewski (2020) and Djankov et al. (2016).

When opposite results arise from nearly identical regressions, replication becomes instrumental in understanding the underlying causes of these differences. The first step

[16] Note that these do not necessarily show the magnitude of the effect on life satisfaction, and some have a weaker significance than others. Please see the original author results for more information.

Table 3: Variable comparisons of Kijewski (2020) and Djankov et al. (2016) regression models

Change	Kijewski	Djankov
Methodology		
OLS		✓
Mixed	✓	
Sample Weighted		
Yes		✓
No	✓	
War Experience	-0.084	-0.008
Other Control Variables		
Year of Birth/Age	0.041	-0.025
Age Squared	0.84	0.000
Gender	0.081	0.045
Marital Status	✓[1]	0.130
Education	0.145	✓[2]
Father's Education	0.032	-0.001
Employment Status	✓[3]	0.023
Occupational Status	✓[4]	
Health Status	0.497	0.186
Religious Participation	0.173	
Civil Activity	0.367	
Income		0.217
Transition Countries		-0.457
Location Variables		
GDP per Capita	0.649	
Unemployment	-0.052	
Population	-0.058	
Life Expectancy	-0.064	
PSU Geographic Characteristics (logitude, latitude, altitude)		✓[5]

1 All values are significant: married is positive and divorced, separated, and widowed are negative. See Table 1 for specific coefficients.
2 University and higher is the only significant value at the 10% level. Secondary and post-secondary education are not significant.
3 Unemployed is significant at the 1% level, and not in the labour market is significant at the 10% level.
4 All occupational classes are significant at the 1% except for *Clerical support workers* and *Plant and machine operators and assemblers.*
5 Latitude and altitude are significant at the 1% level however longitude is not significant.

involves analyzing the sources of variation that lead to changes to the relationship between war and life satisfaction. This approach will investigate the implications of including or modifying variables in both Kijewski (2020) and Djankov et al. (2016) models.

4.2 Changes to the Models

To analyze the effects of war on life satisfaction, I adopt a systematic approach by incrementally altering the original regression, introducing one change at a time while holding all else constant. Each modification was isolated so I can examine the effect each change had on the focal variable, *War Experience*. Table 4 displays a side-by-side overview of the alterations made and will be explained further below. Each of the coefficients and standard errors displayed in the table refer only to the war experience variable, extracted from each of the separate regressions.

Table 4: Impact of changes of the relationship between WWII Experience and life satisfaction

War Experience Result	Kijewski	Djankov
Published Estimate	-0.084***	-0.008
	(0.028)	(0.022)
Replication Estimate	-0.082***	0.001
	(0.027)	(0.0102)
Replication with alternative dependent variable definition (life satisfaction)	-0.018***	-0.044
	(0.006)	(0.041)
Replication with alternative independent variable definition (war experience)	-0.030	-0.010
	(0.026)	(0.011)
Replication with alternative methodology	-0.153***	0.004
	(0.0455)	(0.006)
Replication with alternative control variable definitions	-0.083***	0.001
Inludes the variables of education, marriage, and employment	(0.028)	(0.0102)
Replication including alternative variables		
PSU Geographic Coordinates	-0.083***	
	(0.027)	
Transition Country	-0.084***	
	(0.027)	
Occupation, Religion, Civil Activity, Country Indicators		-0.007
		(0.0104)
	Included	*Excluded*
Replication Income Effects	-0.002***	-0.014
	(0.025)	(0.0105)

Statistically significant effects are marked with *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors are in paretheses.

<u>Alternative Dependent Variable: Life Satisfaction</u>

Kijewski (2020) specifies their continuous variable of life satisfaction using the question 'All things considered, how satisfied or dissatisfied are you with your life as a whole these days?' on a 10-point scale, 1 being 'completely dissatisfied' and 10 being 'completely satisfied'. Djankov et al. (2016) draws from a different question in the dataset, using 'All things considered, I am satisfied with my life now' on a 5-point scale, 1 being 'strongly disagree' and 5 being 'strongly agree'. Those who answered 'agree' or 'strongly agree' were grouped together taking on the value of 1, otherwise 0 to form this binary variable.

Using the Djankov et al. (2016) specification of life satisfaction in place of Kijewski (2020) specification in Kijewski's (2020) regression, the size of the effect of WWII experience on life satisfaction is reduced from -0.082 to -0.018, although the relationship remains significant at the 1% level. Changing the specification of life satisfaction from Kijewski (2020) to Djankov et al. (2016) in Djankov et al. (2016) regression, the size of the effect of WWII on life satisfaction increased from -0.008 to -0.044. This relationship remains insignificant with this change.

These findings indicate that a different definition of subjective wellbeing did not explain why Kijewski (2020) and Djankov et al. (2016) came to different results. Even if they had employed the same definition of subjective wellbeing, they would still have had conflicting results.

Alternative Independent Variable: War Experience

Kijewski (2020) specifies their war experience variable through the question 'Were you, your parents or any of your grandparents physically injured or killed during the Second World War?', with 1 as 'yes' and 0 as 'no'. In contrast, Djankov et al. (2016) combines the same question with a second question, 'Did you, your parents or any of your grandparents have to move as a result of the Second World War?'. Individuals who experienced either of these events were combined and took on the value of 1, otherwise 0 to form this binary variable.

Using Djankov et al. (2016) specification of war experience in place of Kijewski (2020) in Kijewski's (2020) regression results in a reduction of the effect of WWII experience on life satisfaction from -0.082 to -0.030, rendering it statistically insignificant. It is important to note that Kijewski (2020) observes opposite signs when adding the two question components separately, opting to not group the two questions into one variable due to the potential null effect. Therefore, the insignificance found when the questions are combined into one variable is unsurprising. Using Kijewski's (2020) specification of war experience in the Djankov et al. (2016) regression see a slight change in the size of the effect of WWII on life satisfaction from -0.008 to -0.010, remaining insignificant with this change.

In summary, the chosen definition of war experience influences the conclusion of Kijewski's (2020) regression result. This is due to the combination of two different questions about WWII

experience, revealing a statistically insignificant relationship between WWII experience and life satisfaction, based on their opposing signs. For Djankov et al. (2016), WWII experience on subjective wellbeing remains insignificant even when using Kijewski's (2020) definition of experiencing WWII.

Alternative Method

Kijewski (2020) uses a multi-level mixed-effects linear regression model to run her analysis, whereas Djankov et al. (2016) uses a sample-weighted OLS regression model.

Changing Kijewski's (2020) regression model to OLS, Djankov et al. (2016) method, sees the size of the effect of WWII experience on life satisfaction decrease from -0.082 to -0.153, the relationship remaining significant at the 1% level. Taking Kijewski's (2020) mixed-effects regression method and applying it to Djankov et al. (2016) changes the effect of WWII on life satisfaction from -0.008 to 0.004, remaining insignificant.

Shifting the method of regression from mixed-effects to sample-weighted OLS, or vice versa, does not contribute to the opposing results of Kijewski (2020) and Djankov et al. (2016).

Alternative Control Variables

There are some variables that both Kijewski (2020) and Djankov et al. (2016) share in their analysis, though these are defined in slightly different ways. Specifically, education, marriage, and employment are all included but each coded slightly differently.

Using the specification of education, marriage and employment from Djankov et al. (2016) in Kijewski's (2020) regression in place of her own variable definitions, the size of the effect of WWII experience on life satisfaction does not change much, shifting from -0.082 to -0.083. Kijewski's (2020) specification of education, marriage and employment in the Djankov et al. (2016) regression produces a small change in coefficient of -0.008 to 0.001. The significance of each outcome does not change.

The similarity of outcomes after changing the control variable specifications means that slightly differently defined control variables cannot explain the different conclusions of Kijewski (2020) and Djankov et al. (2016).

Other Included Variables

Kijewski (2020) includes various control variables that Djankov et al. (2016) did not include in their analysis. From questions in the LiTSII survey, these variables include indicators of occupation, religion, civil activity, and country-level indicators[17]. Djankov et al. (2016) also incorporates variables in their analysis that Kijewski (2020) does not. This includes PSU geographical coordinates from Eurostat[18] and a transition country variable drawn from questions in the LiTSII survey.

Introducing the additional Djankov et al. (2016) variables independently into Kijewski's (2020) original regression yields small changes to the WWII experience coefficient. From -0.082, the PSU variable shifts to -0.083 and the transition country variable to -0.084. Placing the additional Kijewski (2020) control variables into the Djankov et al. (2016) regression changes the stated replication coefficient from 0.001 to -0.007, continuing to be insignificant and now very close to the original published coefficient.

The strong resemblance of results following the inclusion of the control variables used by the other author suggests that the inclusion of these variables does not influence the relationship between WWII experience and life satisfaction.

Inclusion Criteria of the Income Variable

A variable that only Djankov et al. (2016) includes in their regression is income. Therefore, the next adjustment I make is the inclusion of income in Kijewski's (2020) regression and the exclusion of income from Djankov's et al. (2016) regression. The variable of income is taken

[17] These indicators are GDP, Population, Unemployment and Life Expectancy, all found in the Kijewski regression. See Table 1 for more details.

[18] The data source for these geographical coordinates were NUTS (Nomenclature of territorial units for statistics) classifications, a hierarchical system that divides the EU and UK territories by means of multipart polygon, polyline and point topology. Visit https://ec.europa.eu/eurostat/web/gisco/geodata/reference-data/administrative-units-statistical-units/nuts for more information and to download the data.

from the question in the dataset 'Please imagine a ten-step ladder where on the bottom, the first step, stand the poorest 10% people in our country, and on the highest step, the tenth, stand the richest 10% of people in our country. On which step of the ten is your household today?' with a 10-point scale for respondents to place themselves on.

Incorporating this income variable in the Kijewski (2020) regression produces a change in the association between WWII experience and life satisfaction from -0.082 to -0.002, undergoing a large fall in the coefficient value and a now statistically insignificant relationship. Excluding income from the Djankov et al. (2016) regression sees a change in magnitude of the WWII experience coefficient from 0.001 to -0.014 but no change to the significance of the relationship.

To summarize, adding income into Kijewski's (2020) regression renders the impact of WWII experience on life satisfaction insignificant, an outcome that aligns with Djankov et al. (2016) findings. On the other hand, excluding income from Djankov et al. (2016) does not shift the overall conclusion found in the original study by Djankov et al. (2016).

Inclusion Criteria of the Country Conflict Variables

So far, I have concentrated on assessing the effect of WWII on wellbeing using the specifications of Kijewski (2020) and Djankov et al. (2016) as a basis. Another relevant study, conducted by Obrizan (2019), employs a later wave of the LiTS survey to estimate the impact of more recent wars in transition countries. Obrizan's (2019) analysis does not include any variables relating to WWII, raising the possibility of omitted variable bias and prompting the need for exploration into the effects of incorporating variables that capture both WWII and more recent war experiences.

To undertake this analysis, I take the replications of Kijewski (2020) and Djankov et al. (2016) and using the survey questions from LiTSIII[19] in alignment with Obrizan (2019), I construct war experience variables derived from questions pertaining to recent conflicts in the respondent's

[19] Obrizan (2019) uses the Life in Transition III survey for their analysis, a newer and slightly questionnaire to the LiTS II version.

country[20]. The dummy variable *Physical Injury* takes on the value of 1 if a respondent or household member was physically injured due to the conflict and 0 otherwise. *HH* (Household) *Member Killed* and *Moved due to conflict* both take the value of 1 if a household member was respectively killed or displaced because of the conflict and 0 otherwise. An *Any Violence act* indicator is included, labelled 1 if any of the three previous variables were experienced and 0 otherwise, and a *Count of violence act* variable indicates that all three variables were experienced to take the value of 1, otherwise 0. These war-related variables follow Obrizan's (2019) analysis to capture a model examining the impact of different forms of conflict on life satisfaction[21].

Each of these variables are independently integrated into the replications of Kijewski (2020) and Djankov et al. (2016). Table 5 outlines the estimated change in impact of WWII experience when each of these war-related variables are separately included in the replications, where each of the stated values shows the coefficient of WWII experience on life satisfaction.

From these results, the relationship between WWII experience and subjective well-being converts to insignificant when any country-level conflict variables are included in the regression. From our original replication and published results, Kijewski (2020) finds a highly significant negative relationship between war and life satisfaction, but this shifts to insignificant when any of the country conflict-specific variables are included in the regression. Djankov et al. (2016) did not find a significant relationship, and this outcome holds when the country conflict variables are added to the regression.

[20] The questions related to these variables are the following:
Were you or any member of your household physically injured as a result of the conflict in [COUNTRY] (from [DATE] to [DATE])?
Was any member of your household killed as a result of the conflict in [COUNTRY] (from [DATE] to [DATE])?
Did your household have to move as a result of the conflict in [COUNTRY] (from [DATE] to [DATE])?
[21] The model Obrizan employs follows a similar model to Guriev and Melikov (2018), but with added violence variables to allow for better comparison to prior research. All regressions use robust standard errors clustered at the Primary Sampling Unit (PSU) level following Habibov and Cheung (2017) method.

Table 5: Impact of changes to the relationship between WWII experience and life satisfaction

WWII Experience Result	Kijewski	Djankov
WWII	-0.082***	0.001
	(0.027)	(0.0102)
Country Conflict	-0.0327	0.027
	(0.0438)	(0.024)
Physical Injury	-0.325	0.029
	(-0.044)	(0.024)
Moved due to conflict	-0.033	0.028
	(-0.0435)	(0.0239)
HH member killed	-0.0305	0.027
	(0.0434)	(0.0239)
Any violence act	-0.0303	0.027
	(0.0434)	(0.0239)

Statistically significant effects are marked with *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors are in paretheses.

Attention now shifts to the influence of country conflict on individual life satisfaction. Table 6 shows the impact of an individual's experience with conflict in their country on life satisfaction. Like the relationship between WWII and life satisfaction, none of the findings indicate a significant relationship. Table 6 displays the consistent result that experiencing any form of violence, displacement, or household loss due to a recent war or conflict does not significantly impact life satisfaction.

Table 6: Impact of changes to the relationship between country conflict experience and life satisfaction

Country Conflict Experience Result	Kijewski	Djankov
Regression Including Country Conflict	0.007	-0.026
	(0.065)	(0.036)
Regression Including Physical Injury	0.009	0.016
	(0.079)	(0.042)
Regression Including Moved due to conflict	0.0697	-0.092
	(0.087)	(0.051)
Regression Including HH member killed	0.007	-0.054
	(0.103)	(0.061)
Regression Including Any violence act	0.154	-0.082
	(0.171)	(0.098)

Statistically significant effects are marked with *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors are in paretheses.

5 Discussion

To summarize, there are three decisions that can explain why Kijewski and Djankov came to different conclusions.

Conclusion One: Control Variable Definition

One possible explanation for the differences in some of the control variables, such as *Employment status*, may stem from how the models specified the variable. Djankov et al. (2016) uses the question 'Did you work for income during the past 12 months?', taking the value of 1 if yes and 0 if no. Kijewski (2020) combines this question with 'Are you actively looking for a job at this moment?' to create a new employment variable with the categories of employed (0), actively unemployed (1), and not in the labour market (2). The specifications for these variables are derived from various questions in the survey and are coded with distinct purposes, hence these differences in coefficient. The variation in results between the replication and the publication of other variables can be attributed to factors such as random variation or data imputation, as observed in *GDP per capita.* While some variables are clear in their definition from the publications and can be applied accurately to a replication, others are based on higher levels of interpretation.

Conclusion Two: War Experience Definition

The first distinct factor that is proven to matter is the definition of war experience. Djankov et al. (2016) chooses to group two aspects into a single dummy variable: injured/killed, and displaced as a result of WWII. On the other hand, Kijewski (2020) separates these aspects and includes them as individual variables[20]. When constructing her final regression model, Kijewski (2020) tests both aspects separately and finds an almost identical value for each coefficient, the value positive for displacement and negative for injured/killed. Because they seemed to cancel each other out if combined, Kijewski opted to omit them as a grouped definition. Djankov et al. (2016) instead groups the two questions from the survey into one variable and consequentially finds no effect of the grouped definition on life satisfaction. Therefore, when Djankov et al. (2016) war experience specification is applied to Kijewski's (2020) regression model, war no longer has a significant effect on life satisfaction.

Conclusion Three: Inclusion of Income Variable

The inclusion of income in a regression that analyses the effects of war experience on life satisfaction is also seen to change its overall result. Adding Djankov et al. (2016) income variable in Kijewski's (2020) regression model removes the significance of the resulting relationship between WWII experience and life satisfaction. This opens up the question:

should income be included in regressions when conducting happiness research? Income is influenced by many different factors of circumstance and life, one of which could very well be displacement, injury, or death to close relatives because of war. If one held this belief that war experience could indeed affect income, then any experience with war can influence happiness through the indirect channel of income's more indirect impact on happiness. Thus, if the total effect of war on life satisfaction was desired to be seen, income should be omitted from the regression.

Kijewski (2020) recognized this indirect impact of income and deliberately excludes it from her regression. She hypothesizes that income could indeed influence the relationship between WWII and life satisfaction as it may be a product of the flow-on effects of WWII. It is well known that the second world war led to a significant number of individuals, primarily men, drafted, injured, and consequentially killed, resulting in economic hardship and loss of income for many families. These afflictions could have been transmitted through the generations, continuing to have an adverse effect on life satisfaction and thus, 60 years after the war has ended, still impact the happiness of individuals in these families. Because of this link, Kijewski (2020) elects to use occupational class as a proxy for income. This argument, however, could be extended to several other commonly used control variables in happiness regression analyses. Education, for example, could also be affected by parents' or grandparents' experiences during the war, as could employment status, religious affiliations, or health outcomes. Any such link could be established and justified through various means. Consequently, authors must establish decision boundaries, providing an account of their discretionary choices.

Despite this understanding, a large section of 'happiness' literature typically includes income in the conducted regression analysis. A 1965 study by Hadley Cantril produced one of the first large-scale studies to examine the link between happiness and socioeconomic status. Since then, there has been a growing number of econometric studies that study changes in happiness, many of which use survey data, of which income is almost always included as a control variable. These studies range from directly investigating the differences in the influence of income on subjective wellbeing across countries (Veenhoven, 1991) to indirectly finding that income has a significant influence when analyzing corruption's impact on life

satisfaction (Andriani & Ashyrov, 2022). I present a comprehensive list of studies that either directly or indirectly study the effect of income on happiness, many finding positive and significant links between the two factors. The full list of these studies is found in Appendix 11.1.1.

Conclusion Four: Inclusion of Country-Level Conflict Variables

The last change in result seen in these replications stems from the addition of the country-level conflict variables in the regression. Placing these variables in the model changes the magnitude of the effect of WWII experience that was previously found on life satisfaction, reducing this impact to now statistically insignificant. Moreover, I find little evidence that more recent wars still have a measurable effect on life satisfaction.

6 War in Ukraine

The effect that wars have on the wellbeing of a population has been increasingly analyzed in various fields (Osiichuk & Shepotylo, 2020). Despite the potentially confined nature of a conflict to a small, localized region, there is the chance that a much larger area is impacted due factors such as citizen displacement, destruction of communication and supply chains, and a range of psychological impairments. Research into the social, indirect and boarder impacts of war has improved (Child & Nikolova, 2020; Marshall, 2002[22]) as the importance of capturing these effects grows amid persisting war intensity, casualties, and displacement.

I move past analyzing the studies of Kijewski (2020), Djankov et al. (2016) and Obrizan (2019) and their regressions investigating a war from over 60 years ago, and I now look to a more recent war. Complementary to the previous findings, I conduct a similar analysis using data pertaining to Russia's invasion of Ukraine. This section will analyze and discuss how the war in Ukraine has impacted individuals in countries all around Europe, excluding Ukraine, to

[22] Marshall (2002) states that 'By far, the overwhelming majority of the victims of warfare are those directly and indirectly affected by the far-reaching ravages of warfare' and by disregarding the study of these indirect effects, this 'distorts war's impact on societal systems, violates statistical assumptions, and does a grave injustice to the full, humanistic analysis of war', noting that research has gone further to measure a wider range of the social effects of war.

understand the extent of the effect that the conflict has had in countries not directly experiencing the war itself.

6.1 Background and timeline of the Russia-Ukraine War

The following timeline draws heavily from the United Kingdom House of Commons research briefing undertaken in August of 2023.

The current conflict in Ukraine began with the entering and invasion of Ukraine by Russian military forces on 24th February 2022 (Walker, 2023). However, prior to this breach, conflict between Ukrainian forces and Russian-backed separatists warred for almost a decade, bringing a complex history of regional power struggles, ethnic divisions, and geopolitical rivalries.

In December 2004, Ukraine was entering the last round of their presidential election, the fourth since their independence from the Soviet Union (Meyers, 2004). Viktor Yanukovych was strongly supported by the Russian president Vladimir Putin, and had come out with the highest vote count, preliminarily 'winning' the election (Britannica, 2023). This result led to protests, otherwise known as the Orange Revolution, where thousands of people took part in two weeks of demonstrations calling for a voting re-run. The Ukraine Supreme Court ruled that the election was fraudulent, claiming "systemic and massive violations", deciding to cancel and repeat the election. The repeat election saw Viktor Yushchenko instead winning the vote with the backing of the Western Ukrainian electorate.

Upon his later election in 2010, Yanukovych began strengthening Ukrainian ties with Russia by officially declaring they would not join NATO, a partnership that Russia did not support (Britannica, 2023). During this year, Yanukovych also began talks with the EU to formulate an association agreement. Pressure from Russia delayed these agreements from being signed, Yanukovych stating that there were "several crucial steps left to be made" (BBC, 2013). These delays brought on public dissent, quickly turning into violent demonstrations known as the 'Revolution of Dignity' or 'Euromaidan'. As a result, Ukrainian parliament voted to oust Yanukovych, subsequently instituting a new government in his place.

Near the beginning of 2014, armed figures who were later identified as Russian forces entered Crimea and raised the Russian flag, surrounding the airports of the Ukrainian peninsula, which at the time had a population of mostly ethnic Russian residents. This annexation came a day after Russian president Vladimir Putin placed Russia's military on high alert. "In connection with the extraordinary situation in Ukraine and the threat to the lives of Russian citizens", the Russian parliament approved Putin's request for Russian military forces to be used in Ukraine (BBC, 2014). This was condemned by Western leaders as they chose to support Ukraine and urged for efforts to bring unity, stability, and political and economic health. On 21st March 2014, Putin formalized Russia's takeover of Crimea from Ukraine despite freshly signed sanctions from the EU and US. Meanwhile, pro-Russian separatist movements in Eastern Ukraine escalated, leading to the outbreak of armed conflicts between Ukrainian government forces and separatist militias. The Ukrainian Army began a military campaign to recapture their cities in Eastern Ukraine, which was met with heavy defense (Coupe & Obrizan, 2016). The first Minsk Agreement, attempting to end almost five months of fighting between Ukraine and the Russian-backed separatists, was signed under the rule of then-president Petro Poroshenko (Whittke, 2019). The 12-point roadmap outlined in the Minsk I Agreement aimed at establishing a ceasefire, releasing prisoners, and fostering an inclusive national dialogue. However, the agreement faced immediate challenges as violations of the ceasefire persisted, local elections were held in defiance of the agreement, and the parties failed to agree on its interpretation and implementation in subsequent discussions.

The agreement soon collapsed, and the fighting continued for months. In early February 2015, the situation in Eastern Ukraine grew increasingly dire, leading to an intensive all-night negotiation involving the Normandy Format and the Trilateral Contact Group[23]. Chancellor Angela Merkel, Presidents Putin, Hollande, and Poroshenko, along with representatives of international organizations, convened to establish a formalized political settlement for peace

[23] The Normandy Group was created in June 2014 where the leaders of France, Germany, Russia and Ukraine met on the margins of the 70th anniversary of the 'D-Day' in Normandy. The group is supposed to support conflict settlement and the transition process in the eastern regions of Ukraine. The Trilateral Contact Group was made up of Ambassador Talyavini for the OSCE, former President Kuchma for Ukraine, Russia's Ambassador to Ukraine, Zurabov, and 'representatives' of the Donetsk People's Republic (DPR) and Luhansk People's Republic (LPR), Zakharchenko and Plotnitski. This group was formed as means to facilitate a diplomatic resolution to the war in the Donbas region of Ukraine. See Whittke (2019) for more information.

in the region. An agreement was eventually reached, and the second Minsk Agreement was signed in Belarus on 12th February 2015 by the members of the Trilateral Contact Group.

2017 saw the association agreement between Ukraine and the EU developing deeper political ties, greater economic partnership, and linked values between the two parties. This agreement came into force on 1st September, ratified by all signatories (BBC, 2020). Volodymyr Zelensky won the 2019 presidential election and shortly after, Russia and Ukraine exchanged prisoners captured in the aftermath of Russia's annexation of Crimea and intervention in Eastern Ukraine. In September 2020, President Zelensky approved Ukraine's new National Security Strategy, with the aim of joining NATO. Several months later, Russia's initiation of large-scale military exercises and buildup along the borders heightened tensions and prompted concerns regarding the possibility of a war. Emergency discussions were held, and in December 2021, Russia issued a list of demands to defuse the crisis over Ukraine, including a bid for Ukraine to agree to never gain NATO membership and NATO to give up all military activity in Eastern Europe and Ukraine. Negotiations were held with no progress. Following a threatening cyberattack to the Ukrainian government, the US placed 8,500 troops on standby and both the US and NATO sent responses to Russia's demands, ruling out the NATO retreat in the East. At the beginning of 2022, the US sent out and repositioned existing soldiers in Romania to ensure the 'robust defense' of European NATO members whilst at the height of war tensions. Several acts heightened the tensions along the Ukrainian border, including Russia launching military exercises and joint maneuvers with Belarus close to the Belarus/Ukraine border. Between 169,000 and 190,000 Russian troops were reported to have amassed at the border. In response, Ukrainians raised their national flag and played their national anthem to show unity as the West warned of an imminent Russian invasion. Further deployments of Russian troops, amphibious groups, ships, and missile-capable vessels led Ukraine to prepare their military and population for an attack, the parliament voting for a state of emergency. Curfews were imposed, airports closed their air space, and Russia-based Ukrainians were advised to leave the country as soon as possible. On 24th February 2022, massive air strikes hit critical infrastructure all over Ukraine (including the capital of Kyiv) and Russian troops were ordered to invade, attacking cities all over Ukraine and Crimea (Obrizan, 2022).

It is estimated that from 24 February 2022, which marked the start of the large-scale armed attack by the Russian Federation, to 24th September 2023, there have been 27,449 civilian casualties in the country: 9,701 killed and 17,748 injured. (OHCHR, 2023). Kutyrova (2022) describes this event as 'the destruction of a security cocoon' where the sheer loss of lives, homes, familiarity, and certainty for the future began to characterize Ukrainians' lives.

6.2 Literature Review

6.2.1 Direct Impacts

The people of Ukraine have endured a significant ordeal during this ongoing conflict since 2014. Having replicated and examined the effects of WWII, focus now shifts to the current and pressing conflict between Russia and Ukraine. Given the recent occurrence of Russia's invasion of Ukraine, there remains a limited body of literature on this war. Nonetheless, several studies have used this conflict to analyze the various flow-on effects of the Ukraine-Russia war.

The effects of the Russian invasion go beyond casualties and political instability. The economy took a major hit in Ukraine during the first month of the war (Shubalyi & Gordiichuk, 2022). After martial law was implemented, most businesses and institutions ceased operation, and refugees surged to the central regions of the country to seek safety in more secure territories and abroad. There was an uptick in both the mobilization effort and voluntary military enlistment, leading to a forecasted sharp decline in the Ukrainian economy by 35%. These authors state that even if the war ends relatively soon, the repercussions from the sheer number of casualties, loss of physical capital, and citizen displacement will reverberate across the economy for many years to come.

Just three months into the war saw unemployment soar, and in combination with mass forced displacement, the ensuing poverty levels were unprecedented (Obrizan, 2022). Using Omnibus survey data from Kyiv International Institute of Sociology, Obrizan (2022) found that the Russian invasion had a causal effect on the socio-economic status of Ukrainian citizens who experienced violence in their home cities. Displacement did not alleviate these effects but instead increased the probability of unemployment among those. The invasion also caused disruption to universities and research institutions in Ukraine as many scientists and teachers were forced to move across or out of the country (Ganguli & Waldinger, 2023). Effects

such as these will worsen as the war continues and have the potential to last for decades. This conflict has also been found to have a profound impact on the mental health of adolescents. A large epidemiological study by Osokina et al. (2023) found high levels of trauma, PTSD, anxiety and depression because of exposure to both violent and non-violent[24] war-related events[25]. Obrizan & Iavorskyi (2022) studied the effect of the earlier war in 2015-2016 on population health. Although they did not find any statistical significance in their results, suggestive findings indicate that Ukrainians rely more on traditional medicine and self-medication as opposed to formal medicine[26]. In the qualitative literature, Kutyrova (2022) took assigned biographical essays of students in Ukraine whose university was bombed in the first weeks of the war. The question presented to these students was the following: Is happiness possible during the war? In reading these essays, it is evident that there is a paradox of war. Survival becomes an incredibly concentrated living of life, and these students identified value in family, support systems, national identity and hope, finding means of preserving the meaning of life in conditions where this meaning may be lost. Therefore, these essays and the World Values Survey suggest that Ukraine is on average increasingly happy, despite the myriad of country-wide upheavals they have experienced over the years.

One area lacking in robust exploration regards how individuals' wellbeing is affected by their geographic proximity to the conflict. Guriev and Melnikov (2016) conducted a study on the impact of the Eastern Ukraine conflict on social capital in Russia, revealing that the conflict had an adverse influence on social capital, with its magnitude being negatively correlated with the proximity to the conflict zone.

6.2.2 Indirect Impacts

While the impact of conflict on population well-being is a commonly researched topic, many studies predominantly stem from the countries where these wars or conflicts have taken

[24] Refers to events such as forced relocation and loss of social support. See Osokina et al. (2023) for more information.

[25] This study was undertaken by comparing adolescents in Donetsk, a war-torn region in Ukraine, to Kirovograd, a region in central Ukraine, the severity of the impacts found primarily in those in the Donetsk group. Non-violent war trauma was found to influence mental well-being in the same way as direct war violence, as found in adolescents from Kirovograd. See Osokina et al. (2023) for more information.

[26] Other explanations included data quality, and population statistics failing to reflect the actual level of internal and external migration. See Obrizan and Iavorskyi (2022) for more information.

place[27]. In contrast, I aim to contribute to the literature by examining how the Russia-Ukraine conflict has affected individuals in countries without direct war experience, providing a nuanced analysis of their impact on livelihoods across Europe. The article by Coupe and Obrizan (2016) relates closely to this section, as they examined the conflict in Ukraine and found that average levels of life satisfaction declined only in the conflict zones, whilst there was no discernible change in the other regions. This highlighted the substantial difference in average levels of happiness between individuals residing in war-affected areas and those unaffected by direct war violence.

Some of the literature expands on the indirect consequences that conflicts can inflict on individuals. Helliwell et al. (2023) used data from the Gallup World Poll to compare the life evaluations in Ukraine vs. Russia, both prior to the Crimea annexation and during the Russian invasion. These life evaluations were equivalent in 2020 and 2021, however, in 2022 they fell by about three-quarters of a point across Ukraine, whereas in Russia, they increased. They conclude that life evaluations do indeed respond to life events such as war. Utilizing the Russian Longitudinal Monitoring Survey, Gokmen and Yakovlev (2020) looked at the effect of the Russo-Georgian conflict on the life satisfaction of Georgians living in Russia. They found that during the conflict of 2008, the wellbeing of Georgian nationals living in Russia declined significantly in comparison to the life satisfaction of the majority of Russian citizens. On the other hand, there was no average change in the happiness of Ukrainians after the 2014 Ukrainian-Russian conflict, but instead a drop in life satisfaction of Ukrainians residing in Russia, close to the border.

7 Data and Methodology

7.1 Data

Unlike Kijewski (2020) and Djankov (2016) who use data from several decades after a conflict (WWII), this section will use individual level data to focus on the effects of a current and ongoing conflict on life satisfaction. Specifically, I contribute to the literature by analysing the

[27] See the literature review in Section 2.

impact of the war in Ukraine on residents in other countries of Europe, using data from the Eurobarometer survey.

The Eurobarometer survey serves as a vital polling instrument utilized by the European Commission, the European Parliament, and other EU institutions to systematically gauge public opinion within Europe on matters related to the European Union and broader political or social issues[28]. This survey is representative of the entire EU and consists of approximately 1,000 face-to-face interviews in each of the 27 member states[29], alongside 12 other countries and territories[30].

For my analysis, I use the Standard Eurobarometer which is conducted twice a year and monitors key trends relevant to the European Union. The methodological approaches vary, including face-to-face, telephone, and online interviews, each designed to ensure the representativeness of results across different countries or territories. The sample sizes and selection process aim to guarantee demographic and geographical representativeness, providing valuable insights into public perceptions and sentiments. Of particular importance to this analysis, it offers observations both prior to and following the Russian invasion of Ukraine.

Two separate Eurobarometer datasets are utilised for this analysis. The pre-invasion dataset version 96.3 was conducted in January-February 2022, and the post-invasion dataset version 97.5 was conducted in June-July 2022, a few months after the war had started. I refer to these as the pre-war (January-February 2022) and post-war (June-July 2022) surveys.

[28] For more in-depth information about the Eurobarometer, visit https://europa.eu/eurobarometer/about/eurobarometer

[29] With the exception of Germany (1,500 interviews), Luxembourg (500 interviews), and the United Kingdom (1,300 interviews, including 300 in Northern Ireland). A full list of the countries involved, and the details of their respondent count can be found at https://europa.eu/eurobarometer/screen/home.

[30] These other countries and territories are the following: Albania, Montenegro, North Macedonia, Serbia, Turkey, Turkish Cypriot, Bosnia and Herzegovina, Iceland, Kosovo, Norway, Switzerland, and the United Kingdom (UK).

7.2 Methodology

The descriptive statistics of the following variables included in the regression are found in Appendix 11.2.1.

For the analysis of this section, I choose to follow Djankov's OLS model for the baseline regression. This is supplemented by a range of robustness checks [31].

In my baseline model, the dependent variable is consistent with the previous section, measuring the life satisfaction of the individual respondents from the question: 'On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?' using a scale of 1 ('very satisfied') to 4 ('not at all satisfied'). This was coded into a binary variable with those responding as satisfied into 1 and not satisfied into 0.

The LiTSII survey in the preceding section included a question asking participants whether they or their families experienced injuries, fatalities, or displacement during World War II. This same question was also posed to respondents regarding their country-specific conflict experience, where applicable[32]. The Eurobarometer survey instead focuses its questions on the Ukraine-Russia conflict. A specific section of the survey is dedicated to this, posing several questions to respondents regarding the more indirect impacts of war.

A first question asks the respondent to choose from a scale of 1 (totally agree) to 4 (totally disagree) for the statement: 'The war in Ukraine has had serious financial consequences for you personally'. Based on this, I create the variable *Financial Impacts of War,* taking on the value of 1 if 'agree' or 'tend to agree' and 0 otherwise. The next question, 'In general, how satisfied are you with the response to the Russian invasion in Ukraine by (your nationality)?', was transformed into *Dissatisfied with Country Response,* a binary variable with 1 as dissatisfied and 0 as satisfied. The variable *Fears War Spread* is sorted into 1 if yes and 0 if no to the following: 'Which possible consequences of the war in Ukraine do you personally fear

[31] See Appendix 11.2.2 for robustness measures.

[32] The LiTSII survey excludes Yugoslavia, Azerbaijan, Georgia, Tajikistan as these countries did not experience conflict within their country for the purposes of the LITSII survey. For LITSIII, former Yugoslavia, Armenia, Azerbaijan, Georgia, Kyrgyz Republic, Russia, Tajikistan, and Ukraine are excluded.

the most? The war spreading to your own country.'[33] *Security Threat* is a variable derived from the statement: The invasion in Ukraine is a threat to the security of (your country), where 1 is agree and 0 is disagree.

In addition, I create variables that summarize the general information contained in individual variables. Firstly, *Any War Impact* takes on the value of 1 if any of the aforementioned war variables take on the value of 1, otherwise 0. On the other hand, if all of the war variables above take on the value of 1 for a respondent, this is coded as 1 to create the variable *War Sum*.

From the question above, 'Which possible consequences of the war in Ukraine do you personally fear the most?' two additional binary variables are derived, utilizing the list of the eight subsequent 'fears'. *Indirect Fears* refers to the respondents choosing either one or two of the following: Inflation/rising prices, difficulties in welcoming refugees, more frequent cyber-attacks, problems in supply of energy or goods, a major economic crisis. *Direct Fears* is created from the following choices: the war spreading to more countries in Europe, the war spreading to your own country, a nuclear war.

The above variables represent self-reported, subjective measures of war experience and opinions. To enhance this analysis, I create an objective variable: *Distance to Kyiv.* The probability of war spilling over to directly impact a particular region can be argued to increase as geographical distance to the centre of the conflict decreases. The concentration of refugees in bordering countries is much higher compared to non-bordering countries, many of whom are displaced due to conflict (World Bank, 2010). For instance, Ukrainian refugees primarily seek safety in neighbouring countries such as Poland, Hungary, Romania, Slovakia and Moldova (International Rescue Committee, 2022). When these refugees share the same cultural and linguistic group as the local population, there is greater potential for peaceful co-existence and positive interaction opportunities, often driven by shared cultural and historical ties (Pearson, 1974). Geographical proximity also increases the likelihood of ideological

[33] This question was asked alongside a list of eight 'fears' of which the participant was to choose a maximum of two 'fears' in response.

similarities and common interests between countries. Consequently, from a geographical standpoint, the closer one is to a country in the midst of war, the greater their fear regarding potential indirect spillover effects from the conflict. Therefore, this continuous variable is constructed by mapping the as-the-crow-flies distance (in kilometres) between each European region's capital city to Kyiv, the capital city of Ukraine. For example, the distance between Athens in Greece and Kyiv in Ukraine is approximately 1,476kms.

I use the variables outlined above to create a robust overview of the impacts that this Ukraine-Russian conflict has had on individuals living in Europe both at the subjective and objective level. *Any War Impact* and *War Sum* provide a measure of the intensity of individuals' war experience. *Indirect Fears* captures more indirect, peripheral fears that people may be experiencing at the time of the survey comparative to *Direct Fears*, the fears that directly, physically relate to the warring conflict in question. These indicators are used alongside the subjective, individual war variables and the objective, *Distance to Kyiv* variable to create a bigger picture of how the populations within Europe have been living, feeling, and experiencing the war. All these war experience variables are summarised in Table 7.

I include several control variables that closely follow the structure of the regressions in the previous section. These were chosen as they align with the literature, following what Kijewski (2020), Djankov et al. (2016) and many others have used as being commonly associated with life satisfaction.

I include age as a continuous variable, and a binary gender variable where females are labelled 1 and males are labelled 0. A *Marital status* variable is split into married (omitted category), in a relationship, single, divorce/separated, and widow, whilst education is categorized into three levels: low, medium, and high[34].

[34] *Low education* is categorized by less than primary, primary and lower secondary education, *medium education* by upper secondary and post-secondary non-tertiary education, and *high education* by tertiary education. This follows the International Standard Classification of Education, a reference international classification for organising education programmes and related qualifications by levels and fields. See https://ec.europa.eu/eurostat/statistics-explained/index.php?title=International_Standard_Classification_of_Education_(ISCED)#:~:text=ISCED%201%3A%20Primary%20education,Post%2Dsecondary%20non%2Dtertiary%20education for more information.

Table 7: Description of all war-related control variables included in analysis.

Variable Name	Description	Measurement
Financial Impacts of War	The war in Ukraine has had serious financial consequences for the individual personally	1 if agree, 0 if disagree
Country Response	Are you satisfied are you with the response to the Russian invasion in Ukraine by your country?	1 if dissatisfied, 0 if satisfied
Fears War Spread	Expresses personal concern about the Ukraine conflict potentially spreading to their own country	1 if yes, 0 if no. From list of 8 'fears', maximum of 2 choices
Security Threat	Believes the invasion in Ukraine is a threat to the security of the individual's country	1 if agree, 0 if disagree
Distance to Kyiv	The calculated distance from Kyiv, Ukraine to the capital city of each European region	Unit of measurement: km
Any War Impact	Indicator variable: If the respondents identify with any of the first four variables above related to the war in Ukraine	1 if any of the variables are equal to 1, 0 otherwise
War Sum	Indicator variable: If the respondents identify with all of the first four variables related to the war in Ukraine	1 if all of the variables are equal to 1 for a respondent, 0 otherwise
Indirect Fears	Fears, as a result of the possible consequences of war in Ukraine, from the following list: -Inflation/rising prices -Difficulties in welcoming refugees -More frequent cyber attacks -Problems in supply of energy or goods -A major economic crisis	1 if one is selected, 2 if two are selected, 0 if none are selected
Direct Fears	Fears, as a result of the possible consequences of war in Ukraine, from the following list: -The war spreading to more countries in Europe -The war spreading to our own country -A nuclear war	1 if one is selected, 2 if two are selected, 0 if none are selected

The occupation variable adopts the ISCO-08 classification[35] where the categories unemployed, student, not working, agriculture, professionals, crafts, managers, clerical workers, and

[35] International Standard Classification of Occupations; an International Labour Organization classification structure for organizing information on labour and jobs. It is part of the international family of economic and

service and sales workers are assigned a value of 1 if they match the respondent's occupational class and 0 otherwise. *Health* is 1 if the person self-reports health to be one of the two most important issues they are currently facing and 0 otherwise[36]. Similarly, *Religion* is 1 if the respondent selected religion as one of their most important values and 0 otherwise.[37]

As discussed in the section above, regressions that study happiness often include income as a control variable. As the Eurobarometer survey does not provide a direct measurement of income, I have opted to instead use income proxies. The first is a categorical variable of self-reported social class, a categorical variable with 1 as working class, 2 as lower middle class, 3 as middle class, 4 as upper middle class and 5 as higher class. The second uses the question: 'During the last twelve months, would you say you had difficulties to pay your bills at the end of the month?'. Those who responded 'most of the time' are coded as 1 and others as 0.

I categorise respondents' places of residence into community types of rural area or village, small or middle-sized town, or large town. Trust in both the army and the government of the respondent's country is coded as 1 if they 'tend to trust' and 0 if they 'tend not to trust' for each variable. Attachment to respondent's country and community[38] is also measured; 1 is attached, and 0 is not attached. I create a transition country dummy variable, taking on the value of 1 for Eastern European or 'transition countries' and 0 otherwise[39].

For comparison purposes, the data for this analysis comes from two survey waves: the pre-war survey and the post-war survey. While several of the control variables from the post-war survey was also available in the pre-war survey, the variables of *Health, Religion*, and all war-

social classifications of the United Nations. See ISCO - International Standard Classification of Occupations (ilo.org) for more information.

[36] This variable is derived from the question: 'And personally, what are the two most important issues that you are facing at the moment?' A list of 15 options is available to select a maximum of two answers from, one being health.

[37] This variable uses the following statement: 'In the following list, which are the most important values for you personally?' with a list of 13 values available to select a maximum of two answers from, one being religion.

[38] 'Community' refers to the respondent's city, town, or village.

[39] Of the countries in the study, the following are grouped as Eastern European or 'transition countries': Albania, Bosnia and Herzegovina, Bulgaria, Croatia, North Macedonia, Kosovo, Montenegro, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia, and Serbia.

related variables were introduced only in the post-war survey. To further facilitate comparison, I merge these two surveys by their common variables[40]. Within this merged dataset, I introduce a binary variable identifying the post-war survey data as '1' and the pre-war survey data as '0'.

It is important to analyse a multitude of ways in which individuals in Europe have been impacted by this war. Examining various dimensions of the individual impact of war provides a comprehensive understanding of the factors that influence wellbeing. Aspects such as distance to the war, concern over safety and security, and detrimental financial impacts all contribute to a more nuanced view of the overall effect of war on these individuals. Additionally, individuals may respond differently to these questions based on their personal circumstances, so exploring along these multiple dimensions allows the regression model to capture a more accurate representation of individual response to the conflict occurring in Ukraine. There also exists a limitation to the survey design where no one singular question can provide an absolute measure of individual war experience. All these factors contribute to the importance and therefore my decision to use several ways of measuring how individuals living throughout Europe have experienced this conflict.

[40] Due to formatting differences in the data, the merged dataset does not include information about respondent education. The full list of variables involved in the pre-war, post-war and merged survey models are listed in Appendix 11.2.1.

8 Results

The first model (Table 8) outlines the results of a regression of happiness (a dummy variable, 1 being satisfied with life and 0 not satisfied with life) on a range of control variables and our main war-related variables of interest.

Table 10: Ukraine-Russia War Experience and Life Satisfaction Regression Results

War Experience and Life Satisfaction Regression Results

	Dependent variable:		
	Life Satisfaction		
	(1)	(2)	(3)
Experienced Financial Effects of War	-0.052***		
	(0.005)		
Dissatisfied with Country's War Response	-0.071***		
	(0.005)		
Fears the War Spreading to their Country	0.004		
	(0.005)		
Believes the War to be a Security Threat to their Country	0.028***		
	(0.005)		
Age	-0.0005**	-0.001***	-0.0005***
	(0.0002)	(0.007)	(0.0001)
Relationship	0.048***	0.020***	0.037***
	(0.008)	(0.007)	(0.005)
Single	-0.021***	-0.021***	-0.018***
	(0.007)	(0.006)	(0.005)
Divorced or Separated	-0.010	-0.029***	-0.016***
	(0.009)	(0.008)	(0.006)
Widow	-0.034***	-0.032***	-0.035***
	(0.008)	(0.007)	(0.005)
Female	0.016***	0.013***	0.014***
	(0.005)	(0.004)	(0.003)
Unemployed	-0.084***	-0.099***	-0.104***
	(0.012)	(0.011)	(0.008)
Student	0.031***	0.026**	0.021***
	(0.012)	(0.011)	(0.008)
Out of Labour Force	0.020**	0.012	0.022***
	(0.009)	(0.008)	(0.006)
Agriculture	-0.047**	-0.018	-0.047***
	(0.020)	(0.021)	(0.014)
Professionals	0.017*	0.004	0.011*
	(0.009)	(0.008)	(0.006)
Crafts	-0.023	-0.045***	-0.044***
	(0.015)	(0.014)	(0.010)
Managers	-0.008	-0.025**	-0.024***
	(0.013)	(0.012)	(0.009)
Clerical Workers	0.034***	0.036***	0.041***
	(0.013)	(0.013)	(0.009)

Service and Sales Workers	-0.013	-0.014*	-0.022***
	(0.009)	(0.008)	(0.006)
Lower Middle Class	0.014*	0.030***	0.028***
	(0.007)	(0.007)	(0.005)
Middle Class	0.071***	0.095***	0.095***
	(0.006)	(0.005)	(0.004)
Upper Middle Class	0.093***	0.121***	0.130***
	(0.010)	(0.009)	(0.006)
Higher Class	0.117***	0.144***	0.154***
	(0.027)	(0.024)	(0.018)
Difficulty Paying Bills	-0.250***	-0.242***	-0.256***
	(0.008)	(0.008)	(0.005)
Small/Middle Size Town	-0.001	0.009*	0.007*
	(0.005)	(0.005)	(0.004)
Large Town	-0.039***	-0.025***	-0.029***
	(0.006)	(0.005)	(0.004)
Trust in Country's Army	0.079***	0.114***	0.106***
	(0.005)	(0.005)	(0.004)
Trust in Country's Government	0.070***	0.103***	0.101***
	(0.005)	(0.004)	(0.003)
Attachment to City/Town/Village	0.038***	0.037***	0.033***
	(0.007)	(0.007)	(0.005)
Attachment to Country	0.054***	0.062***	0.064***
	(0.009)	(0.008)	(0.006)
Transition Country	-0.083***	-0.069***	-0.055***
	(0.005)	(0.006)	(0.004)
Medium Education	0.042***	0.024	
	(0.007)	(0.069)	
High Education	0.040***	0.033	
	(0.008)	(0.069)	
Health	0.005		
	(0.006)		
Religion	-0.039***		
	(0.009)		
Distance to Kyiv		0.00002***	0.00003***
		(0.00000)	(0.00000)
Post-War Indicator			-0.010
			(0.008)
Distance to Kyiv*Dataset Indicator			0.00001*
			(0.00000)
Constant	0.676***	0.576***	0.556***
	(0.019)	(0.071)	(0.014)
Observations	27,522	32,337	59,839
R^2	0.171	0.165	0.161
Adjusted R^2	0.170	0.164	0.161
Note:			*p<0.1; **p<0.05; ***p<0.01

Column 1 of Table 8 represents the post-war survey results, column 2 the pre-war survey results and column 3 the merged dataset results. Note that the answers to these were collected four to five months after the invasion officially began and therefore the results of this analysis will reflect this time.

Facing financial difficulties resulting from the war is associated with a decrease in the probability of being happy by –0.052 percentage points. Similarly, an individual's dissatisfaction with their country's response to the Russian invasion also has a negative impact on happiness, with a coefficient of –0.071. Both are statistically significant at the 1% level. There is no evidence that concern over the conflict spreading to a respondent's country does indeed influence life satisfaction, as the estimated coefficient of this variable is not statistically significant, and the magnitude of the coefficient is small at 0.004. Surprisingly, the first column suggests that the probability of being happy is somewhat higher for those who believed the invasion to be a security threat to their country, with an estimated coefficient of 0.028.

Following on from these war-related control variables, other independent variables are seen to have an influence on life satisfaction. Married as the base category sees those in relationships more likely to be happy, whereas the opposite holds true for those who are single and widowed. The probability of being happy is higher for females than for males, and compared to those with low levels of education, people with medium and high levels of education are more likely to have higher life satisfaction. All these results are significant at the 1% level.

Occupation type produces mixed results. Those not in the labour force are the omitted category and in comparison, unemployment and agricultural professions have a significant negative impact on life satisfaction, whilst the opposite is true for students, professionals, and clerical workers.

Respondents report their social class in the survey, establishing a proxy measure for income. Using the base category of working class, each higher social class has a subsequent greater positive influence on life satisfaction. The next proxy for income is respondent's difficulty in

paying their bills. If 'yes', respondents are 24.9% points less likely to indicate they are happy, this measure by far having the largest impact on life satisfaction of all the independent factors.

Compared to a rural area or village, living in a large town has a negative significant impact on the likelihood of being happy, whilst there is no effect for those from small or middle-sized towns. Surprisingly, physical health is not shown to significantly influence the probability of being satisfied with life, but if religion is important to the individual, the chance of being happy is generally lower than other respondents.

Maintaining trust in both the nation's army and government is associated with increases in the likelihood of life satisfaction, compared to a lack of trust in these institutions. Attachment to one's community and country, in contrast to minimal or no attachment, positively and significantly influences the probability of being happy. Finally, individuals from transition countries are associated with a lower probability of life satisfaction than those in non-transition countries.

I next enhance this analysis by using alternative measures of war experience. Table 9 provides an overview of the modifications, with the right-hand column outlining each variable independently added to the original regression. Consistency is maintained across all regressions by including the full set of control variables[41], the first column presenting the original regression's war-related variables for reference.

First, each of the initial war-related variables are independently introduced. Individuals experiencing adverse financial impacts from the war are less likely to report happiness compared to those unaffected. Respondents dissatisfied with their country's response to the war likewise have a lower chance of being satisfied with life. Surprisingly, fearing the war would spread to their county does not exhibit a statistically significant influence on life satisfaction. Those perceiving the war to be a security threat to their country puzzlingly have

[41] The exception to this is the pre-war results, and therefore the pre- and post-war merged regression. This is due to the pre-war survey lacking the consistency in their questions and data such that the same control variables were not available to be constructed. The full list of variables involved in the pre-war and merge surveys are listed in Table 12 in Appendix 11.2.1.

higher probability of happiness. Respondents with one or more 'indirect' fears experience a significant and negative effect on the likelihood of life satisfaction. Unexpectedly, *Direct Fears* have the opposite effect, increasing the probability of being satisfied with life.

Table 13: Regression results of the independently introduced war-related variables.

War Experience Results		
Financial Impacts of War	-0.052***	-0.046***
	(0.005)	(0.005)
Dissatisfaction with their country's response	-0.071***	-0.074***
	(0.005)	(0.005)
Fears War Spread	0.004	0.008
	(0.005)	(0.005)
Security Threat	0.028***	0.029***
	(0.005)	(0.005)
Indirect Fears		-0.017***
		(0.003)
Direct Fears		0.021***
		(0.003)
Any War Impact		-0.028
		(0.010)
All War Impact		-0.022***
		(0.002)
Distance to Kyiv		0.000***
		(0.000)
Distance to Kyiv*Post War		0.000***
		(0.000)

Statistically significant effects are marked with *** p < 0.01, ** p < 0.05, * p < 0.1. Standard errors are in paretheses.

For respondents reporting any war experiences under the variable *Any War Impact,* the probability of being satisfied with life is lower compared to those who have not experienced such impacts. The same is true for respondents who identify with having experienced all the measured war impacts. The distance of respondents from Kyiv positively influences life satisfaction, reaching significance at the 0.1% level, indicating that those who live further away from the war are more likely to report happiness.

Using the pre-war survey conducted in January and February of 2022, I next create variables and conduct further regression analysis. Even before the official commencement of the war, the distance individuals resided from Kyiv had significant positive effect on the probability of being satisfied with life, although with a very small coefficient. Table 8 displays the variable with the distance scale increased by 10,000 (therefore this is in 10,000kms instead of kms),

demonstrating an amplified coefficient result of the impact of distance on life satisfaction. The merged dataset allowed the examination of this impact of distance on happiness over time. By incorporating the variable indicating responses from the post-war survey[42] and the distance variable, I create an interaction term labelled *Distance to Kyiv*Post War*. This interaction term suggests that the effect of distance on happiness became more important after the war, implying that the further one is from the war, the higher probability of happiness, although this is only weakly significant at the 10% level.

Until now, I have not incorporated country fixed effects, following Djankov et al. (2016) approach, and have solely included a transition country dummy to control for country effects. To ensure my findings are robust, I conduct a robustness check by introducing country-level fixed effects to each of the models, as displayed in Table 13, found in Appendix 11.2.2. The results consistently exhibit the same sign and significance as the original findings, reinforcing the stability and reliability of these outcomes.

In summary, employing different ways of quantifying war experience leads to a range of estimates, some positive and some negative. The size of these effects is relatively small, especially when compared to the influence of other variables. For example, facing serious financial consequences due to the war has a lesser impact on happiness than being unemployed, showing that the effect of ordinary life circumstances is comparable to war experience in both size and significance.

9 Discussion

The outcomes presented in Section 8 bear an element of uncertainty, indicating that the impact of war experiences on life satisfaction depend on the specific way war experience is formulated. This analysis incorporates various measures of war experience, ranging from the financial hardships induced by the war to individuals' proximity to the capital city of Ukraine, all of which yield different estimates. The collective results do not offer a definitive conclusion

[42] This binary variable takes on the value of 1 if the respondent's answers came from the post-war survey wave and 0 if from the pre-war survey wave.

regarding the effect of the Ukraine-Russia war on the happiness of European citizens. This lack of a clear, overarching conclusion can be attributed to two key factors.

As previously discussed, the specific methodological choices made during the analysis process play a crucial role in shaping outcomes. For this analysis, I follow the approaches that Kijewski (2020), Djankov et al. (2016), Obrizan (2019), and much of the general happiness literature adopt to analyse the relationship between happiness and experience with war. However, whilst Kijewski (2020) and Djankov et al. (2016) use similarly defined war experience variables, I opt to include a range of war experience indicators, both subjective and objective, all of which led to different conclusions. The obtained results were not consistent, instead revealing a mix of negative and positive findings with varying degrees of significance. In this analysis, the variation in estimates can be specifically attributed to the different methods of measuring war experience. For instance, believing the war to be a security threat to your country has a seemingly paradoxical positive and significant impact on happiness. Choosing the definitions of these variables leads to these differing outcomes, and as a result, the overall conclusion of a study is highly sensitive to the choices made by analysts, including decisions such as choosing a specific measure of war experience.

Furthermore, regardless of whether they are positive, negative, significant, or not, the coefficients derived from the analysis exhibit consistently small magnitudes. It is even the case that other control variables have a much higher relative impact on life satisfaction than any war experience variables in the same model. For example, being unemployed has a more consistently negative and significant effect on life satisfaction than any war exposure an individual may experience. The same holds true for those who have trouble paying their bills in comparison to war experience[43]. This suggests that life circumstances such as income, education, and occupation have more influence on happiness than any indirect war experiences. Therefore, this data presents a consistent pattern of small coefficients, highlighting that according to this analysis, if they have any influence at all, war experiences at best have an impact that is relatively smaller than other facets of life.

[43] See Table 8 for exact coefficients.

10 Conclusion

I have found little evidence that war experience, no matter how it is defined or captured, has a significant influence on the self-reported subjective wellbeing of individuals. As a result, the primary focus of this paper is not how war impacts on an individual's wellbeing but also how the outcomes of such analyses are susceptible to regression model alterations.

The first part of this thesis uses replication to examine the results of the impact of World War II on life satisfaction 60 years after the war took place. Two papers, Kijewski (2020) and Djankov, Nikolova and Zilinsky (2016), use the same database and similar models to examine the relationship between happiness and experience with war for individuals residing in Europe, arriving at opposite conclusions. Kijewski (2020) finds that experience with WWII is negatively related to happiness with a coefficient of -0.084 and significant at the 1% level, whereas Djankov et al. (2016) finds no effect, with a statistically insignificant coefficient of -0.008. I successfully replicate these papers and then modify the regression specifications to see just how such alterations affect conclusions. For example, I take Djankov et al. (2016) specification of war experience and apply it to Kijewski's (2020) regression model instead of Kijewski's (2020) specification. Making changes such as this provided a deeper understanding of the drivers of these outcomes.

The primary cause underpinning the varying size and significance of these conclusions are the selected definitions and inclusions of the regression models. Altering the definition of a variable or including new ones into the regression influences the results and even the overall conclusions of an analysis. This is displayed in Figures 1 and 2, depicting how the influence of war experience on happiness changed with alterations to the models of both Kijewski (2020) and Djankov et al. (2016). The divergence in conclusions between Kijewski (2020) and Djankov et al. (2016) are attributed to three main factors.

Figure 2: Impact of primary regression alterations on the relationship between WWII experience and life satisfaction (Kijewski, 2020))

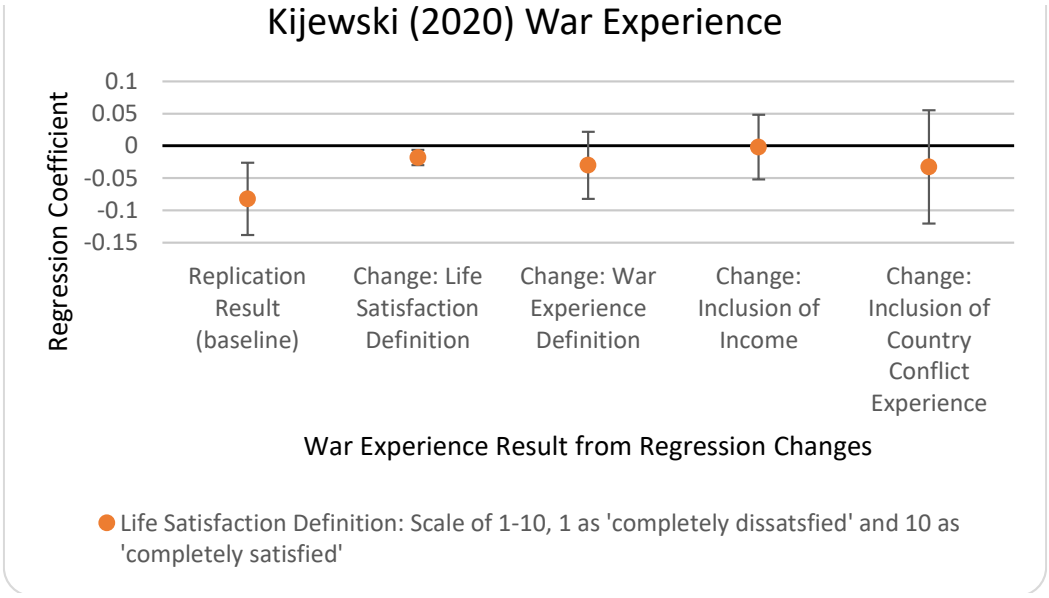
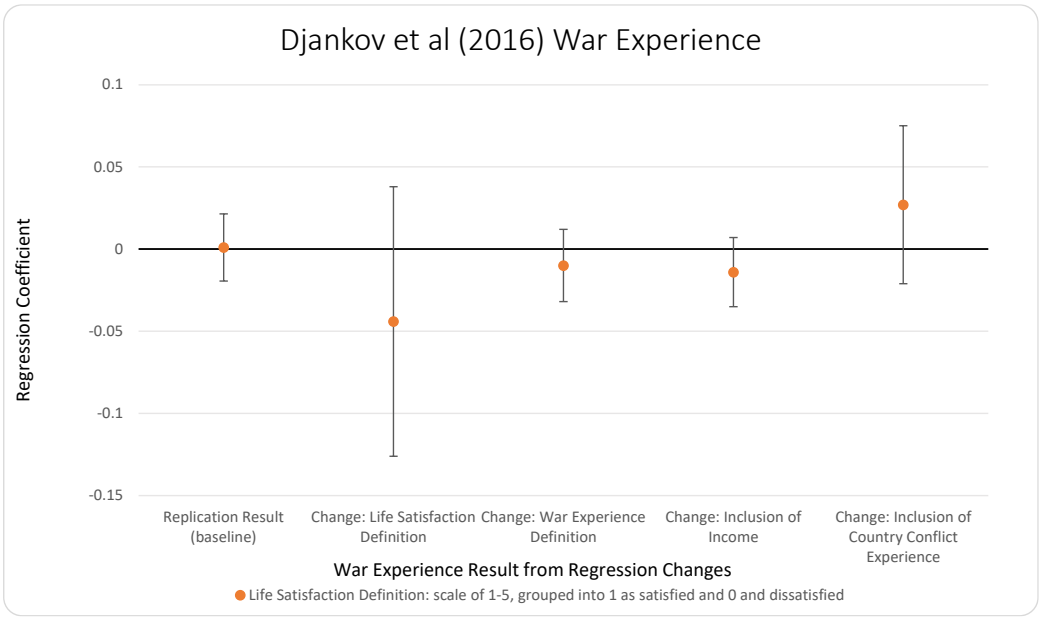


Figure 5: Impact of primary regression alterations on the relationship between WWII experience and life satisfaction (Djankov et al., 2016)



First, one of the most significant factors influencing these authors' conclusions is their definition of an individual's experience of war. Djankov et al. (2016) combines two aspects of war experience into a single variable, while Kijewski (2020) treats them individually. Their

specifications lead to opposite results, with Djankov et al. (2016) approach yielding no significant effect on life satisfaction when applied to Kijewski's model.

Second, the decision to include income in a regression analyzing war experience and happiness also alters the overall results. Kijewski (2020) chooses to exclude income with the belief that it is a flow-on effect from war and thus has an indirect impact on happiness, whilst Djankov et al. (2016) includes it in their regression. Including income in Kijewski's (2020) regression model renders the relationship between war experience and happiness insignificant, verifying that if the total effect of war on life satisfaction was desired to be seen, income should be omitted from the regression.

Third, the introduction of country-level conflict variables diminishes the previously significant impact of WWII experience on subjective wellbeing, converting it to statistical insignificance.

Kijewski (2020) and Djankov et al. (2016) conduct their analyses more than 60 years after WWII officially ended. Therefore, these studies examine the current impacts on happiness of wartime experiences that have not been directly encountered for decades, incorporating responses from participants in many countries, including those directly involved in the war. A time discrepancy is created between past war experience and current life satisfaction, potentially obscuring the short-run impact of this relationship.

The second part of this thesis addresses this issue, introducing a new perspective by transitioning from studying a war that occurred over six decades ago to a more recent conflict – the Russia-Ukraine war. In contrast to Kijewski (2020) and Djankov et al. (2016), I take a different approach and examine the more current war between Ukraine and Russia, thereby eliminating any time discrepancies between war experience and reported subjective wellbeing. The absence of responses from individuals residing in Ukraine adds another dimension to this analysis as the focus falls to people living in every other European country, exploring their indirect experiences with the ongoing war and their subsequent impact on happiness. I therefore contribute to the literature by incorporating time and geographical dimensions into this analysis.

Formulating this model required crucial decision-making, choices of which directly shaped the outcomes of the regression. I decide to deviate from the singular indicator of war experience used by Kijewski (2020) and Djankov et al. (2016). Instead, I opt to incorporate a range of subjective and objective war experience variables to paint a more comprehensive picture of the ways in which war is indirectly experienced. Subjective measures include factors such as an individual's dissatisfaction with their country's response to the Russian invasion, and the personal financial impacts of the war. An objective measure involves an assessment of respondent distance from Kyiv, the capital city of Ukraine and one of the epicenters of the conflict. This objective metric provides an unbiased means of gauging proximity to the conflict, adding a geographical dimension to the analysis.

Despite adhering to the established approaches of the happiness literature, the outcomes of the analysis regarding the more current war between Ukraine and Russia are mixed. This is again primarily due to the specific choices made during the model construction process, namely the decision to include a variety of war experience variables, explaining why Kijewski (2020), Djankov et al. (2016), and the present study all come to such different conclusions. These analyses also reveal consistently small coefficients. Given their size and differing signs, it is difficult to find these results a convincing demonstration of the relationship between happiness and war experience. However, despite the size of these findings, they are highly significant and robust to country fixed effects, suggesting potential for further exploration at the intersection of indirect experiences with war, geographical proximity to conflict, and subjective wellbeing.

The mixed results found throughout this paper underscores the fragile nature of conclusions when subjected to the nuance of choice during the analytical process. This highlights the significance of transparency in research, particularly regarding the specific approaches authors use to derive their results. Providing insight into how researchers navigate challenges like missing data, bias, endogeneity concerns, and formulating their model parameters establishes an important standard for scientists. Increased transparency in analysis decision-making fosters a culture of reliable and accessible results, contributing to the accessibility of building upon other studies using tools such as replication.

In general, it is difficult to convincingly conclude that experience with war, either current or 60 years ago, has a true and significant effect on the wellbeing of people in Europe.

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12 Appendix

All figures in the appendix can be found in an open source excel file. Please see the link below for this resource.

https://www.dropbox.com/scl/fo/en1x1c1dlo608w4q9ifeg/h?rlkey=p982ner13rgz8ri4n4h915ye2&dl=0

12.1 Happiness and Income

This section of the appendix displays a comprehensive list of studies that include income or some form of income (e.g., a proxy such as household consumption) in their analysis of happiness.

12.1.1

Table 12: Happiness and Income Literature

12.2 Subjective Wellbeing Summary Statistics

This section of the appendix presents the descriptive statistics and full regression results of the models examining the relationship between war experience and life satisfaction.

12.2.1

Table 13: Descriptive Statistics of Ukraine-Russia Regression Variables

12.2.2

Table 14: Regression results of the relationship between Ukraine-Russia war experience and life satisfaction.