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A Systematic Review and Meta-analysis of Income Inequality and Crime in Europe: Do Places Matter?

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Abstract
While previous synthesis research studies have found income inequality to be the most consistent predictor of crime at the cross-national level, recent comparative research studies in Europe have implied that the magnitudes of income inequality-crime association might be different in cross-national studies depending on sample composition. Employing a systematic review and meta-analysis, this study aimed to systematically estimate the strength and variability of income inequality-crime association in Europe across multiple published articles and to investigate the intervening role of regions in this relationship. Additional analyses were conducted to detect the regional differences within Europe using the official secondary data of 36 European countries. Income inequality in Europe had a small impact on crime (Mr = .171, $k = 10$), indicating that income inequality accounts for only 3% of the variance in crime outcomes. While the income inequality-crime association was significant in Eastern/Northern Europe, income inequality had little or no effect on crime in Western/Southern Europe. The small association between income inequality and crime in Europe may be due to the well-developed welfare system, which helps to buffer the adverse effects of being poor. This study's findings highlight the importance of incorporating geographic characteristics into cross-national research using purposive sampling techniques.

Keywords Income inequality · Europe · Meta-analysis · Cross-national research

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Introduction

A large body of research has emerged seeking to explain differences in levels of crime across nations (Bennett 2004; Kim et al. 2014, 2015, 2018). This work has found sufficient evidence that crime rates are unequal over time and space (Santos and Testa 2018). International criminologists have sought to find national-level predictors of crime. As these cross-national studies have proliferated, a few researchers have conducted studies that synthesize the empirical findings (LaFree 1999; Nivette 2011; Pridemore and Trent 2010). These synthesis research results have shown income inequality to be one of the most consistent predictors of homicide rates at the cross-national level, while the findings for other factors such as unemployment, urbanism, social and cultural heterogeneity, and population structure are inconsistent in the literature (Cao and Zhang 2017; Nivette 2011).

Like the other two research synthesis on cross-national predictors of crime (LaFree 1999; Nivette 2011), Pridemore and Trent (2010) concluded that there is relatively consistent evidence for an association between homicide and income inequality cross-nationally. However, they indicated that future researchers need to pay closer attention to the results of the studies in which inequality was tested, as more than one-quarter of the available test results assessed by the authors were either null or in the opposite direction. Thus, it could be that the relationship between income inequality and crime varies by cultural context (Ioakimidis and Heijke 2016).

Recently, Cao and Zhang (2017) argued that "economic inequality [has] to be understood within the regional context and together they exert influence on homicide" (p. 31). Earlier, Stamatel (2006) also pointed out the importance of socio-historic context in the economic inequality-crime relationship. She suggested that the documented relationship between economic inequality and crime noted in the published research is different in cross-national studies, and influenced by sample composition.

As more international data have become available to criminologists, a considerable number of recent cross-national studies have since tested the relationship between income inequality and homicide. Many of these studies have employed large samples. For example, Santos et al. (2018) used data from 148 countries, and Lappi-Seppälä and Lehti (2014) analyzed data from 222 countries. Both studies concluded that inequality and homicide have a universal positive relationship. On the contrary, Hu et al.'s (2015) study with data from 43 European countries reached a different conclusion; their results suggested that, in the context of Europe, national levels of income inequality do not have an independent effect on homicide or suicide rates.

Furthermore, several cross-national studies have investigated the impact of income inequality on crime in Europe using regional datasets. One example includes a study by Stamatel (2009), who used data taken from 9 Eastern European countries that was collected between 1990 and 2003. Another example is a more recent study by Piatkowska et al. (2016) in which the authors analyzed data from 10 Eastern European countries that was collected between 1990 and 2011. The results from these two cross-national studies on the relationship between income inequality and homicide in Eastern Europe are inconsistent, with no significant effects found in Stamatel's (2009) work and a positive relationship noted in Piatkowska et al.'s (2016) research. Related, using data taken from 15 Western European countries between 1960 and 2010, Aebi and Linde (2014) found a non-significant negative correlation between estimates of income inequality and homicide. Collectively, these cross-national research studies have shown a lack of consistency in empirical findings on the relationship between income inequality and crime in Europe.

To date, there has been no systematic attempt to quantitatively synthesize the evidence linking income inequality and crime across different regions of Europe and for various types of crime. In the present study, we identified cross-national studies that have estimated the association between income inequality and crime indicators in Europe and performed a meta-analysis on this data to determine the strength of association between income inequality and crime, as well as the moderating effect of crime type. An additional purpose of the study was to detect the possible variation in income inequality's effects on crime across regions within Europe. Therefore, we also conducted supplemental analyses to compare the magnitude of the association between income inequality measures and different types of outcomes in four European regions using official secondary data taken from 36 European countries.

Literature Review: Income Inequality and Crime

Resource and economic deprivation theory assumes that certain deprivations can be criminogenic (Heimer 2019; Hooghe et al. 2011; Pratt and Cullen 2005). Scholars are divided in terms of the types of deprivations that predict criminal behaviors. While some argue from a Marxist perspective that absolute deprivation or poverty leads to crime among people with low levels of resources seeking daily survival (Bonger 1969; Pratt and Cullen 2005), other scholars insist that high levels of relative deprivation produced by income inequality are ultimately responsible for high crime rates (Blau and Blau 1982; Hooghe et al. 2011). Drawing on resource and economic deprivation perspectives, criminologists have repeatedly tested the effects of either poverty and/or income inequality on crime (Heimer 2019; Pratt and Cullen 2005). A meta-analysis on all macro-level variables and crime rates used in empirical studies between 1960 and 1999 concluded that the effects of both poverty and inequality on crime are relatively robust and stable across various methodological conditions—supporting the empirical status of the resource and economic deprivation theory (Pratt and Cullen 2005).

Similarly, one finding that emerged in early empirical tests with remarkable consistency is that high levels of income inequality increase homicide rates (Chamlin and Cochran 2006; Jacobs and Richardson 2008; Messner and Rosenfeld 1997; Pickett et al. 2005; Pratt and Godsey 2003). In more recent studies of income inequality and crime, a distinction has been noted between different types of crime (Costantini et al. 2018; Choe 2008; Hooghe et al. 2011). For example, using panel data from 50 states and the District of Columbia for the 1995 to 2004 timeframe, Choe (2008) investigated the relationship between income inequality, measured by the Gini index, and seven different crime categories. The results showed that relative income inequality had a strong and robust effect on burglary and robbery, but there was no significant relationship between income inequality and other categories of crime, including overall violent and property crime (Choe 2008). In addition to differences in the types of crime, variations in units of analysis across studies have yielded mixed results in the literature on the effects of income inequality on crime rates (Brush 2007). Using tract- and county-level panel data in the USA between 1990 and 2009, Kang (2016) found that the positive relationship between income inequality and violent crime is primarily driven by economic segregation across-tract inequality and not by local inequality within-tract inequality.

Most recently, Costantini et al. (2018) investigated the long-term relationship between crime, economic inequality, unemployment, and deterrence in the USA at the state level for data collected between 1978 and 2013 using non-stationary panels based on a common factor structure. The novelty of this study was to use different measures of crime rates (e.g., property,

violence, robbery, burglary, larceny, and auto theft) and various measures of inequality, including the top 10% and top 5% of income earners, as well as the Gini index. Costantini et al. (2018) found that, on average, their crime-theoretical model was able to explain the long-term relationship between measures of different types of crimes, inequality, unemployment, and deterrence. In regard to the effect of income inequality on crime, the results demonstrated that all inequality measures have a positive impact on the elasticities of both property and violent crimes. Costantini et al. (2018) concluded that "our analysis highlights that income inequality plays a crucial role in affecting all types of crimes" (p.563).

It should be noted that while the study of the relationship between income inequality and crime rates has a long history in criminology and economics (Brush 2007; Heimer 2019; Kang 2016), most of the evidence in this area has originated from data collected in the USA (Hooghe et al. 2011). Comparatively, little work in this area has been done abroad. In her presidential address on "Inequalities and Crime" to the American Society of Criminology (ASC), Heimer (2019) presented that the study of economic inequality should be central to criminology globally (p.378). She emphasized the importance of cross-national comparisons, particularly including European countries, as a strategy for understanding the link between macro-indicators of economic inequality and crime rates. That is, according to Heimer (2019), "findings from studies have shown that homicide rates are higher in countries with greater economic inequality and less supportive social welfare systems. It is important that scholars keep pursuing this line of work as we see chips in even the great social welfare systems of Europe: for example, even the "model" Scandinavian countries are beginning to discuss changes in social welfare support in the face of new patterns of immigration and the tensions that have rising to the surface in some areas" (p.382).

Previous Synthesis Research on Cross-National Predictors of Crime

Previous synthesis studies on predictors of crime at the cross-national level can be divided into two groups: one focusing on statistical significance—using the vote-counting method—and the other focusing on effect sizes using the meta-analysis method. Using a vote-counting strategy, LaFree (1999) presented a review and summary of 34 quantitative cross-national comparative studies on homicide. He concluded that "a positive association between economic inequality and homicide rates is among the most consistent findings in the cross-national homicide literature" (p. 141). In a more recent study using the "vote-counting" approach, Pridemore and Trent (2010) reviewed 65 cross-national studies on social structure and homicide. Their conclusion was consistent with the one from LaFree (1999). That is, they concluded that, while the findings for other correlates are inconsistent in the cross-national empirical literature, inequality is the most consistent predictor of homicide rates at the cross-national level. Notably, of the 49 studies in which inequality was tested, 36 found a positive association. However, Pridemore and Trent (2010) also noted that, still, more than one-quarter of the test results included in their analysis were null (n = 11) or in the opposite direction (n = 2).

National-level predictors of homicide and different types of crime have also been tested in meta-analytical research. Pratt and Cullen's (2005) meta-analysis compared the relative mean effect size estimates for 31 different macro-level predictors of crime extracted from 214 research studies, of which 12 were cross-national level research studies. Results revealed that economic deprivation is among the strongest macro-level predictors of crime. It must be noted

that Pratt and Cullen (2005) did not test for variations in effect sizes across the different units of analysis of primary studies. To date, Nivette's (2011) work is the only existing meta-analysis on cross-national predictors of homicide. Of the 30 predictors assessed, being in the Latin American region (*Mr* = .445) showed the most substantial effect on homicide, followed by income inequality as measured by ratios (*Mr* = .416) and indices (*Mr* = .224). This suggests that higher levels of income inequality are associated with higher homicide rates at the cross-national level.

It is important to note that an earlier meta-analysis by Hsieh and Pugh (1993) is distinguished from other meta-analyses in that the study exclusively focused on the relationship between economic deprivation and violent crime. Hsieh and Pugh (1993) estimated separate effect sizes across units of analysis from 34 aggregate-level research studies. The meta-analysis results showed a stable and strong positive association (*Mr* = .430) between income inequality and aggregate violent crime rates.

The Current Study: a Systematic Review and Meta-analysis

As noted in our review of the literature, the regional difference in crime trends has been examined in several review articles (Chabot and Ouimet 2018; Lappi-Seppälä and Lehti 2014; Santos and Testa 2018), but less attention in the criminological literature has been paid to variations in predictors across regions. Although previous synthesis research results have indicated a strong effect for income inequality on crime, recent cross-national primary studies results suggest that its effect might vary by location. Notably, some of the recent European studies have reported statistically non-significant findings, while others have shown a statistically significant association. Thus, the exact effect size of the income inequality-crime association in European countries remains unknown.

Given these conflicting findings, this paper synthesized primary research that has examined the cross-national level crime-income inequality association, with data focusing on or including European countries, to determine whether there is evidence that the effect of income inequality varies across regions and by crime types in Europe. The best way to examine associations between constructs is to rely on effect size (ES) values examined within a meta-analysis that synthesizes ESs across a representative collection of studies (McLeod et al. 2007). The current paper presents such a meta-analysis, relying on a highly representative set of studies and using stringent procedures to assess this strength of association (Cooper 2017; Ellis 2010; McLeod et al. 2007).

Method

Search Strategy

The search strategy applied to test the association between income inequality and crime in the present study mirrors the approach taken by previous review articles, including Stamatel (2006), Hsieh and Pugh (1993), and Nivette (2011). Ten electronic databases (Criminology: A Sage Full-Text Collection, Criminal Justice Abstracts, Social Service Abstracts, SocINDEX with full text, Sociological Abstracts, Sociological Collection, Health and Safety Science Abstracts, JSTOR, Psych INFO, and Psychological & Behavioral Science Collection) were searched by two researchers for full reports published by the end of January 2019. The

following Boolean search strings were used: (comparative OR cross-national OR cross-cultural) AND ("income inequality" OR "economic inequality" OR "relative deprivation") AND (crime OR homicide OR murder OR incarceration OR "fear of crime" OR suicide OR assault OR robbery OR theft) (Hsieh and Pugh 1993; Stamatel 2006). Since comparative studies often list the individual countries included in the sample without indicating the regions of countries, the search equation included the keywords *comparative*, *cross-national*, or *cross-cultural* instead of using the keyword *Europe* (Gartner 1995; Stamatel 2006). Consistent with the guidelines set forth by Nivette (2011), international organizations' publication databases including "World Health Organization [WHO] Library, United Nations Office on Drugs and Crime [UNODC], and European Institute for Crime Prevention and Control [HEUNI]" (p.106) were also examined for cross-national studies that may have been missed. Additionally, citation searches were performed on all papers that met the criteria for study inclusion. Finally, after obtaining initial sample studies through the searching of online databases and reference lists, Google Scholar was also searched with the names of the authors found to further detect works of active researchers cited (Cooper 2017).

Criteria for Study Inclusion

To be included in the meta-analysis, a study had to meet the following criteria: (1) the study had to be written in English, published in full-text format in a peer-reviewed journal using the publication as a proxy for research quality (Pratt 2010); (2) the unit of analysis had to be at the cross-national level; (3) the study had to provide a list of countries included in the analyses; (4) the data had to include at least one European country; and (5) the study had to report sufficient information to allow for a calculation of effect size estimates. Also, the publication date was restricted to 2009 or later, given that in Nivette's (2011) meta-analysis, the most recent articles included were those published in 2009. In this meta-analysis, studies were not restricted to a specific crime type (Pare and Felson 2014; Stamatel 2006).

Data Extraction

An a priori data extraction form was developed, and data were coded from each article by two coders (Molloy et al. 2014). The following information was extracted from each included study: reference information, sample descriptors, measurement information, research design, and research results (i.e., outcomes of interest and the corresponding descriptive and inferential statistics). Inter-coder agreement measured by kappa statistics was excellent, ranging from .78 to .99 (McLeod et al. 2007). Any discrepancies in coding were identified and resolved by rechecking the paper in question and referring to established methodological conventions in the meta-analysis (Borenstein et al. 2009; Cooper 2017; Molloy et al. 2014).

Identified Studies

Using the strategy noted above, 3099 hits were returned from the database search and four sources were identified through the reference tree search. Papers were then excluded from the sample in the following manner. First, from the initial sample of 3103 articles, all duplicate references were removed (n = 1475). Second, all titles and abstracts of the remaining articles

(n = 1628) were screened. Those that did not meet the inclusionary criteria were removed. These included studies where the unit of analysis is not at the cross-national level (n = 997); studies which do not provide a list of counties included in the analysis (n = 509); and studies without specific statistics regarding the relationship between crime and income inequality (n = 122). Third, full-text copies were obtained for all citations that remained (n = 52). The inclusionary criteria were applied to each paper. During the full-text review, eight articles were excluded for the following reasons: the same data was used in another study (n = 2) and lack of adequate effect size data or information needed to convert effect size estimates (n = 6). Overall, the final sample included 44 empirical studies, which produced a total of 54 effect size estimates. Figure 1 shows a flow chart of the study selection process.

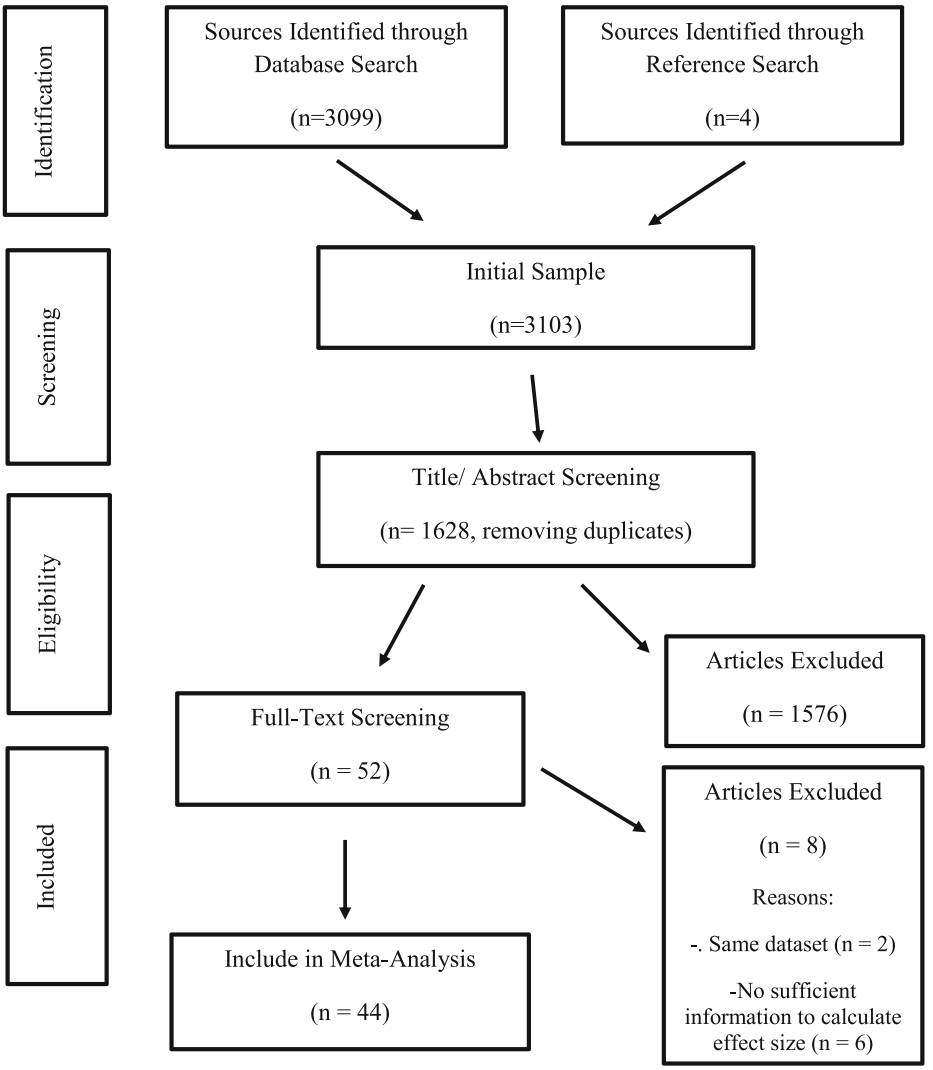

Fig. 1 Flow chart of the study selection process

Meta-analytic Method

The effect size (ES) *r* of the association between income inequality and crime indicator from each study was used as the primary data for the meta-analysis. The ES *r* is most commonly employed in analyses concerning two continuous variables and easily interpreted in the meta-analysis (Nivette 2011; Pratt and Cullen 2005). The Campbell Collaboration's Practical Meta-Analysis Effect Size Calculator was used to convert other test statistics into ES *r* when the *r* was not presented in the included paper.

Normally distributed ES estimates are necessary for the accurate determination of mean ES estimates and unbiased tests of statistical analysis (Pratt et al. 2014). To normalize the sampling distribution of ES *r*, the ES drawn from the studies were transformed into $z(r)$ values using Fisher's *r*-to-*z* transformation equation (Nivette 2011). Also, each ES was weighted by the inverse of its variance, which has been recommended as a matter of course in meta-analysis due to the tendency of small samples to yield inflated values (Batastini et al. 2016).

Once ES values were calculated within each study, we analyzed data at two different levels: the study level and construct level (McLeod et al. 2007). The goal of the study-level analysis was to produce an estimate of the population ES for income inequality-crime indicator associations. To ensure the independence of observations, each study contributed only one ES to the analysis by averaging across all crime indicators contained within each study. The relied-upon primary studies examined a variety of different outcomes (e.g., crime indicators). As a result, construct-level analyses were conducted to investigate outcome type as a potential moderator of the association between income inequality and crime. To ensure the independence of observations, each study was allowed to contribute only one ES to each outcome type (Batastinin et al., 2016).

A random-effects model was used for all analyses and plots. The variance estimates were calculated, consistent with a random effect model, via the method-of-moments approach (Lipsey and Wilson 2001). The resulting mean ES estimates were interpreted following Pratt and Cullen's (2005) benchmark for the meta-analysis of the macro-level crime literature: Mr is a "small" effect when between .10 and .20, Mr is a "moderate" effect when above .20, and Mr is a "substantial" effect when above .30.

In order to assess the potential role of moderators in the income inequality and crime indicator relationship, each study was coded according to the following: income inequality measures (e.g., Gini coefficient/ratio of the top to bottom), study design (e.g., cross-sectional/longitudinal), year of data (e.g., before 2000/2000–2009/2010 or later), and sample country composition (e.g., mixed-country data/Europe-only data). The selection of these moderators was based on previous meta-analyses of macro-level crime predictors (Nivette 2011; Pratt and Cullen 2005). Because the potential moderators were categorical, procedures analogous to analysis of variance (ANOVA), the subgroup analyses were employed. At the study level, heterogeneity of the ES distributions was assessed using the *Q* statistics (McLeod et al. 2007).

Lastly, publication bias was assessed both schematically, using a funnel plot, and statistically, using Egger's regression intercept and by calculating the fail-safe *N* (Borenstein et al. 2009; Molloy et al. 2014). This approach determines how many hypothetical unpublished studies would take to substantially reduce a mean ES (Batastini et al. 2016). All models were estimated with Version 2 of the Comprehensive Meta-Analysis (CMA) software.

Findings: Meta-analyses

Characteristics of Studies Included in a Meta-analysis ($k = 44$)

The sample characteristics (i.e., country regions, sample size, sample composition, and year of data), types of income inequality measures and outcome measures, and unadjusted ES *r* values are provided in Table 1. AS noted in Table 1, publication dates ranged from 2009 to 2019, while the year of data ranged from 1960 to 2013. Ten studies used a Europe-only sample, one study used a sampling consisting of America and European countries, and 33 others used samples taken from both Europe and non-European countries. Sample sizes ranged from relatively small ($n = 9$) to relatively large ($n = 222$). The majority of studies used the Gini coefficients, and only four studies employed the ratios taken from the top 20% to bottom 20% to measure the cross-national level income inequality. The types of outcome measures varied across studies, including homicide, suicide, crime, fear of crime, assault, burglary, robbery theft, bullying, and incarceration. There was also relatively large variability in unadjusted ES *r* values within and across outcome domains.

Meta-analytic Results

Overall Weighted Mean ES: Study-Level Analysis The weighted mean ES (Mr) across the 44 studies was .436 using a random-effects model, which is presented in Table 2. The magnitude of this Mr meets the criteria for a large effect and indicates that income inequality accounts for almost 19% of the variance in crime-relevant outcomes. The homogeneity analysis was significant, indicating that moderating variables are likely to exist ($Q = 213.60$, $p < .001$). Before proceeding with the construct-level analyses, we conducted analyses examining whether ESs varied according to sample composition. We divided 44 studies into two groups: studies with mixed-country (e.g., both Europe and non-Europe) data and studies with Europe-only data. Of the 34 studies with mixed-country data, the weighted mean ES was .496 using a random-effects model. The weighted mean ES across ten studies with Europe-only data was .171 using a random-effects model, which meets the criteria for a small effect. The result indicates that within the Europe-only context, income inequality accounts for only 3% of the variance in crime outcomes.

Crime Types: Construct-Level Analyses Table 2 shows the results from the construct-level analyses examining the ESs across different types of crime in a total sample, a sample of studies with mixed-country data, and a sample of Europe-only studies. Eight types of crime measures were tested in studies with mixed-country data. Of these outcomes, bullying (*Mr* = .620, k = 1) showed the strongest effect, followed by homicide (*Mr* = .576, k = 28), incarceration (*Mr* = .370, k = 3), burglary (*Mr* = .355, k = 2), and robbery (*Mr* = .321, k = 2), all of which meet criteria for a substantial effect (Pratt and Cullen 2005). The three remaining outcomes, suicide (Mr = -.207, k = 3), theft (Mr = .140, k = 1), and assault(Mr = .054, k = 3) , meet criteria for exerting a small or null effect. Across the 10 studies with Europe-only data, 4 types of outcomes were tested: fear of crime (*Mr* = .432, k = 2) and suicide (*Mr* = .361, k = 2) met criteria for a large effect, whereas both homicide (*Mr* = .039, k = 4) and general crime (*Mr* = -.026, k = 3) had no effect in the context of Europe.

Table 1 Characteristics of studies included in the meta-analysis

Author (year)	Regions	Total *N*	*N* (%) of European countries	Year of data	Income inequality measure	Outcome	*r*
Aebi and Linde (2014)	Western Europe	15	15 (100)	1960–2010	Gini coefficient	Homicide	− .140
De Vogli and Gimeno (2009)	Eastern Europe	15	15 (100)	1989–1997	Gini coefficient	Suicide	.768
Stamatel (2009)	Eastern Europe	9	9 (100)	1990–2003	Gini coefficient	Homicide	.400
Piatkowska et al. (2016)	Eastern Europe	10	10 (100)	1990–2011	Gini coefficient	Homicide	.023
Hummelsheim et al. (2011)	Europe	23	23 (100)	2003	Gini coefficient	Crime	− .300
Kar (2012)	Europe	20	20 (100)	2010	Ratio of top 20% to Bottom 20%	Crime	.212
Vieno et al. (2013)	Europe	27	27 (100)	2006	Gini coefficient	Crime	.030
Hu et al. (2015)	Europe	43	43 (100)	1987–2008	Gini coefficient	Homicide Suicide	.012 .012
Vauclair and Bratanova (2017)	Europe	29	29 (100)	2008–2010	Gini coefficient	Fear of crime	.460
Krulichova (2019)	Europe	23	23 (100)	2010–2011	Gini coefficient	Fear of crime	.399
Rosenfeld and Messner (2009)	USA and Europe	10	9 (90)	1993–2006	Gini coefficient	Burglary	− .062
Crutchfield and Pettinicchio (2009)	Mixed	15	13 (86.67)	2003	Gini coefficient	Homicide	.657
Elgar et al. (2009)	Mixed	37	35 (94.59)	2006	Gini coefficient	Bullying	.620
Huisman and Oldehinkel (2009)	Mixed	35	30 (85.71)	2000	Ratio of top 20% to bottom 20%	Homicide Suicide	.620 .460
Elgar and Aiken (2010)	Mixed	33	20 (60.61)	2006	Gini coefficient	Homicide	.800
Fox and Hoelscher (2010)	Mixed	134	33 (24.63)	2002–2004	Gini coefficient	Homicide	.597
Fearon (2011)	Mixed	145	52 (35.86)	2000–2005	Gini coefficient	Homicide	.570
Lappi-Seppala (2011)	Mixed	30	27 (90.00)	2007	Gini coefficient	Incarceration	.649
Pridemore (2011)_1	Mixed	46	24 (52.71)	2000	Gini coefficient	Homicide	.370
Pridemore (2011)_2	Mixed	32	18 (56.25)	1965–1994	Gini coefficient	Homicide	.580
Pridemore (2011)_3	Mixed	32	18 (56.25)	1990	Gini coefficient	Homicide	.525
Schaible and Hughes (2011)	Mixed	46	28 (60.87)	1999–2004	Ratio of top 20% to bottom 20%	Homicide Incarceration	.399 .501
Shah and Bhandarkar (2011)	Mixed	52	NA	2000	Gini coefficient	Suicide	− .470
Altheimer (2013)	Mixed	51	16 (31.37)	2001–2005	Gini coefficient	Homicide	.520

Table 1 (continued)

Author (year)	Regions	Total *N*	*N* (%) of European countries	Year of data	Income inequality measure	Outcome	*r*
Chon (2012)	Mixed	132	NA	2002	Gini coefficient	Homicide	.540
Ouimet (2012)	Mixed	165	NA	2010	Gini coefficient	Homicide	.630
Elgar et al. (2013)	Mixed	37	35 (94.59)	2006	Gini coefficient	Homicide	.300
Nivette and Eisner (2013)	Mixed	65	32 (49.23)	2009	Ratio of top 20% to bottom 20%	Homicide	.590
Rogers and Pridemore (2013)	Mixed	30	23 (76.67)	2004	Gini coefficient	Homicide	.540
Lappi-Seppälä and Lehti (2014)	Mixed	222	55 (24.77)	2004–2012	Gini coefficient	Homicide	.571
Pare and Felson (2014)	Mixed	63	28 (44.44)	1990–2000	Gini coefficient	Homicide	.540
Pare and Felson (2014)	Mixed	28	22 (78.57)	1989–2000	Gini coefficient	Assault Burglary Robbery Theft	.210 .460 .490 .140
Wolf et al. (2014)	Mixed	34	26 (76.47)	2000–2010	Gini coefficient	Assault Burglary Homicide	−.038 .373 .670
Cao and Zhang (2017)	Mixed	123	32 (26.02)	2008–2010	Gini coefficient	Homicide	.640
Chon (2017)	Mixed	124	33 (26.61)	2004–2008	Gini coefficient	Homicide Suicide	.620 −.350
Dawson (2017)	Mixed	86	32 (37.21)	2000–2013	Gini coefficient	Homicide	.567
Santos et al. (2018)	Mixed	145	40 (27.59)	2005–2012	Gini coefficient	Homicide	.567
Coccia (2017)	Mixed	77	21 (27.27)	2006–2013	Gini coefficient	Homicide	.630
Davis and Gilbson-Light (2020)	Mixed	134	39 (29.10)	2000–2010	Gini coefficient	Incarceration	.129
Goda and Garcia (2017)	Mixed	59	27 (45.76)	1980–1997	Gini coefficient	Robbery	.209
Ouimet et al. (2018)	Mixed	145	41(28.28)	2013	Gini coefficient	Homicide	.650
Santos and Testa et al. (2018)	Mixed	82	38 (46.34)	2010	Gini coefficient	Homicide	.693
Weiss et al. (2018)	Mixed	85	39 (43.53)	2010	Gini coefficient	Homicide	.511
Chon (2020)	Mixed	45	9 (20)	2008–2011	Gini coefficient	Homicide	.620
Corcoran et al. (2018)	Mixed	100	27 (27.00)	2009–2012	Gini coefficient	Assault Homicide	.030 .392

NA, not available

Regional Differences Within Europe: Study-Level Analyses As seen in Table 2, there was significant moderate heterogeneity around the weighted mean ES in the ten observed studies with Europe-only data ($Q = 21.351$, $p < .05$). Figure 2 presents a forest plot of the weighted mean ESs observed in the ten studies according to regions. The income inequality-crime association was large in the studies with Eastern Europe-only data ($Mr = .506$, $k = 3$), but this association in the other studies with mixed region-Europe data ($Mr = .142$, $k = 6$) or studies with Western Europe-only data ($Mr = -.140$, $k = 1$) was small and in the opposite direction.

Table 2 Crime type and countries of data: mean effect size estimates and statistical diagnostics for income inequality

Crime type	Total				Studies with mixed-country data				Studies with Europe-only data			
	k	Mr	*Q*	Rank	*k*	Mr	*Q*	Rank	*k*	Mr	*Q*	Rank
Assault	3	.057	.942***	8	3	.054	.942***	8				
Burglary	2	.347	1.761***	5	2	.355	1.761***	4				
Bullying	1	.620	–	1	1	.620	–	1				
Crime	3	− .027	2.672	10					3	− .026	2.672	4
Fear of Crime	2	.432	.063***	3					2	.432	.063	1
Homicide	32	.551	58.959**	2	28	.576	31.927	2	4	.039	1.290	3
Incarceration	3	.395	12.547**	4	3	.370	12.547**	3				
Robbery	2	.330	1.814	6	2	.321	3.039	5				
Suicide	5	− .030	42.701***	9	3	− .207	22.759***	6	2	.361	9.294**	2
Theft	1	.140	–	7	1	.140	–	7				
Overall—random	*N* = 44	.436			*N* = 34	.496			*N* = 10	.171		

**$p < .01$; ***$p < .001$; *k*, number of effect size; *Mr*, the weighted mean effect size; *Q*, homogeneity statistic

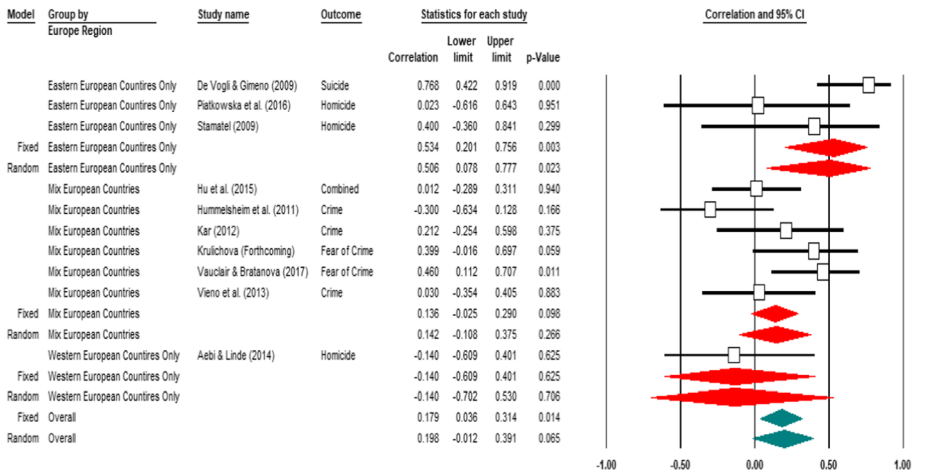

Fig. 2 Forest plot: studies with Europe-only data: mean effect size estimates by regions

Methodological Moderators: Study-Level Analyses The between-group test of heterogeneity in the random-effects models examining the moderating effects of methodological variations indicated that the type of income inequality measures, research design, and year of data were not significant moderators of the income inequality-crime association (see Table 3). The only exception found was for the year of data used within studies for the Europe-only data (Qb = 12.697, df = 2, $p < .01$). Specifically, the association was significantly stronger in studies analyzing data before 2000 (*Mr* = .768, k = 1), compared to studies using data collected between 2000 and 2009 (*Mr* = -.027, k = 4) or others with data collected from 2010 or later (*Mr* = .277, k = 5). This result implies that in Europe, the impact of income inequality on crime has recently decreased.

Publication Bias The current study utilized a systematic review approach which is explicit about the search and review process, thereby reducing selection bias and improving the reliability and accuracy of conclusions (Cooper 2017; Hassett et al. 2020). It must be noted,

Table 3 Moderator analyses

Moderators	Total			Studies with mixed-country data			Studies with Europe-only data		
	k	Mr	Q_b	*k*	Mr	Q_b	*k*	Mr	Q_b
Income inequality measures	44	.452	.050	34	.496	.101	10	.201	.001
Gini coefficient	40	.450		31	.493		9	.200	
Ratio of top 20% to bottom 20%	4	.478		3	.533		1	.212	
Research design	44	.452	.204	34	.496	.853	10	.201	.757
Cross-sectional	20	.470		16	.532		4	.086	
Longitudinal	24	.437		18	.466		6	.288	
Year of data	44	.452	1.766	34	.496	1.253	10	.201	12.697**
Before 2000	4	.512		3	.440		1	.768	
2000–2009	21	.399		17	.462		4	− .027	
2010 or later	19	.493		14	.539		5	.277	

**$p < .01$

however, that only articles published in peer-reviewed journals were included in this systematic review. According to Pratt (2010), because the primary motivation of academic criminologists for carrying out theoretical research is to seek publication, the potential bias of using only published work in a meta-analysis is much less in sociology or criminal justice, compared to other fields such as medicine, psychology, or education where meta-analysis is primarily used to evaluate the intervention/program effects.

Furthermore, Pratt (2010) warns against selection bias, which may do more to distort the meat-analysis results. That is, "even among those who are contacted and asked to send a study, there is no way of knowing what the selection bias is (those who send you their research may be different from those who do not send their research)" (Pratt 2010, p. 160). Nevertheless, as Rosenthal (1979) pointed out, not including unpublished studies in meta-analysis might be problematic in connection with the potential inferential errors. To address this concern, numerous tests for publication bias were performed.

Egger's regression intercept indicated no evidence for publication bias in the identified studies (-1.23; 95% CI, -3.18, .71; p = 21). The Trim and Fill method indicated that if the ES distribution was truly symmetrical, four studies might be missing from the left side of the funnel plot. After imputing those four studies, the adjusted mean ES was .439, which is not much different from the observed mean ES of .458 in this study. As computed in CMA, Rosenthal's Fail-Safe *N*, a measure for determining the number of studies it would take to render a statistically significant result null, was 9171 with a threshold of 215 (Borenstein et al. 2009; Rosenthal 1979). The Fail-Safe *N* was greater than the threshold, supporting the position that publication bias would not be an issue.

Regarding the ten studies with Europe-only data, Egger's regression intercept also indicated no evidence for publication bias (1.41; 95% CI, -2.27, 5.10; p = .41). The Trim and Fill results suggested that the estimated number of missing studies on the left side was zero, supporting the position that no publication bias was evident.

Findings: Regional Variations Within Europe

Although the publication bias test results supported the idea that publication bias was not an issue in the current meta-analyses with ten studies containing Europe-only data, the number of studies included was too small to pinpoint the effects of regions and outcome types within Europe. To address this limitation in the meta-analyses, a series of bivariate correlation analyses between income inequality measures and different types of crime indicators in each region of Europe were conducted. A growing group of statisticians, sociologists, and criminologists have recommended simple bivariate analyses and warned against the use and abuse of sophisticated statistical models to test predictors of crime indicators in cross-sectional research (Aebi and Linde 2014; Goertzel and Goertzel 2008).

To conduct this analysis, two income inequality measures for 36 European countries, Gini coefficients and the ratio of top 20% to bottom 20% were taken from the World Bank (2012) and the United Nations Development Program (UNDP) (2007/2008), respectively. Also, four crime indicators, general crime in 2017 from NUMBEO, homicides in 2015 from the United Nations Office on Drugs and Crime (UNODC), suicides in 2015 from the World Health Organization (WHO), and the incarceration rate in 2016 from World Prison Brief, were included in the analyses. Table 5 presents the statistics for each of the 36 European countries.

Correlation matrices are provided in Table 4. The resulting association was interpreted following the general guideline in criminal justice and criminology research: values between 0 and .29 are generally considered weak, from about .30 to .49 are moderate, .50 to .69 are strong, and anything beyond .70 is very strong (Gau 2019).

European Countries As seen in Table 4, the only statistically significant correlation found was between the Gini coefficient and the homicide rate (r = .362). The association was positive and moderate.

Eastern European Countries (N = 10) When analyzed with only Eastern European countries (N = 10), the associations between income inequality measures and crime indicators were substantially stronger. As seen in Table 4, both the Gini coefficient (r = .606) and the ratio of

Table 4 Correlation matrix: income inequality and crime indicators in 36 European countries

	Total ($N = 36$)	*M*	SD	1	2	3	4	5
1	Gini coefficient	30.925	4.056					
2	Ratio of top 20%/bottom 20%	5.239	1.453	.630**				
3	Crime rate	34.786	8.896	.185	.128			
4	Homicide rate	1.856	2.056	.362*	.270	.305		
5	Suicide rate	11.764	4.793	− .058	.019	− .019	.570**	
6	Incarceration rate	139.352	83.856	.310	.263	.147	.823**	.508**
	Eastern Europe ($N = 10$)[1]	*M*	SD	1	2	3	4	5
1	Gini coefficient	29.920	5.393					
2	Ratio of top 20%/bottom 20%	4.770	1.193	.752*				
3	Crime rate	36.177	8.794	.347	.307			
4	Homicide rate	2.958	3.196	.606	.784**	.551		
5	Suicide rate	14.120	3.837	.211	.415	.173	.479	
6	Incarceration rate	217.800	95.394	.500	.719*	.146	.856*	.549
	Northern Europe ($N = 11$)[2]	*M*	SD	1	2	3	4	5
1	Gini coefficient	30.664	3.502					
2	Ratio of top 20%/bottom 20%	5.530	1.223	.652*				
3	Crime rate	34.383	10.294	.053	.276			
4	Homicide rate	1.903	1.763	.681*	.404	−.028		
5	Suicide rate	13.282	5.112	.530	.162	.007	.932**	
6	Incarceration rate	114.970	78.879	.837**	.698*	.016	.908**	.737*
	Western Europe ($N = 7$)[3]	M	SD	1	2	3	4	5
1	Gini coefficient	30.814	2.600					
2	Ratio of top 20%/bottom 20%	5.117	2.163	.573				
3	Crime rate	31.074	9.684	− .099	− .174			
4	Homicide rate	.987	.552	− .201	.057	.900**		
5	Suicide rate	11.114	2.602	− .443	.130	.511	.809*	
6	Incarceration rate	92.714	17.085	.691	.285	.184	.272	.164
	Southern Europe ($N = 9$)[4]							
1	Gini coefficient	32.638	4.080					
2	Ratio of top 20%/bottom 20%	5.600	1.520	.737				
3	Crime rate	36.848	6.620	.335	.178			
4	Homicide rate	1.173	.521	− .586	− .542	.265		
5	Suicide rate	7.300	4.252	− .645	− .185	− .665	− .145	
6	Incarceration rate	115.625	42.149	− .098	.279	.206	.476	− .143

*$p < .05$; **$p < .01$

[1] Belarus; Bulgaria; Czech Republic; Hungary; Moldova; Poland; Romania; Russia; Slovak Republic; Ukraine

[2] Croatia; Denmark; Estonia; Finland; Iceland; Ireland; Latvia; Lithuania; Norway; Sweden; UK

[3] Austria; Belgium; France; Germany; Luxembourg; Netherlands; Switzerland

[4] Albania; Bosnia and Herzegovina; Greece; Italy; Portugal; Serbia; Slovenia; Spain

the top 20% over the bottom 20% (r = .784) met the criteria for strong and very strong associations with homicide rates, respectively. Also, the association between the ratio of the top 20% over the bottom 20% and incarceration ratio was robust (r = .719).

Northern European Countries (N = 11) Results in Northern European countries ($N = 11$) showed very similar patterns to the ones noted in Eastern European countries ($N = 10$). Gini coefficient was strongly or very strongly correlated with homicide ($r = .681$), suicide ($r = .530$), and incarceration rates ($r = .837$), while the ratio of the top 20% over the bottom 20% was very strongly associated with incarceration rate ($r = .698$).

Western European Countries (N = 7) The correlation results for Western and Southern European countries were clearly distinguished from those for Eastern and Northern European countries in both strength and direction of associations. In Western European countries ($N = 7$), the Gini coefficient was strongly correlated with incarceration ($r = .691$). Its association with suicide ($r = -.443$) was moderate but negative. The Gini coefficient was weakly and negatively correlated with two other indicators, including general crime ($r = -.099$) and homicide ($r = -.201$). The same weak associations were found for the results of the ratio of the top 20% to the bottom 20%. This estimate had a weak and positive correlation with homicide ($r = .057$), suicide ($r = .130$), and incarceration ($r = .285$), while it had a weak but negative correlation with general crime ($r = -.174$).

Southern European Countries (N = 8) With the exception of general crime rate, which had a moderate and positive correlation (r = .335) all other indicators—including homicide (r = -.586), suicide (r = -.645), and incarceration (r = -.098)—had negative correlations with the Gini coefficient in Southern European countries ($N = 8$). With the ratio measure of income inequality, homicide ($r = -.542$) and suicide ($-.185$) consistently showed a negative association. However, both general crime ($r = .178$) and incarceration ($r = .279$) were positively but weakly related to the ratio of the top 20% to bottom 20%.

Discussion

This meta-analysis included only published work. While the diagnostic test results for publication bias suggest that publication bias is not a problem in the current study, supporting the validity of the results, the effect size estimates may be inflated as a result of editorial preference to publish statistically significant results (Franco et al. 2014; Kruis et al. 2020; Pratt 2010). Nevertheless, the meta-analysis results in the current study support the position that, compared to other regions of the world, income inequality in Europe has a much smaller impact on general crime and homicide. The relatively small effects for both the Gini coefficient and the ratio measure of income inequality on crime indicators remained stable in the studies using longitudinal data, as seen in the moderator analyses.

Income inequalities in Southern and Western European countries are relatively higher than in Northern and Eastern Europe (Hong et al. 2017). In the current study, however, results of both meta-subgroup analyses, as well as bivariate correlation analyses for the 36 European countries, revealed that income inequality had little or no effect on crime in Western Europe and Southern Europe.

This study's findings highlight the importance of incorporating geographic characteristics into cross-national criminology (Aebi and Linde 2014; Cao and Zhang 2017). More and more comparative studies that analyze data from a large sample are appearing. This helps to improve the representativeness of the data, which consequently enhances the generalizability of the results. However, opponents of a large sample comparative research argue that this approach ignores the particular socio-historical context in which crime occurs (Gartner 1995).

Stamatel (2006) suggests that purposive sampling can be a better alternative than convenience sampling in cross-national crime research. Using the purposive sample of specific regions or countries, future comparative research might be able to provide insights into cross-national variations in the impact of income inequality on crime. Also, purposive sampling of specific regions can control for definitional differences of crime categories among countries, resulting in more accurate estimates of income inequality in relation to various types of crime.

Implications for Future Primary Studies: What Areas are Absent?

The validity of the current research results was increased by conducting both a systematic review and meta-analysis and cross-national level bivariate correlation analyses. The current study has provided evidence that the impact of income inequality on crime is different in certain countries. However, the current synthesis study could not explain why there exists a strong link between crime and income inequality in other countries, as indicated by previous synthesis research (Hsieh and Pugh 1993; LaFree 1999; Nivette 2011; Pratt and Cullen 2005; Pridemore and Trent 2010). More research is needed to answer the questions raised by this study, especially in light of the potential theoretical and practical benefits. At the very least, the authors hope that this study will spark further cross-national research into the mechanism between income inequality and crime.

First of all, future research should investigate the intervening role of the country's welfare regime in the dynamic between income inequality and crime in Europe (Ioakimidis and Heijke 2016). The basic tenet of the social support theory is that macro-level social support is a "conditioning variable" between aggregate structural characteristics and crime (Altheimer 2008; Cullen 1994). Evaluations of social support theory at the cross-national level have been few, but generally supportive of the interaction effect between social support and income inequality on crime (Pratt and Godsey 2002, 2003; Savolainen 2000). Measuring social support by the percentage of the nation's GDP spent on general social support, health care, and public education, the cross-national studies found that the effect of income inequality on homicide rates is significantly reduced when citizens have high levels of social support (Altheimer 2007).

More recently, investigating the relationship between income inequality and mortality in 43 European countries, Hu et al. (2015) concluded that in a European context, national levels of income inequality do not have an independent effect on homicide and suicide due to the well-developed welfare system in Europe, which helps to buffer the adverse effect on mortality of being poor. Vieno et al. (2013) using data collected in 27 European countries showed that the nation's welfare and education service has a buffering effect on the relationship between income inequality and fear of crime.

Table 6 shows the nation's social expenditure in a percentage of GDP between 2010 and 2018 for 36 OECD member states. European countries' social welfare expenditure (22.1%) was higher than in other non-European countries (16.1%). Comparing the regional differences among European countries, the social welfare expenditure of the Southern European countries (24.6%) was the highest, followed by countries in Western (22.7%), Northern (21.4%), and Eastern (19.6%) Europe.

Taken together, in Southern and Western European countries where income inequalities are relatively high, inequalities in other domains of life seem to be successfully tackled by welfare regimes, which may play a role in creating a buffering effect on crime (Muffels and Fouarge 2004). For example, in Hooghe et al.'s (2011) Belgium study, a result revealed an unexpected negative association between inequality and violent crime. According to Hooghe et al. (2011), a possible explanation for this result might be due to the Belgian welfare system, where minimum income levels are quite firmly entrenched. In reality, it is impossible in Belgium—and countries with a similar welfare system—for a substantial portion of the population to drop below that minimum level needed to lead to strong income inequality patterns. Instead, the presence of very high incomes is the only way inequality can grow (Hooghe et al. 2011).

Within Europe, there are variations in welfare regimes across countries and regions (Headey et al. 2000; Ioakimidis and Heijke 2016; Muffels and Fouarge 2004). For example, many Western and Southern European countries, including Belgium, France, Germany, Luxembourg, Portugal, Spain, and Italy, are conservative corporate welfare states where income stability and social integration are priority welfare goals (Headey et al. 2000).

Hummelsheim et al. (2011) found that the degree of social welfare policy's buffering effect on fear of crime depends on the type of welfare measures. In European countries, welfare measures on early childcare and education, which contribute to people's ability to care for their own social independence, buffer fear of crime development. In contrast, welfare measures on mere financial support, including unemployment, old age, and other cash benefits, which simply replace a loss of income or alternative deprivation through cash transfers, have not been found to be able to effectively reduce the fear of crime. More research needs to investigate the intervening roles of the various welfare policies in the association between income inequality and different types of crime. Also, future studies need to pay more attention to other country/region-specific economic, socio-cultural, and historical factors that may affect crime and/or the relation between income inequality and crime.

Another area to consider in future cross-national research is the relationship between absolute poverty, income inequality, and crime. Still few, but a growing number of studies in the criminology literature have addressed this topic, and the results have been mixed. Pridemore (2008, 2011) analyzed the relationship between inequality and homicide rates while controlling for infant mortality rate, an indirect measure of poverty. Results showed a positive effect of infant mortality, but no effect leveled by the Gini index on homicide. More recently, Pare and Felson (2014) examined this relationship but with different types of crime. The results were consistent with Pridemore (2008, 2011), showing that inequality is unrelated to homicide, assault, robbery, burglary, and theft when poverty is controlled. In contrast, Santos et al. (2018) found that inequality and homicide have a universal positive relationship, while poverty is only related to homicide in countries with lower homicide rates. Likewise, another recent study (Chabot and Ouimet 2018) concluded that income inequality is a more critical determinant of homicide than poverty.

Perhaps the main reason for the lack of cross-national research on the poverty-crime link and the inconsistent results across the existing studies on this topic is due to the absence of any valid poverty measure (Nivette 2011). Pridemore (2008, 2011) championed infant mortality as an indicator of poverty on the cross-national level. However, Chabot and Ouimet (2018) argued that "even if poverty is causally related to infant mortality, poverty, and infant mortality remain two distinct concepts" (p. 277). Once a valid measure of poverty is established, it is expected that research on the relationship between income inequality, poverty, and crime will increase.

Appendix A

Table 5 Statistics on income inequality and crime indicators in European countries ($N = 36$)

	Region	Gini coefficient[1]	Ratio of top to bottom[2]	General crime[3]	Homicide[4]	Suicide[5]	Incarceration[6]
Albania	Southern	29.00	4.80	42.11	2.28	3.80	192.00
Austria	Western	30.50	4.40	19.13	.51	11.70	97.00
Belarus	Eastern	26.00	4.50	24.64	3.58	19.10	306.00
Belgium	Western	27.60	4.90	42.31	1.95	16.10	98.00
Bosnia and Herzegovina	Southern	33.00	3.80	40.21	1.50	4.40	70.00
Bulgaria	Eastern	36.00	4.40	40.01	1.80	11.20	125.00
Croatia	Northern	32.00	4.80	28.14	.87	12.10	81.00
Czech Republic	Eastern	26.10	3.50	29.17	.75	10.60	211.00
Denmark	Northern	29.10	4.30	21.50	.99	9.10	61.00
Estonia	Northern	33.20	6.40	22.38	3.20	14.90	221.00
Finland	Northern	27.10	3.80	23.19	1.60	14.20	55.00
France	Western	33.10	5.60	44.78	1.58	12.30	103.00
Germany	Western	30.10	4.30	32.64	.85	9.10	78.00
Greece	Southern	36.70	6.20	39.41	.85	3.20	91.00
Hungary	Eastern	30.60	3.80	38.16	1.48	15.70	183.00
Iceland	Northern	26.90	4.20	26.29	.91	11.80	45.00
Ireland	Northern	32.50	5.60	44.76	.64	11.10	79.00
Italy	Southern	35.20	6.50	44.59	.78	5.40	89.00
Latvia	Northern	35.50	6.80	37.54	4.11	17.40	224.00
Lithuania	Northern	35.20	6.30	39.06	5.98	26.10	254.00
Luxembourg	Western	34.80	4.10	28.21	.72	8.50	120.00
Moldova	Eastern	28.50	5.30	44.42	3.19	12.50	222.00
Netherlands	Western	28.00	2.50	28.89	.61	9.40	69.00
Norway	Northern	25.90	6.10	44.99	.56	9.30	70.00
Poland	Eastern	32.40	5.60	30.19	.74	18.50	187.00
Portugal	Southern	36.00	8.00	34.91	.97	8.50	137.00
Romania	Eastern	27.30	4.90	28.53	1.49	9.20	142.00
Russia	Eastern	41.60	7.60	45.70	11.31	17.90	450.00
Serbia	Southern	29.70	NA	38.80	1.13	12.10	142.00
Slovak Republic	Eastern	26.10	4.00	30.52	.88	9.90	184.00
Slovenia	Southern	25.60	3.90	24.71	1.21	15.00	73.00
Spain	Southern	35.90	6.00	30.04	.66	6.00	131.00
Sweden	Northern	27.30	4.00	49.35	1.15	12.70	53.00
Switzerland	Western	31.60	9.00	21.56	.69	10.70	84.00
Ukraine	Eastern	24.60	4.10	50.43	4.36	16.60	168.00
United Kingdom	Northern	32.60	7.20	41.01	.92	7.40	121.67

[1] 2012 Data, from World Bank, http://www.worldbank.org/en/research/brief/all-the-ginis

[2] 007 Data, from United Nations Development Program (UNDP), *Human development report*.

[3] 2017 Data, from NUMBEO

[4] 2015 Data, from United Nations Office on Drugs and Crime (UNODC)

[5] 2015 Data, from World Health Organization (WHO)

[6] 2016 Data, per 100,000 population, from World Prison Brief http://www.prisonstudies.org/map/europe

Appendix B

Table 6 OECD countries ($N = 36$): social welfare spending (in the percentage of gross domestic product)[1]

	Region	2010	2015	2016	2017	2018	Mean
Austria	Western	16.6	18.5	17.8	-	-	17.6
Belgium	Western	28.3	29.2	29.2	29.2	28.9	28.9
France	Western	31.0	32.0	32.0	31.8	31.2	31.6
Germany	Western	25.9	24.9	25.1	25.1	25.1	25.2
Luxembourg	Western	23.1	22.1	22.2	22.6	22.4	22.5
Netherlands	Western	17.8	17.7	17.5	17.0	16.7	17.3
Switzerland	Western	15.1	15.9	15.9	16.1	16.0	15.8
	Western						*22.7*
Greece	Southern	24.9	25.4	25.7	24.8	23.5	24.9
Italy	Southern	27.1	28.5	28.3	28.1	27.9	28.0
Portugal	Southern	24.5	24.0	23.7	23.7	22.6	23.7
Slovenia	Southern	23.4	22.6	22.2	21.4	21.2	22.2
Spain	Southern	24.7	24.7	24.3	23.9	23.7	24.3
	Southern						*24.6*
Denmark	Northern	28.6	29.0	28.7	28.1	28.0	28.5
Estonia	Northern	18.3	17.7	18.3	18.0	18.4	18.1
Finland	Northern	27.3	30.4	29.8	28.9	28.7	29
Iceland	Northern	16.9	15.5	15.1	15.9	16.0	15.9
Ireland	Northern	24.6	15.5	14.9	14.3	14.4	16.7
Latvia	Northern	19.5	15.7	16.1	15.8	16.2	16.7
Lithuania	Northern	19.4	15.8	16.0	15.8	16.2	16.6
Norway	Northern	22.0	24.7	25.7	25.3	25.0	24.5
Sweden	Northern	26.3	26.3	26.4	26.1	26.1	26.2
United Kingdom	Northern	22.4	21.6	21.2	20.8	20.6	21.3
	Northern						*21.4*
Czech Republic	Eastern	19.7	19.4	19.1	19.0	18.7	19.2
Hungary	Eastern	23.0	20.9	20.8	20.2	19.4	20.9
Poland	Eastern	20.6	20.2	21.2	21.0	21.1	20.8
Slovak Republic	Eastern	18.0	17.8	17.8	17.3	17.0	17.6
	Eastern						*19.6*
Austria		27.6	27.7	27.8	27.1	26.6	27.4
Canada		17.5	17.6	17.4	17.3	-	17.5
Chile		10.4	10.8	11.0	10.9	-	10.8
Israel		15.4	15.5	15.5	16.0	-	15.6
Japan		21.3	21.9	-	-	-	21.6
Korea		8.2	10.2	10.5	10.6	11.1	10.1
Mexico		7.4	7.7	7.5	-	-	7.5
New Zealand		20.4	19.2	18.9	18.6	18.9	19.2
Turkey		12.3	11.6	12.5	-	-	12.1
USA		19.4	18.8	18.9	18.9	18.7	18.9
	Non-Europe						*16.1*
OECD	Total	*20.6*	*19.0*	*20.5*	*20.2*	*20.1*	*20.1*

[1] Data from OECD.Stat https://stats.oecd.org/Index.aspx?DataSetCode=SOCX_AGG

References

Aebi, M. F., & Linde, A. (2014). The persistence of lifestyles: Rates and correlates of homicide in Western Europe from 1960 to 2010. *European Journal of Criminology, 11*(5), 552–577.

Altheimer, I. (2007). Assessing the relevance of ethnic heterogeneity as a predictor of homicide at the cross-national level. *International Journal of Comparative and Applied Criminal Justice, 31*(1), 1–20.

Altheimer, I. (2008). Social support, ethnic heterogeneity, and homicide: a cross-national approach. *Journal of Criminal Justice, 36*, 103–114.

Altheimer, I. (2013). Cultural processes and homicide across nations. *International Journal of Offender Therapy and Comparative Criminology, 57*(7), 842–863.

Batastini, A. B., King, C. M., Morgan, R. D., & McDaniel, B. (2016). Telepsychological services with criminal justice and substance abuse clients: a systematic review and meta-analysis. *Psychological Services, 13*(1), 20–30.

Bennett, R. R. (2004). Comparative criminology and criminal justice research: the state of our knowledge. *Justice Quarterly, 21*, 1–21.

Blau, P. M., & Blau, J. R. (1982). The cost of inequality: metropolitan structure and violent crime. *American Sociological Review, 47*, 114–129.

Bonger, W. (1969). *Criminality and economic conditions*. Bloomington: Indiana University Press.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Chichester, Hoboken: John Wiley & Sons.

Brush, J. (2007). Does income inequality lead to more crime? A comparison of cross-sectional and time-series analyses of United States countries. *Economics Letters, 96*, 264–268.

Cao, L., & Zhang, Y. (2017). Governance and regional variation of homicide rates: evidence from cross-national data. *International Journal of Offender Therapy and Comparative Criminology, 61*(1), 25–45.

Chabot, C., & Ouimet, M. (2018). It is less about wealth or poverty than with equality and formal social control: An analysis of the determinants of the homicide rate in 145 countries of the world. In M. Deflem (Ed.), *Homicide and Violent Crime*, *Sociology of Crime, Law and Deviance* (Vol. 23, pp. 223–240). Emerald Publishing Limited. https://doi.org/10.1108/S1521-613620180000023013.

Chamlin, M. B., & Cochran, J. K. (2006). Economic inequality, legitimacy, and cross-national homicide rates. *Homicide Studies, 10*, 231–252.

Choe, J. (2008). Income inequality and crime in the United States. *Economics Letters, 101*, 31–33.

Chon, D. S. (2020). Are Competitive Materialism and Female Employment Related to International Homicide Rate? *Journal of interpersonal violence* 886260517705664. Advance online publication. https://doi.org/10.1177/0886260517705664.

Chon, D. S. (2012). The impact of population heterogeneity and income inequality on homicide rates: A cross-national assessment. *International Journal of Offender Therapy and Comparative Criminolog, 56*(5), 730–748.

Chon, D. S. (2017). National religious affiliation and integrated model of homicide and suicide. *Homicide Studies, 21*(1), 39–58.

Coccia, M. (2017). *General Causes of Violent Crime: The Income Inequality*. CocciaLab Working Paper No.5. Retrieved September 20, 2019, from https://www.researchgate.net/profile/Mario_Coccia/publication/316146770_General_Causes_of_Violent_Crime_the_Income_Inequality/links/58f25135aca27289c2169c2c/General-Causes-of-Violent-Crime-the-Income-Inequality.pdf

Cooper, H. (2017). *Research synthesis and meta-analysis: a step-by-step approach* (5th ed.). Thousand Oaks, CA: SAGE Publication Inc.

Corcoran, K. E., Pettinicchio, D., & Robbins, B. (2018). A Double-Edged Sword: The Countervailing Effects of Religion on Cross-National Violent Crime. *Social Science Quarterly, 99*(1), 377–389.

Costantini, M., Meco, I., & Paradiso, A. (2018). Do inequality, unemployment and deterrence affect crime over the long run? *Regional Studies, 52*(4), 558–571.

Crutchfield, R., & Pettinicchio, D. (2009). Cultures of inequality: Ethnicity, immigration, social welfare, and imprisonment. *The Annals Of The American Academy, 623*(1), 134–147.

Cullen, F. T. (1994). Social support as an organizing concept for criminology. *Justice Quarterly, 11*, 527–559.

Davis, A. P., & Gibson-Light, M. (2020). Difference and punishment: Ethno-political exclusion, colonial institutional legacies, and incarceration. *Punishment & Society, 22*(1), 3–27.

Dawson, A. (2017). The belief in state legitimacy and homicide: A cross-national analysis. *Sociological Quarterly, 58*(4), 552–575.

De Vogli, R., & Gimeno, D. (2009). Changes in income inequality and suicide rates after "shock therapy": evidence from Eastern Europe. *Journal of epidemiology and community health, 63*(11), 956.

Elgar, F., Craig, W., Boyce, W., Morgan, A., & Vella-Zarb, R. (2009). Income inequality and school bulllying: Multilevel of adolescents in 37 countries. *Journal of Adolescent Health, 45*, 351–359.

Elgar, F., & Aitken, N. (2010). Income inequality, trust and homicide in 33 countries. *European Journal of Public Health, 21*(2), 241–246.

Elgar, F., Pickett, K., Pickett, W., Craig, W., Molcho, M., Hurrelmann, K., & Lenzi, M. (2013). School bullying, homicide and income inequality: A cross-national pooled time series analysis. *International Journal of Public Health, 58*, 237–245.

Ellis, P. D. (2010). *The essential guide to effect sizes: Statistical power, meta-analysis, and the interpresentation of research results*. New York: Cambridge University Press.

Fearon, J. D. (2011). *Homicide data, third revision: Background paper prepared for the WDR 2011 team*. Retrieved September 20, 2019, from http://wwwwds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2011/06/01/000356161_20110601045939/Rendered/PDF/620370WP0Homic0BOX0361475B00PUBLIC0.pdf

Fox, S., & Hoelscher, K. (2010). *The political economy of social violence: theory and evidence from a cross-country study*. Crisis States Research Centre working papers series 2 (72). Crisis States Research Centre, London School of Economics and Political Science, London, UK.

Franco, A., Malhotra, N., & Simonovits, G. (2014). Publication bias in the social sciences: unlocking the file drawer. *Science, 345*(6203), 1502–1505.

Gartner, R. (1995). Methodological issues in cross-cultural large-survey research on violence. In R. B. Ruback & N. A. Weiner (Eds.), *Interpersonal violent behaviors: social and cultural aspects* (pp. 7–24). New York: Springer Publishing Co.

Gau, J. (2019). *Statistics for criminology and criminal justice* (3rd ed.). Thousand Oaks, CA: Sage.

Goda, T., & Garcia, A. T. (2017). The rising tide of absolute global income inequality during 1850-2010: Is it driven by inequality within or between countries? *Social Indicators Research, 130*(3), 1051–1072.

Goertzel, T., & Goertzel, B. (2008). Capital punishment and homicide rates: sociological realities and econometric distortions. *Critical Sociology, 34*(2), 239–254.

Hassett, M. R., Kim, B., & Seo, C. (2020). Attitudes toward concealed carry of firearms on campus: a systematic review of the literature. *Journal of School Violence, 19*(1), 48–61.

Headey, B., Goodin, R. E., Muffels, R., & Dirven, H.-J. (2000). Is there a trade-off between economic efficiency and a generous welfare state? A comparison of best cases of the three worlds of welfare capitalism. *Social Indicators Research, 50*, 115–157.

Heimer, K. (2019). Inequalities and crime. *Criminology, 57*, 377–394.

Hong, Y., Park, H., Kum, H., Park, S., & Kim, B. (2017). *Criminal justice policy and future strategy for social change (III): economic polarization and changes in criminal policies*. Korean Institute of Criminology: Seoul, South Korea.

Hooghe, M., Vanhoutte, B., Hardyns, W., & Birgan, T. (2011). Unemployment, inequality, poverty and crime. *British Journal of Criminology, 51*, 1–20.

Hsieh, C.-C., & Pugh, M. D. (1993). Poverty, income inequality, and violent crime: a meta-analysis of recent aggregate data studies. *Criminal Justice Review, 18*(2), 182–202.

Hu, Y., Van Lenthe, F., & Mackenbach, J. (2015). Income inequality, life expectancy and cause-specific mortality in 43 European countries, 1987–2008: a fixed effects study. *European Journal of Epidemiology, 30*, 615–625.

Huisman, M., & Oldehinkel, A. (2009). Income inequality, social capital and self-inflicted injury and violence-related mortality. *Journal of Epidemiology and Community Health, 63*(1), 31–37.

Hummelsheim, D., Hirtenlehner, H., Jackson, J., & Oberwittler, D. (2011). Social insecurities and fear of crime: a cross-national study on the impact of welfare state policies on crime-related anxieties. *European Sociological Review, 27*(3), 327–345.

Ioakimidis, M., & Heijke, H. (2016). Income inequality and social capital, are they negatively related? European cross-country analyses 2006-2012. *The Journal of Developing Areas, 50*(1), 215–235.

Jacobs, D., & Richardson, A. M. (2008). Economic inequality and homicide in the developed nations from 1975 to 1995. *Homicide Studies, 12*, 29–45.

Kang, S. (2016). Inequality and crime revisited: effects of local inequality and economic segregation on crime. *Journal of Population Economics, 29*, 593–626.

Kar, J. (2012). Income inequality in some major European union economies a discriminant analysis. *Annals of the University of Petrosani, Economics, 12*(4), 117–128.

Kim, B., Lin, W.-C., & Lambert, E. (2014). Research on policing in East Asia: a review of SSCI policing specialty journals. *Policing: An International Journal of Police Strategies & Management, 37*(3), 612–629.

Kim, B., Lin, W.-C., & Lambert, E. (2015). Comparative/international research on juvenile justice issues: a review of juvenile justice specialty journals. *Journal of Criminal Justice Education, 16*(4), 545–563.

Kim, B., Merlo, A. V., & Seo, C. (2018). Internationality of women specialty journals: content analysis and survey of editors. *Asian Journal of Criminology, 13*, 231–249.

Kruis, N. E., Soe, C., & Kim, B. (2020). Revisiting the empirical status of social learning theory on substance use: a systematic review and meta-analysis. *Substance Use & Misuse, 55*(4), 666–683.

Krulichová, E. (2019). The relationship between fear of crime and risk perception across Europe. *Criminology & Criminal Justice, 19*(2), 197–214.
LaFree, G. (1999). A summary and review of cross-national comparative studies of homicide. In M. D. Smith & M. A. Zahn (Eds.), *Homicide: a sourcebook of social research* (pp. 125–145). Thousand Oaks, CA: Sage Publications.
Lappi-Seppälä, T. (2011). Explaining imprisonment in Europe. *European Journal of Criminology, 8*(4), 303–328.
Lappi-Seppälä, T., & Lehti, M. (2014). Cross-comparative perspectives on global homicide trends. *Crime and Justice, 43*, 135–230.
Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.
McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007). Examining the association between parenting and childhood depression: a meta-analysis. *Clinical Psychology Review, 27*, 986–1003.
Messner, S. F., & Rosenfeld, R. (1997). Political restraint of the market and levels of criminal homicide: a cross-national application of institutional-anomie theory. *Social Forces, 75*(4), 1393–1416. https://doi.org/10.1093/sf/75.4.1393.
Molloy, G. J., O'Carroll, R. E., & Ferguson, E. (2014). Conscientiousness and medication adherence: a meta-analysis. *Annals of Behavioral Medicine, 47*, 92–101.
Muffels, R., & Fouarge, D. (2004). The role of European welfare states in explaining resources deprivation. *Social Indicators Research, 68*, 299–330.
Nivette, A. F. (2011). Cross-national predictors of crime: a meta-analysis. *Homicide Studies, 15*(2), 103–131.
Nivette, A., & Eisner, M. (2013). Do legitimate polities have fewer homicides? A cross-national analysis. *Homicide Studies, 17*(1), 3–26.
NUMBEO (2017). *Crime index for country 2017*. Retrieved from https://www.numbeo.com/crime/rankings_by_country.jsp. Accessed 20 Sep 2019.
Pare, P.-P., & Felson, R. (2014). Income inequality, poverty and crime across nations. *The British Journal of Sociology, 65*(3), 434–458.
Piatkowska, S., Messner, S., & Raffalovich, L. (2016). The impact of accession to the European Union on homicide rates in eastern Europe. *European Sociological Review, 32*(1), 151–161.
Pickett, K. E., Mookhersef, J., & Wilkinson, R. G. (2005). Adolescent birth rates, total homicides, and income inequality in rich countries. *American Journal of Public Health, 95*, 1181–1183.
Pratt, T. C. (2010). Meta-analysis in criminal justice and criminology: what it is, when it's useful, and what to watch out for. *Journal of Criminal Justice Education, 21*(2), 152–168.
Pratt, T. C., & Cullen, F. T. (2005). Assessing macro-level predictors and theories of crime: a meta-analysis. *Crime and Justice, 32*, 373–450.
Pratt, T. C., & Godsey, T. W. (2002). Social support and homicide: a cross-national test of an emerging criminological theory. *Journal of Criminal Justice, 30*, 589–601.
Pratt, T. C., & Godsey, T. W. (2003). Social support, inequality, and homicide: a cross-national test of an integrated theoretical model. *Criminology, 41*, 611–643.
Pratt, T. C., Turanovic, J. J., Fox, K. A., & Wright, K. A. (2014). Self-control and victimization: a meta-analysis. *Criminology, 52*(1), 87–116.
Pridemore, W. A. (2008). A methodological addition to the cross-national empirical literature on social structure and homicide: a first test of the poverty-homicide thesis. *Criminology, 46*, 133–154.
Pridemore, W. A. (2011). Poverty matters: a reassessment of the inequality–homicide relationship in cross-national studies. *British Journal of Criminology, 51*, 739–772.
Pridemore, W., & Trent, C. L. (2010). Do the invariant findings of Land, McCall, and Cohen generalize to cross-national studies of social structure and homicide? *Homicide Studies, 14*(3), 296–335.
Ouimet, M. (2012). A world of homicides: The effect of economic development, income inequality, and excess infant mortality on the homicide rate for 165 countries in 2010. *Homicide Studies, 16*(3), 238–258.
Ouimet, M., Langlade, A., & Chabot, C. (2018). The dynamic theory of homicide: Adverse social conditions and formal social control as factors explaining the variations of the homicide rates in 145 countries. *Canadian Journal of Criminology and Criminal Justice, 60*(2), 241–265.
Rogers, M., & Pridemore, W. (2013). The effect of poverty and social protection on national homicide rates: Direct and moderating effects. *Social Science Research, 42*, 584–595.
Rosenfeld, R., & Messner, S. F. (2009). The crime drop in comparative perspective: The impact of the economy and imprisonment on American and European burglary rates. *British Journal of Sociology, 60*(3), 445–471.
Rosenthal, R. (1979). The file drawer problem and tolerance for null results. *Psychological Bulletin, 86*(3), 638–641.
Santos, M. R., & Testa, A. (2018). Global trends in homicide. *Homicide and Violent Crime: Sociology of Crime, Law and Deviance, 23*, 199–222.
Santos, M., Testa, A., & Weiss, D. (2018). Where poverty matters: examining the cross-national relationship between economic deprivation and homicide. *British Journal of Criminology, 58*(2), 372–393. https://doi.org/10.1093/bjc/azx013.

Savolainen, J. (2000). Inequality, welfare state, and homicide: further support for the institutional anomie theory. *Criminology, 38*, 1021–1042.
Schaible, L., & Hughes, L. (2011). Crime, shame, reintegration, and cross-national homicide: A partial test of reintegrative shaming theory. *The Sociological Quarterly, 52*, 104–131.
Shah, A., & Bhandarkar, R. (2011). Does adversity early in life affect general population suicide rates? A cross-national study. *Journal of Injury and Violence, 3*(1), 25–27.
Stamatel, J. P. (2006). Incorporating socio-historical context into quantitative cross-national criminology. *International Journal of Comparative and Applied Criminal Justice, 30*, 177–207.
Stamatel, J. P. (2009). Correlates of national-level homicide variation in post-communist east-central Europe. *Social Forces, 87*(3), 1424–1448.
United Nations Development Program (2007/2008). *Human development report,* Retrieved from http://hdr.undp.org/sites/default/files/reports/268/hdr_20072008_en_complete.pdf. Accessed 20 Sep 2019.
United Nations Office on Drugs and Crime (2015). *Global study on homicide*, Retrieved from https://www.unodc.org/gsh/. Accessed 20 Sep 2019.
Vauclair, C., & Bratanova, B. (2017). Income inequality and fear of crime across the European region. *European Journal of Criminology, 14*(2), 221–241.
Vieno, A., Roccato, M., & Russo, S. (2013). Is fear of crime mainly social and economic insecurity in disguise? A multilevel multinational analysis. *Journal of Community & Applied Social Psychology, 23*, 519–535.
Weiss, D. B., Testa, A., & Santos, M. R. (2018). Hazardous alcohol drinking and cross-national homicide rates: The role of demographic, political, and cultural context. *Journal of Drug Issues, 48*(2), 245–268.
Wolf, A., Gray, R., & Fazel, S. (2014). Violence as a public health problem: An ecological study of 169 countries. *Social Science & Medicine, 104*, 220–227.
Word Prison Brief (2016). *World prison brief data*. Retrieved from http://www.prisonstudies.org/world-prison-brief-data. Accessed 20 Sep 2019.
World Bank (2012). *Gini Index*. Retrieved from https://data.worldbank.org/indicator/SI.POV.GINI. Accessed 20 Sep 2019.
World Health Organization (2015). *Global health observatory data*. Retrieved from http://www.who.int/gho/mental_health/suicide_rates/en/. Accessed 20 Sep 2019.

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