

PEACE AS A COMPOSITE INDICATOR: THE GOALS AND FUTURE OF THE GLOBAL PEACE INDEX

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Abstract This article provides an overview of the purpose, development and future of the Global Peace Index (GPI), a composite indicator of peacefulness at the national level. It explains why the concept of negative peace is well suited to being captured by a composite index, for both theoretical and statistical reasons. It examines how the GPI fits within the field of peace and conflict studies and how its methodological soundness has been assessed. This is done by looking at the history and structure of the GPI and showing how it relates to other definitions and indicators of peacefulness. The article then analyzes how the index is constructed with respect to its weighting, aggregation, and robustness. Some of the criticisms of the index are also explored, as well as the main proposed directions for the GPI evolution over the coming decade. Three main advantages of the index are identified as the ones that best reflect its novel input in peace and conflict studies. First, a composite indicator of peace helps to provide a more compelling narrative around the dynamics of peace between countries, to generate more interest in the peace and conflict field and to promote the concept of peace as a crucial driver of development. Second, the aggregation of multiple indicators of violence allows for the construction of a continuous measure of peacefulness with a less skewed distribution that can serve as the baseline for seeing which factors in other areas are correlated with peacefulness. Third, this composite measure of peacefulness highlights areas where data on aspects of negative peace are missing, incomplete, or not comparable across countries and drives the creation of new and novel indicators to fill these data gaps.

Keywords Global Peace Index, indices, composite indicators, peace, conflict, negative peace concept, methodology, measurement

Название статьи Мир как составной индикатор: цели и будущее Глобального индекса мира

Аннотация Статья содержит анализ целей, эволюции и направлений будущего развития Глобального индекса мира (GPI) – составного индикатора миролюбия, который вычисляется для государств мира. В ней показано, что по причинам как теоретического, так и статистически-прикладного характера именно составной индекс адекватно отражает концепцию «негативного мира». Также показано, как индекс вписывается в область исследований мира и конфликтов, и проведена оценка его методологической базы. Для этого проведен обзор истории и структуры GPI и выявлено его соотношение с

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другими определениями мира и индикаторами уровня мира (миролюбия). Методология индекса проанализирована на предмет взвешенного распределения, агрегации и устойчивости. Также приведена основная критика индекса и намечены направления развития его методологии на ближайшее десятилетие. Выявлены три основных преимущества данного индекса, совокупность которых составляет его инновационный вклад в исследования мира и конфликтов. Во-первых, составной индикатор мира позволяет более убедительно показать и донести до широкой аудитории динамику мира между странами, стимулирует интерес к сфере мира и конфликтов и продвигает концепцию мира как ключевого фактора и условия человеческого развития. Во-вторых, агрегация многих параметров и показателей насилия позволяет обеспечить непрерывное измерение уровня мира (миролюбия) с менее асимметричным распределением, что создает основу для выявления факторов в других сферах, коррелирующих с индикатором мира. В-третьих, составной индекс мира помогает высветить те аспекты негативного мира, данные по которым отсутствуют, носят неполный характер или не дают возможности сравнивать эти аспекты для разных стран. Таким образом, GPI служит стимулом к созданию новых, инновационных индикаторов, которые заполнили бы эти пробелы.

Ключевые слова	Глобальный индекс мира, индексы, составные индикаторы, мир, конфликт, концепция «негативного мира», методология, измерение
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I. Introduction

The vast increase in the use of data and indicators in the social sciences over the past two decades has led to a concurrent increase in the number of composite indices. The number of such indices is estimated to have quadrupled from the 1990s to the 2000s, and then tripled again in the 2010s.¹ The number of papers that mention composite indicators rose from less than 50 in 1997 to close to 600 by 2016.² Composite indicators (sometimes called composite indices, global performance indicators, or synthetic indicators) seek to measure the level of, or performance on, some underlying abstract or complex concepts that cannot be adequately captured or understood using a single metric.

Although the number of composite indicators that measure concepts in governance, development, and wellbeing has risen considerably, the use of composite indicators in the field of peace and conflict studies remains relatively rare. Of the 160 composite indicators identified in the dataset compiled for the *Power of Global Performance Indicators* (2019),³ only four were listed in the “security” category, two of which were indices created by the Institute for Economics and Peace (IEP) – the Global Peace Index and the Global Terrorism Index. Very few composite indices include indicators of conflict, and those that do typically look only at binary measures of the presence or absence of violent conflict, rather than combining different types of conflict and violence into a single measure.

This article paper gives a brief overview of why the concept of negative peace, defined by the Institute for Economics and Peace as “the absence of violence or the fear of violence”⁴ is well suited to being captured by a composite index, for both theoretical and statistical reasons. It will do so by first looking at the history and structure of the Global Peace Index (henceforth “GPI”) and how it relates to other definitions and indicators of peacefulness. Secondly, it will look in more detail at how the index is constructed with respect to its weighting, aggregation, and robustness. The final part of

the paper will look at some of the criticisms of the index and how it might evolve over the coming decade.

II. Peace as a composite measure

There is no single agreed upon definition of “peace” within the field of peace and conflict studies. However, despite this lack of consensus, almost all definitions of peace share considerable conceptual overlap. Following on from the pioneering work of Johan Galtung (1964),⁵ virtually every conception of peace includes a “negative” and a “positive” aspect, where “negative peace” refers to the absence of violence or conflict, and “positive peace” is about the underlying structural conditions that foster harmonious relations, prevent the outbreak of violence without recourse to force, and allow human potential to flourish.⁶ IEP’s understanding of peace mirrors this vision of peace having positive and negative aspects. Alongside the GPI, IEP also produces a Positive Peace Index, although a full discussion of IEP’s understanding of “positive peace” lies outside the scope of this article.

There are many potential approaches to measuring negative peace. They range from minimal approaches that use a single binary indicator of the presence or absence of conflict to maximal approaches that focus on violence in all its forms.⁷ There are several issues with using a minimalist approach to negative peace. Firstly, there is a simple conceptual issue of excluding any type of violence other than armed conflict. For example, although there may be differences in the severity and consequences of armed conflict compared to homicide, they are not so conceptually unrelated that a clear distinction can be drawn between the two. Second, binary indicators of conflict rely on measurement thresholds (e. g. a thousand or more battle-related deaths in one country being classified as a “war”) that often exclude long-running low-level conflicts.⁸ Finally, using a threshold measure of conflict to assess negative peace makes conflict a relatively rare event that affects only a small number of countries each year. This makes predicting conflict extremely sensitive to the choice of threshold, and makes correlation analysis between variables of negative peace and variables of positive peace almost impossible.

One possible alternative to a single indicator of peace that is not a full composite index would be a measure that combines different types of violent deaths (homicide, battle-related deaths, terrorism fatalities etc.) into a single “violent death rate”. A properly constructed violent deaths measure would avoid the problems of defining which deaths count as conflict-related or not and eliminate the problem of double counting across different conflict death datasets with overlapping definitions. Although no such database currently exists, one is currently being constructed. The *Global Registry of Violent Deaths* is a global consortium of experts that aim to construct a single, unified database of all violent deaths worldwide.⁹ However, although such a database would be an extremely useful tool in checking GPI indicators for double counting of deaths, it could not in of itself serve as a replacement for a composite measure like the GPI. First, a database that combines different types of violent deaths implicitly weights all these deaths equally. However, different types of violent deaths can vary significantly in the impact they have on the *fear* of violence, which is the second element of IEP’s definition of negative peace. For example, a high-profile mass casualty terrorist attack may have far greater psychological, social, and political ramifications than the equivalent number of homicide deaths. Second, a composite indicator that only includes violent deaths but does not include indicators that measure the response to violence, such as the number of police or military forces or the level of political terror, would fail to capture the dynamic

wherein high levels of peace in one domain are achieved at the expense of low levels of peace in another. A registry of violent death rates by country would make no useful distinction between a low death rate in a closed, controlling totalitarian regime compared to a low death rate in an open, pluralistic society with high levels of positive peace.

The GPI thus takes a maximalist approach to measuring negative peace, combining multiple indicators of violence and the fear of violence, as outlined in Table 1. However, although the GPI indicators cover almost the entire spectrum of negative peace, the index has been criticized for excluding certain types of violence. Early criticism of the index focused on the lack of indicators related to gender-based violence and violence against children.¹⁰ This criticism is addressed in the final section of this article. Other critics have argued that the GPI does not include indicators related to conflict between groups within a country, but rather focuses on state-based and interpersonal violence only.¹¹ While the index does not directly measure relations or tensions between groups (although these are measured in the Positive Peace Index), it does, however, have a number of indicators that capture violence between non-state groups. Indicators such as “deaths from internal conflict”, “intensity of internal conflict”, and “number and duration of internal conflicts” all capture elements of group tensions, conflict, and violence.

The advantages that the Global Peace Index has as a composite measure of peacefulness can be summarized into three key points. First, a composite indicator of peace provides a more compelling narrative around the dynamics of peace between countries, which helps to generate more interest in the peace and conflict field and promotes the concept of peace as a crucial driver of development. Indeed, it is this ability to generate interest and attention that drove the initial success of the Human Development Index and arguably led to the proliferation of composite indicators during the first two decades of the 21st century.¹² Second, the transformation of multiple indicators of violence, many of which have heavily skewed distributions or were traditionally interpreted in a binary manner, allows for the construction of a continuous measure of peacefulness with a less skewed distribution that can serve as the baseline for seeing which factors in other areas are correlated with peacefulness. The construction of the GPI made it possible to create a cross-national index of Positive Peace¹³ and has served as the basis for assessing the impact of many other factors such as GDP growth, economic development, and tourism on levels of peacefulness (for example, M.Trussell looks at the cyclical relationship between peace and trust).¹⁴ Third, the existence of a composite measure of peacefulness highlights areas where data on aspects of negative peace is missing, incomplete, or not comparable across countries (such as gender-based violence and violent crime) and helps to drive the creation of new and novel indicators to fill these data gaps.

III. Global Peace Index: history and structure

The GPI was created in 2007 by the Australian entrepreneur and philanthropist Steve Killelea. Its methodology was developed in conjunction with the Economist Intelligence Unit (EIU) and with the help of international panel of experts. The impetus for the creation of the index stemmed from Killelea’s charitable work in conflict-affected developing countries, which led to him being exposed to the impact that violence and violent conflict had on the development projects he was funding.¹⁵ Thus, the purpose of the index from its onset was to conceptualize peace as having both intrinsic and instrumental value. If peacefulness is necessary for development, then understanding

which nations in the world were the most peaceful would allow for a better understanding of the drivers of peacefulness and would in turn make development more successful.

Table 1. Global Peace Index indicators and sources

Indicator	Source
Safety and Security Domain	
Perceptions of criminality	Gallup World Poll, IEP estimates
Refugees and IDPs as a percentage of population	UNHCR, IDMC
Political instability	EIU qualitative assessment
Political terror	Political Terror Scale
Impact of terrorism	Terrorism Tracker Database
Homicide rate per 100,000 people	UNODC UN-CTS, IEP estimates
Violent crime	EIU qualitative assessment
Incarceration rate per 100,000 people	World Prison Brief
Police officers and internal security rate per 100,000 people	UNODC UN-CTS, IEP estimates
Violent demonstrations	EIU qualitative assessment
Ongoing Conflict Domain	
Number and duration of internal conflicts	Uppsala Conflict Data Program (UCDP) Battle-Related Deaths Dataset, Non-State Conflict Dataset and One-sided Violence Dataset
Number, duration, and a country's role in external conflicts	UCDP Battle-Related Deaths Dataset
Deaths from external organised conflict	UCDP Georeferenced Events Dataset
Deaths from internal organised conflict	UCDP Georeferenced Events Dataset
Intensity of internal organised conflict	EIU qualitative assessment
Relations with neighbouring countries	EIU qualitative assessment
Militarisation Domain	
Military expenditure as a percentage of GDP	IISS Military Balance, IEP estimates
Armed services personnel rate per 100,000 people	IISS Military Balance, IEP estimates
Weapons imports rate per 100,000 people	SIPRI Arms Transfer Database
Weapons exports rate per 100,000 people	SIPRI Arms Transfer Database
Financial contributions to UN peacekeeping missions	United Nations Committee on Contributions
Nuclear and heavy weapons capabilities	IISS Military Balance, IEP estimates
Access to small arms and light weapons	EIU qualitative assessment

The GPI defines peace as “the absence of violence or the fear of violence” and comprises 23 indicators across three domains: “Safety and Security”, “Ongoing Domestic and International Conflict”, and “Militarization”. The “Safety and Security” domain measures the level of violence, discord, and unrest within a nation, using indicators of direct violence like homicides, as well as indicators that capture civil unrest such as

“violent demonstrations”. The “Ongoing Domestic and International Conflict” indicator seeks to capture information related to the number, duration, and intensity of the conflicts that a country is involved in. The “Militarization” domain measures both the level of militarization within a country through indicators such as military expenditure as a percentage of GDP, but also the extent to which a country is responsible for increasing militarization elsewhere, such as through weapons exports per capita. A full list of indicators and their sources is provided in Table 1.

Six of the indicators are qualitative and are scored by the EIU’s country analysts. These scores are checked by a regional director and are then subject to further review by the GPI expert panel which comprises five experts in the field of peace and conflict and composite index construction. A more detailed review of the process of qualitative scoring can be found in the 2021 Global Peace Index report. These qualitative indicators are only used for types of violence on which there is a lack of adequate comparable quantitative data. IEP’s long-term goal is to replace qualitative indicators with quantitative indicators wherever possible: e.g., in 2022 the currently qualitative “violent demonstrations” indicator is scheduled to be replaced with a quantitative indicator that draws on data from the Armed Conflict Location and Event Data project (ACLED) and the Cross-National Time Series (CNTS).

IV. The GPI as a composite index

Even if negative peace is well-suited to being measured by a composite indicator, that does not guarantee that the GPI is the best measurement of negative peace. A good composite indicator must be both conceptually and technically sound. This section looks at the two most common types of criticism of composite indices: the way they are interpreted and the way they are constructed.

Critics of composite indicators note that the use of a single, composite measure can lead to a strong emphasis on rank differences between countries, ignoring the uncertainty in rankings and overemphasizing small differences in scores, even assuming that an index has the “right” set of indicators which are measured without error.¹⁶

This in turn can lead to national governments explicitly trying to improve or “game” their rank on a composite index relative to other countries, rather than focusing on improving actual score or performance. Composite indicators may also lead to high-performing countries being seen as “successes” or benchmarks to emulate, with lower performing countries seen as “failures”. This framing then obscures the structural and cross-national factors affecting country performance and implicitly suggests that index performance is solely a matter of domestic policy.¹⁷ More broadly, composite indicators may act as a form of indirect governance, replacing top-down directives with indirect pressure in the form of “information politics”. As global governance has become more politicized and the decisions made by international organizations and NGOs have become more contested, indicators and composite measures provide a seemingly neutral assessment of performance that faces less resistance.¹⁸ Composite indicators have also been criticized for being short-term projects that are discontinued after only a few years, rendering the whole exercise of constructing a composite index of questionable value.¹⁹

Technical criticism of composite indicators generally focuses on the ways indicators are weighted and aggregated. However, it should be noted that there is no single scientific or objective method of constructing a composite index. Some attempts to make index construction objective, such as using equal weights for all domains or deriving indicator weights using data-driven techniques such as principal components analysis,

are often touted as being more objective than more normative approaches such as expert assessment. However, while such techniques might produce weights from a set of indicators without the need for any subjective judgement, the choice to use such a technique still requires a jump from a statement of fact about a given indicator (e. g. that it has higher variance than other indicators) to a subjective decision to use this fact to assess indicator importance (e. g. indicators with higher levels of variance must therefore be better measures of the underlying concept). Therefore, the construction of any composite indicator must necessarily involve some subjective or normative elements.²⁰

Although no purely objective index construction method exists, several frameworks have been proposed to aid in best practices for composite indicator construction. The OECD *Handbook on Constructing Composite Indices* (2008) provides a ten-point checklist for building a composite indicator.²¹ More recently, S.Greco and his colleagues looked in more detail at a framework for assessing the technical validity of composite indices, focusing on the issues of aggregation, robustness, and weighting.²² Most of the issues in the OECD checklist related to the theoretical framework of an index and data selection have been covered already in the article, so the focus in what follows here will be on the issues of weighting, aggregation, and robustness of the GPI.

Weighting a composite index allows for different indicators it comprises to be given different levels of importance. As discussed earlier, this is especially important with regards to peace, as even conceptually similar indicators like homicide and battle deaths may have a significantly different psychological and social impact. Composite indices are usually given weights in one of three ways. The most common method is for each element to be unweighted (and thus equally weighted with all other elements). The second method is for indicators to be weighted through expert assessment, which involves a formal process of comparison with a set method of deriving weights (such as an analytical-hierarchical process) or through a more general discussion of the indicator value. The final method is for weights to be derived through some statistical process, such as correlation analysis or principal components analysis. IEP considered both expert assessment and statistical methods when originally weighting the index. The final weights were arrived at through a process of expert consultation, although not through a formal method with a set formula for deriving weights. All indicators have a maximum potential weight of five, and a minimum weight of one, which means that the maximum possible difference in importance between indicators would be one indicator being considered five times more important than another. The source of data was also taken into consideration, with qualitative indicators generally given lower weights than their quantitative counterparts. As a result, the index weights will have to be reviewed when new quantitative indicators are introduced in the future.

Aggregation refers to how the components of a composite index will be combined after they have been weighted. Most indices are a simple arithmetic average of their weighted components scores (an example of linear aggregation). Some indices will use a geometric mean or other more complicated multi-criteria methods to combine component scores. The GPI uses the weighted arithmetic average approach. This method implicitly assumes that there are no synergies between the composite index components. In the case of negative peace, it means that a country will not be overly penalized for having one cluster of indicators with very low levels of peace, as long as it has another cluster of indicators with very high levels of peace. In theory, this might seem to result in underestimation of the joint impact of having high levels of violence in multiple areas. However, in practice it is very rare for countries to have high variance of scores within each of the three GPI domains. Countries with a high number of conflict deaths are more likely to be involved in more intense conflicts, countries with high levels of homicide

generally have higher levels of violent crime, and so on. However, constructing alternative versions of the GPI which use a geometric rather than a linear aggregation and comparing the results is an area where the robustness of the index could be explored in more detail, and will be part of future methodological reviews.

Robustness testing is used to determine how sensitive a composite indicator is to the choices made in the processes of weighting and aggregating. As with other technical questions surrounding index construction, there is no “correct” threshold beyond which an index can be considered suitably robust. However, lower levels of robustness are a sign that a composite indicator is particularly sensitive to the choice of weights and aggregation method. IEP has performed uncertainty analysis robustness testing with regards to the index domain weights, but has not at this stage performed robustness testing with regards to different index aggregation methods. Trialing different aggregation methods will be part of the index review process in 2022–2023. Rank robustness testing with respect to different weights was performed in the 2016 GPI. Calculating robustness across all possible weight combinations for all 23 indicators would have led to serious computational cost. As an alternative, IEP calculated robustness across 100 different weight settings for each of the three GPI domains, resulting in over 5100 differently weighted version of the GPI. IEP found that 70 percent of pairwise country comparisons were completely robust across every version of the index. This means that for 70 percent of country comparisons, one country was always more or less peaceful than the other across all 5100 version of the index. This was equivalent to the same level of absolute robustness as the ones showed by Human Development Index.²³

V. The future of the index

There are two main areas where changes to the index could be made in the near future. First, additional indicators could be added or removed from the index. Second, existing qualitative indicators that rely on expert assessment from the EIU could be transformed into quantitative indicators, pending the existence of new datasets, most likely massive event open-source databases, or through the use of novel approaches to existing datasets.

A number of indicators have been added to or removed from the index since its inception. In its original form, the index included an indicator on troop commitments to UN peacekeeping operations, an indicator that counted the total number of conflicts fought within a nation’s borders, and an indicator of military capability and sophistication. All these three indicators have since been removed or replaced in the index. The peacekeeping indicator is now a measure of financial rather than troop commitment to peacekeeping operations. The count of conflicts was transformed into a weighted indicator that combines the number, duration, and intensity of conflicts. No replacement was made for the military sophistication indicator, as it was felt by the expert panel that all of the dimensions of this indicator were already being captured by the military expenditure and heavy weapons indicators.

There are two areas of negative peace that are not covered by the index at present: gender-based violence and self-directed violence. A failure to include data on gender-based violence and violence against children was one of the first major criticisms of the index after its initial release in 2007.²⁴ However, while some datasets of gender-based violence exist, most suffer from either comparability issues or a lack of country coverage. For instance, the UN Office on Drugs and Crime (UNODC) data on sexual assault cannot be directly compared across countries, owing to differences in definitions across national jurisdictions, and vastly different underreporting rates across

countries.²⁵ Comparable data on intimate partner violence is collected through the U.S. Agency for International Development (USAID) Demographic Health Surveys, but it is collected infrequently and primarily in less economically developed countries. Should data for a higher number of countries become available, the GPI could expand to include an indicator of gender-based violence.

There are two issues with including self-directed violence as part of the GPI. Firstly, there is no consensus in the peace and conflict field that self-directed violence should be classified as a form of violence on a par with interpersonal or state-based violence. However, it has been argued that suicides should be viewed through a peacebuilding lens and that suicide falls under Galtung's definition of violence, even (at least partially) in the case of euthanasia or assisted suicide.²⁶ The World Health Organization (WHO) also classifies suicide as a form of self-directed violence, on a par with other forms of violence, and notes that the number of deaths from self-directed violence is considerably higher than the number of deaths from homicide in most countries.²⁷ IEP does not have a definitive position at this stage on whether self-directed violence falls under its definition of negative peace. However, even if this position were reached, data quality issues would prevent suicides from being included in the index. In 2014, the WHO estimated that only 35 percent of its member states had vital registration data of high enough quality to accurately estimate suicide rates,²⁸ which means that estimates in other countries would have to be modelled. As such, the GPI team has no immediate plans for an indicator of self-directed violence to be included in the index, although, given the high number of deaths from suicides globally, data quality will be reviewed annually.

Reducing the reliance on expert assessments will be the main venue of index reform over the next decade. Out of 23 GPI indicators, six are still based on expert assessment, although this will be reduced to five in the 2022 index, with the introduction of a new quantitative indicator for "violent demonstrations". While expert assessment is sometimes the only option where quantitative data is not available, an overreliance on expert assessment increases the likelihood of measurement error. As expert indicators on the GPI are scored on a truncated, one to five scale, this may lead to an overestimation of year-on-year changes in peacefulness. In the absence of suitable quantitative data, one potential method of reducing expert measurement error is to increase the number of experts making assessments and to pool or average their results.²⁹ However, this approach greatly increases the time and costs associated with data collection, so it is unfeasible for indicators where a very high number of pairwise comparisons between countries need to be made. Therefore, IEP has relied on the expert panel review of its qualitative indicators to make score adjustments, and on introducing new sources of data or new indicators based on novel transformations of existing datasets.

The best example of the replacement of a qualitative indicator with its quantitative equivalent is the "terrorism impact" indicator. At the time of the index's creation in late 2006, there was no terrorism database comprehensive enough to serve as the basis for an indicator in the GPI. Although there were some databases of terrorist acts, such as the RAND database of Worldwide Terrorism Incidents, the level of country coverage in these databases was considered insufficient. Similarly, the US State Department's quantitative analysis of global trends in terrorism attracted high levels of criticism for perceived inaccuracies in its analysis of terrorism trends between 2001 and 2004.³⁰ As a result of this lack of data, in 2007–2011, the "terrorism impact" indicator in the GPI was a qualitative assessment of the potential for future terrorist attacks, assessed and compiled by the EIU.

In 2012, IEP changed the indicator from a qualitative assessment of the threat from terrorism, to a quantitative assessment of the level of terrorism, using the Global Terrorism Database (GTD)³¹ as the base for the construction of the new indicator. The change was made following a recommendation from the GPI's expert panel. With the data from the GTD, IEP was able to construct a much more sophisticated and granular indicator of the full impact of terrorism. The new indicator incorporated the total number of terrorist events, deaths, injuries, and property damage from terrorism, weighted over a five-year period to reflect the lingering psychological and social impact of terrorist attacks. The data was also normalized using an exponential function in order to reflect the higher impact of terrorist attacks in non-conflict environments.

Although the new indicator was a considerable improvement on the original qualitative indicator, it had two outstanding problems. First, data for the GTD was typically released with a six-month lag, meaning that data for the GPI indicator had to be supplemented with more timely data taken from a variety of other open-source databases. However, these databases were generally less comprehensive than the GTD, leading to an undercounting and underweighting of terrorism in the most recent year. Second, there were concerns that data from the GTD in high-conflict areas was also being captured in other GPI indicators, in particular the battle-related deaths indicators. This seems to have been the result of the use of certain tactics typically associated with terrorist groups, such as suicide bombings, in ongoing conflicts, or from attacks by militant-terrorist groups against military bases that led to more protracted battles. Whatever the cause, this potential double counting of deaths could imply underestimation of the level of peace in some high conflict areas.

As a result of these problems, IEP will be using the *Terrorism Tracker* database as the basis of its "terrorism impact" indicator from 2022 onwards. Data from *Terrorism Tracker* is updated on a daily basis, obviating the need to supplement the GTD with other open source data. It also has a stricter set of criteria for counting a violent attack as terrorist one: i. e., attacks in high-conflict countries taking place within the context of an ongoing battle or campaign are less likely to be included. This would make the GPI "terrorism impact" indicator a more accurate reflection of the true impact of terrorism and of terrorist attacks and fatalities only, rather than combat and battle-related deaths.

Replacing qualitative assessments with quantitative indicators has proven to be much more difficult for the remaining qualitative indicators. Constructing new indicators in these areas will depend upon the introduction of new datasets or taking novel approaches to indicator construction that build open open-source data. This can best be illustrated by examining IEP's current attempts to construct new indicators of "violent crime" and "neighboring countries relations".

The current "violent crime" indicator is a qualitative assessment of the extent to which violent crime impacts social life and business environment. While data on police-recorded violent crime at the national level are currently available, comparability issues across countries mean that these data cannot currently be used as the basis of a GPI indicator. The UNODC collects data on serious assault as part of its United Nations Crime Trends Survey (UN-CTS). However, differences in the definition of assault, police reporting procedure, classification procedure (e. g. whether an assault is classified when reported or when charges are filed, whether an assault by four people counts as one incident or four etc.), and underreporting rates mean that the data are very hard to compare across countries.

Although attempts have been made by the UNODC to harmonize data collection to minimize these issues, the UNODC collected data still poorly correlates with survey data on self-reported violent crime victimization. For example, the correlation between the

UNODC serious assault data and the Lloyd's Register World Risk Poll question on violent crime victimization for the past two years was only 0.26. Thus, the best potential source of a quantitative violent crime indicator is survey data on crime victimization. However, there is very little comparable survey data on violent crime at the national level. For example, the International Crime Victimization Survey is only updated sporadically, is available for less than 80 countries, and has not been updated for most countries since 2010.

The “neighboring countries relations” indicator assesses diplomatic, economic, and social relations between a given country and its neighbors. A potential source of data for a quantitative indicator would be various large event databases that have been developed over the past decade, such as the Global Database of Events, Language, and Tone (GDELT). These massive event databases collect real-time data from various media sources, most commonly online news reports. The events are then machine coded to extract data on the actors involved, the type of action, and the tone or sentiment between actors. In theory, such databases could be used to assess the level of positive or negative sentiment between nation states: for example, events in the database could be scored using the Goldstein scale that assigns a score on a conflict-cooperation scale to diplomatic or military events.³² However, in practice such databases are likely to have a very high number of false positives.³³ Thus, machine coding without human review of open-source data cannot serve as the basis for an indicator of relations between countries. However, a hybrid approach that uses humans to check a filtered event dataset is more plausible and is likely to serve as the basis for any new indicator in this area.

VI. Conclusion

The problems associated with using a composite index to measure an abstract concept are well documented. The coverage of composite measures often leads to an excessive focus on relative country rankings, an excessive emphasis on small differences between countries, and simplistic conclusions about the drivers of a complex phenomenon. However, despite all these issues, composite measures can help generate interest and public attention, build connections between otherwise siloed areas of research, and draw attention to data gaps and inadequacies in existing datasets, thus helping to drive the creation of new indicators and approaches to measuring and understanding the underlying phenomena.

In the field of peace and conflict studies, the GPI provides a composite, continuous measure of negative peace, whereas previously most approaches had focused on either binary measures of the presence or absence of peace, or maximalist approaches which were too complex to be quantified. The GPI has provided the benchmark which has served as the basis for much of IEP's other research, including the Global Terrorism Index, Positive Peace Index, and various national level measures of peace that mimic the GPI in structure and purpose. IEP's aim over the next decade is to increase the timeliness and robustness of the index and to create several new and novel indicators of negative peace, in order to make the index more useful to other researchers in the peace and conflict field.

ENDNOTES

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