A THEORY OF GENERAL CAUSES OF TERRORISM: HIGH POPULATION GROWTH, INCOME INEQUALITY AND RELATIVE DEPRIVATION

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Abstract.
A fundamental problem in psychosocial sciences is how to explain the root causes of terrorism. The vast literature has analyzed several determinants of terrorism. However, the precise role of demographic factors for the evolution of terrorism is hardly known. Statistical evidence here reveals that fatalities for incidents of terrorism are associated with growth rates of population. This finding seems to suggest that terrorism thrives –in average– in specific regions with high growth rates of population that may generate income inequality, subsistence stress and relative deprivation of people. In addition, geospatial analysis here reveals that countries with high association between fatalities from terrorist incidents and population growth are mainly in Africa and Middle East. Overall, then, the study here can clarify and generalize whenever possible, one of the causes of terrorism, which seems to be due to sociodemographic factors combined with psychosocial risk factors. Finally, the study suggests socioeconomic policies directed to reduce this critical problem in society.

Keywords: Terrorism; Terrorist Incidents; Population Growth; Population Pressure; Demographic Factors; Income Inequality; Subsistence Stress; Poverty; Relative Deprivation.

The scope of the present study
This paper has two goals. The first is to analyze the possible association between demographic factors and effects of terrorist attacks in society. The second is to detect possible socioeconomic and psychosocial risk factors. These topics are basic in social sciences because terrorism is growing both in rich and in developing nations (Devezas & Santos, 2006; Root causes, 2015; Li & Schaub, 2004; Norris et al., 2013; Reardon,
that set the stage for terrorism over the long run, and *precipitants*, specific events that immediately precede the occurrence of terrorism*. Some preconditions of terrorism are economic factors, such as low income, poverty, income inequality, etc. (Ezcurra & Palacios, 2016; Newman, 2006; Krueger, 2007). Ackoff and Rovin (2003, p. 146) argue that: “countries that are the breeding grounds for terrorists are the least advanced economically”. Enders *et al.* (2016) observe that domestic and transnational terrorist attacks are more concentrated in middle-income countries and the point of concentration is shifted to lower income countries after the rising influence of the religious fundamentalist. Other studies show that poverty and large numbers of young men facing dim economic prospects are also likely contributors to terrorism (Ehrlich & Liu, 2002). In addition, scholars show that high growth rates of population combined with low household income and socioeconomic inequality can support violent crime (Christens & Speer, 2005; Curtis, 1975; Coccia, 2017).

The UN General Assembly claimed that international terrorism can be also due to socioeconomic issues of poverty, income inequality, underdevelopment and the absence of social justice in some regions (United Nations, 2016). A popular hypothesis in the literature is that terrorism and other forms of political violence are due to poverty and poor distribution of economic resources (Piazza, 2006; Von Hippel, 2010). This “rooted-in-poverty hypothesis” explains terrorism as “expression of socioeconomic discontent and desperation” (Piazza, 2006, p. 160). In particular, terrorist organizations can use poor socioeconomic conditions as a base to foster their criminal activities (cf., Blomberg *et al.*, 2004; Enders & Hoover, 2012; Krieger & Meierrieks, 2011). In fact, low levels of socioeconomic development increase the appeal of political extremism, encourage political violence and support instability in society (Piazza, 2006). Many

Theoretical framework and working hypothesis

Crenshaw (1981, p. 381, original Italics) claims that an appropriate theoretical framework for the analysis of likely settings for terrorism should consider different typologies of factors: “*preconditions*, factors

2015; Rosendorff & Sandler, 2005; cf. Park & Bali, 2017). Many studies analyze the direct and indirect determinants of terrorism (Abadie, 2005; Crenshaw, 1981; Newman, 2006; Freytag *et al.*, 2011; McAllister & Schmid, 2011), though predictors of terrorism tend to be often not equal between different societies over the course of time (Krueger & Malečková, 2009). Some sources of terrorism are explained with economic factors (Enders *et al.*, 2016; Blomberg *et al.*, 2004; Hertog, 2010; Krueger & Malečková, 2002; Von Hippel, 2010), political factors (Coggins, 2015), social factors (Burgoon, 2006; Krueger & Malečková, 2002), etc. However, *whether* and *how* demographic factors cause and sustain terrorism is hardly known. The study here confronts this scientific problem trying to analyze and explain whenever possible, the role of demographic factors associated with terrorist incidents. Findings can clarify one of the precipitating factors of the evolution of terrorism over time and space. Overall, then, this study suggests that empirical and theoretical analyses should deeply investigate the effects of demographic factors on specific societies to understand *why* terrorism is growing in order to defuse the underlying principal causes. The results here can also support fruitful insights for a policy that ameliorates socioeconomic conditions of population and indirectly reduces drivers of terrorism in society. In order to position this analysis in the field of terrorism studies, the next section begins by developing the theoretical framework and working hypothesis of this contribution.
studies confirm that low income and high inequality are conducive to violent crime (Christens & Speer, 2005; cf., Blomberg et al., 2004; Coccia, 2017). Piazza (2006, p. 463) also argues that unlike popular opinion: “no significant relationship between any of the measures of economic development and terrorism can be determined. Rather, variables such as population, ethnoreligious diversity, increased state repression and, most significantly, the structure of party politics are found to be significant predictors of terrorism”. The study of these variables, such as demographic factors, is basic for understanding the sources and effects of terrorism in society. In general, scholars argue that population growth can support resource scarcity and violence (Christens & Speer, 2005; Lee, 2016, 2016a; cf., Christian, 1961). The theoretical background of these studies is the theory by Malthus (1817) presented in the book An Essay on the Principle of Population: T. R. Malthus wrote that population has geometric growth rates, while food resources have arithmetic growth rates. Population-resource imbalance (population pressure) is often evoked as a source of subsistence stress in society that generates a looming crisis and environmental conflicts. Many scholars are proponents of neo-Malthusian approaches to explain economic and social issues, such as Ehrlich (1968) that foretold a coming crisis from overpopulation (population pressure) and limited resources, which generate subsistence stress in society (cf., Meadows et al., 2009; Coccia, 2005, 2009, 2013, 2014, 2018). Linstone (2003, p. 288) argued that: “The world population is expected to increase from 6.2 billion to 9.3 billion in 2050 and 98% of this growth will be in the poorer countries” (cf., Rapoport, 2004). Ehrlich and Liu (2002, p. 188) observed that:

high population growth rates are expected to continue in many developing nations, with a projected annual growth rate for people aged 20–34 of 2.82% as opposed to a rate of 0.16%

in developed countries during the years 2000–2050 … In the face of such growth, job opportunities may be doomed to become much rarer.

In this context, Kaplan (2000) argued that a possible threat to developed countries can be due to population pressure of poor countries. These studies support that high growth rates of population, combined with scarce economic resources, can foster conflicts and violence (Lee, 2016, 2016a). Visaria (1989, p. 7) claims that one of the most serious consequences of the acceleration of population growth is the difficulty of generating adequate employment opportunities for the growing labour force of countries (cf., Keyfitz, 1993). Cassils (2004) claims that the poorest regions of the world, where population growth is rapid, will continue to suffer and decrease life expectancy because of resource depletion, possible new conflicts and diffusion of diseases. In general, the mismanagement of the equilibrium between population and natural-economic resources in specific regions can cause crimes and conflicts associated with subsistence stress (Peluso & Watts, 2001). In particular, the interrelationships between overpopulation and low economic growth of specific regions are a critical factor of growing insecurity worldwide and a universal source of stress in society (Cassils, 2004, p. 172). Krieger & Meierrieks (2010, p. 914) claim that: “Terrorism is also positively linked to larger populations, but this may simply indicate that terrorism is more likely in more populous countries”. In short, population growth of specific regions may support problematic socioeconomic conditions in society and, as a consequence, deteriorated human behaviour and violent crime (cf., Altman, 1975; Curtis, 1975; Coccia, 2017). In fact, Cassils (2004) suggests that population growth can contribute to the overexploitation of resources and space, reducing the freedom of people mainly in poor and unstable regions of the globe, and possibly give rise to more violence and ter-
rorism. However, whether and how population growth influences terrorism is hardly known. The studies discussed above suggest a critical relation between population growth and evolution of terrorism that can lay theoretical foundation to explore a hypothesis of general causes of terrorism.

Firstly, Rice (2009, p. 253) states that: “similarities between terrorism and crime are … evident” and, in this context, the study here supposes that terrorism is a specific and distinct typology of violent crime (cf., LaFree & Dugan, 2009). This crime, in general, is due to some organized group and/or person that has technical skills to carry out a terrorist action directed to challenge a nation's authority, induce fear and anxiety into civilian population (cf., Coates, 1996, p. 298; Crenshaw, 1981, p. 380).

Secondly, theoretical framework, just discussed, suggests the working hypothesis of the study here is:

- **Hypothesis of terrorism driven by population growth**: The effectiveness of terrorism is positively affected by high growth rates of population over time and space, *ceteris paribus*.

The purpose of the present study is to see whether statistical evidence supports the hypothesis that fatalities from terrorist attacks are associated with high growth rates of population between countries. To put it differently, the study here has the goal of clarifying, as far as possible, the relation between demographic factors and lethality of terrorism between countries. In order to substantiate the hypothesis just mentioned, the experimental design is described in the next section.

### Materials and methods

The method of condition-seeking of the study here analyzes whether under the condition of high growth rate of population, confirmed fatalities for the incident from terrorist attacks increase, even when controlling other factors (Greenwald, Pratkanis, Leippe, & Baumgardner, 1986).

#### 1.1. Sample and sources

The sample of this study is based on N=132 countries (see Appendix). Source of data is Democracy Cross-National Data by Norris (2015), World Development Indicators (World Bank, 2008) and Global Terrorism Database (START, 2015). The dataset by Norris (2015) includes demographic and socioeconomic factors applied for the study here, whereas data of terrorism are from the Global Terrorism Database (GTD) that is an open-source database including information on terrorist events and incidents around the world (more than 140,000 cases) from 1970 to 2014 (START, 2015; Global Terrorism Database codebook, 2015).

#### 1.2. Measures

The measures of terrorism effects, growth rates of population and other socioeconomic indicators are as follows. In general, the analyses are based on arithmetic mean of variables over a period of time, but in some case it is considered a single year of the indicator under study because more data are not available.

- **GTD defines terrorist attacks** (Global Terrorism Database codebook, 2015, p. 8): “the threatened or actual use of illegal force and violence by a non-state actor to attain a political, economic, religious, or social goal through fear, coercion, or intimidation. In practice this means in order to consider an incident …, all three of the following attributes must be present:
The incident must be intentional – the result of a conscious calculation on the part of a perpetrator.

The incident must entail some level of violence or immediate threat of violence -including property violence, as well as violence against people.

The perpetrators of the incidents must be sub-national actors. The database does not include acts of state terrorism”.

Effects of terrorist attacks in society are measured here by the number of total confirmed fatalities for the incident for the 2002-2014 period. This number includes all victims and attackers who died as a direct result of the incident (Global Terrorism Database, START, 2015).

Annual population growth rate, 1975-2002 and 2002-2015 period, is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage. Source of data is Norris (2015).

Freedom House standardized scale (100 pts 2000 year) indicates the democratization of countries. It assigns ratings of political rights and civil liberties for each independent nation (electoral process, political pluralism and participation, and government functioning). High levels indicate higher democratization of countries, and vice versa. Source of data is also Norris (2015).

Kaufmann political stability 2000 year. It measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Source of data is Norris (2015).

Ethnic fractionalization -combined linguistic and racial- 2002 year (Alesina et al., 2003). It reflects the likelihood that two people chosen at random will be from different ethnic groups. It is calculated using a simple Herfindahl concentration index: \( \text{FRACT}_j = 1 - \sum_{i=1}^{N} s_{ij}^2 \), where \( s_{ij} \) is the share of group \( i \) (\( i = 1, ..., N \)) in country \( j \). Source of data is also Norris (2015).

Human Development Index (HDI) 2005 year. The HDI is a composite index that measures the average achievement of human development: a long and healthy life (life expectancy at birth), the education (mean of years of schooling for adults aged 25 years) and the standard of living dimension based on gross national income per capita (UNDP, 2016; Norris, 2015).

Gross Domestic Product (GDP) per capita US$, 1997 year and 2002 year – GDPPC– (UNDP 2004) The GDP is the value of all goods and services produced minus the value of any goods or services used in their creation. GDPPC is the control variable in some statistical analyses here. Source of data is the World Bank (2008) and Norris (2015).

Income Gini coefficient 2004 year is a measure of the deviation of the distribution of income among individuals or households within a country from a perfectly equal distribution. A value of zero represents absolute equality, a value of 100 indicates absolute social and economic inequality. Source of data is also the World Bank (2013) and Norris (2015).

1.3. Research Design and Data Analysis Procedure

Figure 1 shows the general model of this study.
The approach here performs a country-level analysis worldwide ($N=132$ countries). Statistical analyses apply the Statistics Software SPSS® version 24. Skewed variables are ln-transformed before including in statistical analyses. Statistical techniques to support the hypothesis stated in the previous section are:

- Descriptive statistics, bivariate correlation and partial correlation (with control variables Gini coefficient of income inequality).
- Regression analysis with linear models. The specification of the model of simple regression is:

$$\ln Y_{i,t} = \lambda_0 + \lambda_1 \ln (x_{i,t}) + u_{i,t}$$  \[1\]

where:

- $Y_{i,t} = $ Number of total confirmed fatalities for the incident from terrorist attacks over 2002-2014 period (dependent variable)
- $x_{i,t} = $ Annual population growth rate 1975-2002 (explanatory variable)

Moreover, in order to check the generalizability of results, the study applies the hierarchical regression, starting from model [1], to show if additional socioeconomic variables of interest explain a statistically significant amount of variance in dependent variable (Number of total confirmed fatalities for the incident from terrorist attacks), after accounting for all other variables. This technique is a framework for model comparison to determine whether added variables show a significant improvement in $R^2$ (the proportion of explained variance in dependent variable by the model).

Conceptual steps of hierarchical regression here are:

- Model 1 includes as explanatory variable: Annual population growth rate 1975-2002 period
- Model 2 includes two explanatory variables: Annual population growth rate 1975-2002 period and GDP per capita US$ 1997 year
- Model 3 includes three explanatory variables: Annual population growth rate

Figure 1. Model of terrorism incidents associated with population growth and other underlying factors

Hierarchical regression calculates $\Delta R^2$ and $\Delta F$ to determine if model 2 and model 3 are better than model 1. The models of hierarchical regression are estimated with the Ordinary Least Squares (OLS) method.

This study also calculates arithmetic mean and standard deviation of variables between the following geoeconomic regions based on Regional categories of the dataset by Norris (2015):

North America, Central America and Caribbean, South America, East Asia, Southeast Asia, South Asia, Central Asia, Western Europe, Eastern Europe, Middle East and North Africa, Sub-Saharan Africa and Australasia and Oceania. This classification is used to analyze differences of demographic and socioeconomic factors underlying effectiveness of terrorist attacks between geoeconomic regions of the globe.

- **Geospatial analysis of the association between effects of terrorism and population growth**

Coccia (2017) applied a geospatial analysis to explain spatial differences of violent crime between countries. This study here applies a similar approach calculating the association between annual population growth and number of confirmed fatalities for terrorist incidents of country $i$ (ASCT$i$) that is given by:

$$\text{ASCT}_i = \frac{\text{annual population growth rate (1975-2002)} \times \text{number of confirmed fatalities for terrorist incidents over (2002-2014)}}{(i=\text{country, with } i=1, 2, \ldots, N)}$$  \[2\]

The sample of this analysis is based on $N=132$ countries indicated in Appendix. Then, countries $i$ are divided in four categories, considering the quartiles of the distribution ASCT$i$:

1) low association with $\text{ASCT}_i \leq 25^{\text{th}}$ percentile

2) moderate association with: $25^{\text{th}}$ percentile $< \text{ASCT}_i \leq 50^{\text{th}}$ percentile

3) high association with: $50^{\text{th}}$ percentile $< \text{ASCT}_i \leq 75^{\text{th}}$ percentile

4) very high association with: $\text{ASCT}_i > 75^{\text{th}}$ percentile

A geographic map of the globe visualizes each country according to the category just mentioned to which it belongs.

The expectation of these statistical analyses is that high levels of confirmed fatalities for terrorist incidents are associated, *in average*, with countries having high growth rates of population. The geospatial analysis is based on Graphboard Template Chooser in SPSS.

**Results**

Understanding where terrorism happens can provide vital information to explaining *why* it happens.

In particular, terrorism cannot be understood without having accurate knowledge of environmental determinants in which it occurs (e.g., demographic, economic, geographic and social factors).

- **Statistical evidence with correlation and regression analyses**

The bivariate correlation shows a high coefficient of Pearson correlation $r=.40$ ($p$-value $< .001$) between levels of annual population growth rate and number of confirmed fatalities for terrorist incidents (Table 1). The partial correlation in Table 2, controlling income inequality, also reveals a positive relationship between these variables ($r=.30$, $p$-value $< .01$). These results...
are consistent with the hypothesis stated above about the positive association between annual population growth and confirmed fatalities for terrorist incidents (Table 1 and 2 show all correlations performed).

**Table 1. Correlations**

| LN number of confirmed fatalities for terrorist incidents (2002-2014 period) |  
|-----------------------------|-----------------------------|
| LN annual population growth rate (1975-2002 period) | $r = .40$  
| | $p$-value $= .001$  
| LN GDP per capita US$ 1997y | $r = -.45$  
| | $p$-value $= .001$  
| LN Income Gini coefficient 2004y | $r = .20$  
| | $p$-value $= .08$  

*Note: y=year.*

**Table 2. Partial Correlations**

| LN number of confirmed fatalities for terrorist incidents (2002-2014 period) |  
|-----------------------------|-----------------------------|
| LN annual population growth rate (1975-2002 period) | $r = .30$  
| *Control variable: LN Income Gini coefficient 2002y* |  
| | $p$-value $= .01$  
| LNGDP per capita US$ 1997y | $r = -.39$  
| *Control variable: LN Income Gini coefficient 2002y* |  
| | $p$-value $= .001$  
| LN Income Gini coefficient 2002y | $r = -.03^{†}$  
| *Control variable: LNGDP per capita US$ 1997y* |  
| †Not significant |  

*Note: y=year.*

The OLS estimation of the model 1 in table 3 indicates that a 1% higher level of annual population growth rate increases the expected number of confirmed fatalities for terrorist incidents by about 0.68% ($p$-value$<.001$). Hierarchical regression analysis shows that the best model is model 1 because in model 2 and 3, coefficients of population growth rate are not significant. Moreover, $\Delta R^2$ in model 2 is low and $\Delta F$ has a $p$-value$<.1$, whereas in model 3 $\Delta F$ is not significant. The linear model 1, as a consequence, is preferred to other models (2 and 3). $R^2$ adjusted of the model 1 indicates that about 14% of the variation in terrorist incidents can be attributed (linearly) to annual population growth rate (Table 3).
Table 3. Hierarchical regression analysis of predictors of confirmed fatalities for terrorist incidents

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant $\lambda_0$</td>
<td>-0.23</td>
<td>2.07*</td>
<td>3.99</td>
</tr>
<tr>
<td>(St. Err.)</td>
<td>(0.19)</td>
<td>(1.21)</td>
<td>(3.47)</td>
</tr>
<tr>
<td>LN (annual population growth rate 1975-2002)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coefficient $\lambda_i$</td>
<td>0.68***</td>
<td>0.33</td>
<td>0.44</td>
</tr>
<tr>
<td>(St. Err.)</td>
<td>(0.20)</td>
<td>(0.27)</td>
<td>(0.33)</td>
</tr>
<tr>
<td>LNGDP per capita US$ 1997y</td>
<td></td>
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<td></td>
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<tr>
<td>Coefficient $\lambda_i$</td>
<td>-0.30*</td>
<td>-0.29*</td>
<td></td>
</tr>
<tr>
<td>(St. Err.)</td>
<td>(0.16)</td>
<td>(0.16)</td>
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</tr>
<tr>
<td>LN Income Gini coefficient 2002y</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Coefficient $\lambda_i$</td>
<td></td>
<td>-0.55</td>
<td></td>
</tr>
<tr>
<td>(St. Err.)</td>
<td></td>
<td>(0.92)</td>
<td></td>
</tr>
<tr>
<td>$F$</td>
<td>11.95</td>
<td>8.06</td>
<td>5.44</td>
</tr>
<tr>
<td>Sig.</td>
<td>0.001</td>
<td>0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>$R^2\ adj.$</td>
<td>0.14</td>
<td>0.18</td>
<td>0.17</td>
</tr>
<tr>
<td>(St. Err. of the Estimate)</td>
<td>(1.45)</td>
<td>(1.42)</td>
<td>(1.43)</td>
</tr>
<tr>
<td>$\Delta R^2$</td>
<td>.155</td>
<td>0.046</td>
<td>0.004</td>
</tr>
<tr>
<td>$\Delta F$</td>
<td>11.95***</td>
<td>3.68*</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Note: *** = p-value < .001  
** = p-value < .050  
* = p-value < .100

- **Geospatial analysis of the association between terrorism and population growth**

The quartiles of the distribution of the association ASCT$i$ (between annual population growth rate in 1975-2002 period and number of confirmed fatalities for terrorist incidents over 2002-2014 period) and categories of country $i$, based on quartiles of ASCT$i$ to which they belong to, are:

1) ASCT$i$ $\leq$ 0.15 (a level lower than 25$^{th}$ percentile indicates low association, countries with yellow color in the map)

2) 0.15 < ASCT$i$ $\leq$ 2.23 (between 25$^{th}$ and 50$^{th}$ percentile includes countries with moderate association, green color)

3) 2.23 < ASCT$i$ $\leq$ 6.32 (between 50$^{th}$ and 75$^{th}$ percentile, countries with high association, red color)

4) ASCT$i$ > 6.32 (higher than between 75$^{th}$ percentile, countries with very high association, purple color)
Figure 2. Global association between annual population growth rate 1975-2002 period and number of confirmed fatalities for terrorist incidents over 2002-2014 between countries. Note: color grey in the map indicates missing values.

The spatial distribution of the association between annual population growth rate and number of confirmed fatalities for terrorist incidents is in figure 2, whereas figure 3 shows the level of association under study between geoeconomic regions of the globe. The geospatial analysis here reveals that high levels of growth rates of population are associated with high number of confirmed fatalities for the terrorist incident in some regions of the globe, such as Middle East and North Africa, Sub-Saharan Africa, East and South Asia (Figure 2 and 3). An exception is the high association in the USA that may be due to different factors, such as possible effects of the US foreign policy for the Middle East and other regions, US deterrence policy and preventive...
actions against non-state organizations of terrorism, etc. These activities may nourish revenges of terrorist cells and individuals with deteriorated behavior by attacking the civilian population in order to induce fear and anxiety in society.

![Figure 3](image-url)  
**Figure 3.** Association between annual population growth rate 1975-2002 period and number of confirmed fatalities for terrorist incidents over 2002-2014 period between geoeconomic regions of the globe.

Table 4 shows the arithmetic mean (M) and Standard Deviation (SD) of socioeconomic variables under study between geoeconomic regions. In particular, results confirm previous statistical analyses, though a high variability of data within each geoeconomic area: i.e., high growth rates of population associated with high number of confirmed fatalities for terrorist incidents are in Middle East and North Africa, Sub-Saharan Africa, East and South Asia. To put it differently, the statistical evidence here reveals problematic socioeconomic, institutional and demographic factors in some geoeconomic regions (e.g., sub-Saharan Africa, Middle-East, Eastern Europe, etc.) that may set the stage for terrorism over the long run. In fact, Ackoff and Rovin (2003, p. 146) claim that inequality of the distribution of wealth, low opportunities for economic development and low quality of life contribute to “the frustration and alienation that give rise to terrorism”. A study for the Heritage Foundation in 2002 also argues that countries prone to terrorism are the least advantaged economically (cf., Ackoff & Rovin, 2003, p. 146). To sum up, this statistical analysis here suggests that high annual average rates of population growth combined with problematic socioeconomic factors, especially poverty, high income inequality, low democratization, HDI and political stability, can be possible distal causes of lethality of terrorism in society (cf., Enrlich & Liu, 2002, pp. 187-189).
Table 4: Descriptive statistics between geoeconomic regions of the globe

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</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>M 9.21</td>
<td>92.82</td>
<td>0.70</td>
<td>0.58</td>
<td>0.97</td>
<td>0.91</td>
<td>$21,701.0</td>
<td>42.83</td>
<td></td>
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<tr>
<td>South America</td>
<td>SD 105.03</td>
<td>12.37</td>
<td>0.68</td>
<td>0.12</td>
<td>0.25</td>
<td>0.07</td>
<td>$14,872.2</td>
<td>10.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central America &amp;</td>
<td>M 1.13</td>
<td>89.25</td>
<td>0.50</td>
<td>0.39</td>
<td>0.61</td>
<td>0.80</td>
<td>$8,386.00</td>
<td>39.65</td>
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<tr>
<td>Caribbean</td>
<td>SD 3.55</td>
<td>16.28</td>
<td>0.63</td>
<td>0.23</td>
<td>0.56</td>
<td>0.10</td>
<td>$9,426.55</td>
<td>3.720</td>
<td></td>
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</tr>
<tr>
<td>South Asia</td>
<td>M 1.32</td>
<td>74.03</td>
<td>−0.21</td>
<td>0.44</td>
<td>1.41</td>
<td>0.78</td>
<td>$2,654.94</td>
<td>51.73</td>
<td></td>
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<tr>
<td>East Asia</td>
<td>SD 4.08</td>
<td>19.07</td>
<td>0.70</td>
<td>0.19</td>
<td>0.53</td>
<td>0.06</td>
<td>$1,480.19</td>
<td>5.040</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Southeast Asia</td>
<td>M 5.23</td>
<td>64.26</td>
<td>0.40</td>
<td>0.14</td>
<td>0.70</td>
<td>0.84</td>
<td>$10,714.8</td>
<td>36.30</td>
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<td>South Asia</td>
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<td>0.49</td>
<td>0.15</td>
<td>0.48</td>
<td>0.12</td>
<td>$14,473.9</td>
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<td>Central Asia</td>
<td>M 0.93</td>
<td>42.13</td>
<td>−0.23</td>
<td>0.47</td>
<td>1.47</td>
<td>0.74</td>
<td>$3,713.00</td>
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<td>Western Europe</td>
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<td>23.91</td>
<td>1.04</td>
<td>0.19</td>
<td>0.50</td>
<td>0.12</td>
<td>$7,045.06</td>
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<tr>
<td>Eastern Europe</td>
<td>M 1.99</td>
<td>52.02</td>
<td>−0.47</td>
<td>0.49</td>
<td>1.93</td>
<td>0.62</td>
<td>$746.57</td>
<td>33.68</td>
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<td>Middle East</td>
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<td>20.90</td>
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<td>0.23</td>
<td>0.73</td>
<td>0.09</td>
<td>$668.883</td>
<td>1.940</td>
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<tr>
<td>&amp; North Africa</td>
<td>M 0.85</td>
<td>63.68</td>
<td>0.00</td>
<td>0.34</td>
<td>1.42</td>
<td>0.73</td>
<td>$4,250.06</td>
<td>38.24</td>
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<td>Sub-Saharan Africa</td>
<td>SD 2.19</td>
<td>28.97</td>
<td>0.94</td>
<td>0.24</td>
<td>0.67</td>
<td>0.14</td>
<td>$7,545.36</td>
<td>6.650</td>
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<tr>
<td>Australasia &amp;</td>
<td>M 0.23</td>
<td>97.36</td>
<td>1.17</td>
<td>0.23</td>
<td>0.45</td>
<td>0.94</td>
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<td>31.13</td>
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<tr>
<td>Oceania</td>
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<td>4.15</td>
<td>0.26</td>
<td>0.21</td>
<td>0.62</td>
<td>0.02</td>
<td>$9,693.64</td>
<td>4.510</td>
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<td></td>
<td>M 1.63</td>
<td>60.95</td>
<td>−0.29</td>
<td>0.40</td>
<td>0.12</td>
<td>0.80</td>
<td>$2,709.85</td>
<td>31.77</td>
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<td>SD 10.89</td>
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<td>0.91</td>
<td>0.18</td>
<td>0.97</td>
<td>0.07</td>
<td>$2,561.54</td>
<td>5.170</td>
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<td>M 2.80</td>
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<td>−0.25</td>
<td>0.44</td>
<td>1.79</td>
<td>0.80</td>
<td>$7,677.41</td>
<td>37.99</td>
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<td>0.82</td>
<td>0.22</td>
<td>0.52</td>
<td>0.07</td>
<td>$8,279.25</td>
<td>3.010</td>
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<td>M 5.11</td>
<td>51.04</td>
<td>−0.64</td>
<td>0.65</td>
<td>2.03</td>
<td>0.51</td>
<td>$926.26</td>
<td>48.32</td>
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<td></td>
<td>SD 15.27</td>
<td>22.92</td>
<td>1.03</td>
<td>0.23</td>
<td>1.00</td>
<td>0.12</td>
<td>$1,515.71</td>
<td>10.69</td>
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<td></td>
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<td>83.48</td>
<td>0.46</td>
<td>0.27</td>
<td>1.36</td>
<td>0.76</td>
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<tr>
<td></td>
<td>SD 0.601</td>
<td>17.82</td>
<td>0.89</td>
<td>0.23</td>
<td>0.66</td>
<td>0.15</td>
<td>$6,559.16</td>
<td>8.790</td>
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Source: Norris (2015), START (2015). Note: M=arithmetic mean; SD=Standard Deviation; y=year.

Discussion

The statistical evidence reveals that, in average, regions with a high incidence of fatalities for terrorist incidents have also high growth rates of population. This analysis suggests that high growth rates of population can be one of the determinants that induces the evolution of terrorism. Studies show that high density of population can have a negative influence on psychosocial relations and psychological health of people (Baum & Paulus, 1987; Baum et al., 1982; Christian, 1961; Calhoun, 1962; Thiessen & Rodgers, 1961). Large numbers of people may also lead to social overload and threaten regulation of human interaction (Altman, 1975; Baum & Koman, 1976; Desor, 1972; Laird, 1973). In particular, terrorism can be associated with disorganized and distressed
areas with high population growth and ethnic heterogeneity (cf., Christens & Speer, 2005). Schaaæmsa and Williams (2012, p. 829) argue that social exclusion and rejection among ethnic minority and majority members lead to increased intergroup hostility (cf., Schuurman & Horgan, 2016; van Bergen et al., 2015). Choma et al. (2016) confirm that in-group identity factors combined with intergroup disgust sensitivity may lead to relevant prejudices in society. The positive correlation between population growth and terrorism found here can be also explained with the theory of association between population density and poverty (Curtis, 1975). Especially, unfavourable socioeconomic-demographic conditions and subsistence stress in built or natural locations can generate cultural deviance and psychological health problems of people (Lepore et al., 1991; Regoezzi, 2003). Sociological studies consider the perspective that high density of population produces deteriorated human functioning, which leads to violent crime (Altman, 1975; Christian, 1961; Callhoun, 1962; Thiessen & Rodgers, 1961). Other studies suggest that frustration of people, a determinant of violent crime, seems to increase in response to decreasing environmental resources and space because of high population growth and population pressure (Stokols & Altman, 1987; Altman, 1975; Mackintosh, et al., 1975).

In addition, high growth rates of population modify the demographic structure of nations, increasing younger age categories (cf., Ehrlich & Liu, 2002). Younger people, in the presence of poverty, can be unable to achieve valued goals: the “blockage of goal-seeking behavior” (Agnew, 1985) is a source of frustration and violence in society. Ehrlich and Liu (2002, p. 187) confirm that the vast majority of terrorists were young adult males: “Based on the information from the FBI’s most wanted terrorist list... approximately 90% of those on the list were all males and from 22 to 34 years old when their first alleged terrorist act took place” (cf., Butler, 2015; Crenshaw, 1981, p. 384). In general, the prevalence of young population in poor socioeconomic environments may induce social deprivation that is conducive to frustrated, angry and violent behaviour of individuals (cf., van Bergen et al., 2015). These psychosocial risk factors in specific regions can cause terrorism (cf., Christens & Speer, 2005; LaFree & Dugan, 2009; Regoezzi, 2003; Rice, 2009). In particular, the combination of problematic socioeconomic conditions and high growth rates of population in society may drag the young individuals into a collective/individual deviance and in turn to terrorism. Another possible effect of high growth rates of population is higher economic inequality, which supports violent crime in society (cf., Coccia, 2017). The relationship between high growth rate of population, income inequality and terrorism can be explained with the sociological theory of “relative deprivation”: inequality breeds social tensions and the less well-off individuals feel dispossessed when compared with wealthier people (Stack, 1984). Hsieh and Pugh (1993) argue that poverty and income inequality can generate resource deprivation and subsistence stress, which are associated with violent crime. Arthur (1991) finds in criminology that homicides can be explained with an individual’s reaction to resource deprivation or material disadvantage that causes personal frustration and diffuse hostility (cf., Nettler, 1984, p. 229). Stolzenberg, Eitle and D’Alessio (2006) confirm that violence is based on economic deprivation that acts as a motivational factor in the manifestation of crime. Overall, economic inequality of countries, driven by population-resource imbalance (population pressure), engenders resentment, hostility, frustration, which can be situational factors of terrorism and violence in society (cf., Blau & Blau, 1982). Messner and Golden (1992) claim that: “‘relative deprivation’... and that the inability of the disadvantaged to get a fair redistribution of re-
sources, or more open access to wealth, generates anger and frustration, which ultimately leads to more crime” (as quoted by Stolzenberg et al., 2006, p. 304, original emphasis; cf., Blau & Schwartz, 1984). As a matter of fact, high levels of population growth, associated with income inequality, induce feeling of disadvantage and unfairness that leads poor people to seek compensation and satisfaction by all means, including committing crimes against other individuals in society (Fajnzylber et al., 2002, p. 2). According to Gilligan (2001), income inequality affects personality of people and generates disrespect and humiliation, which are amongst the most common triggers to violence and possibly to terrorism. In short, economic inequality and high population growth can generate negative social interactions, resource deprivation and low sense of control over one's life (Elgar & Aitken, 2010). These psychosocial risk factors may support terrorism.

Overall, then, the statistical evidence and discussion of this study seem in general to be consistent with the hypothesis that one of the sources of terrorism can be also explained by the level of growth rates of population, combined with socioeconomic poverty, subsistence stress, political instability and economic inequality that generate relative deprivation, frustration and criminal behaviour of people in society.

**Differences and predictions of the theory**

The present theory shares some features with the rooted-in-poverty hypothesis (Pi-azza, 2006) and other theoretical frameworks of the causes of terrorism (Blomberg et al., 2004; Crenshaw, 1981; Krueger, 2007; Freytag et al., 2011). The theories differ in important ways, however.

First, the rooted-in-poverty hypothesis focuses on economic determinants of terrorism, whereas other theory seeks to explain terrorism with a connection between low education and poverty (Krueger & Malečková, 2002, etc.). The theory here argues that —in average— population growth has a true impact on evolution and lethality of terrorism. High growth rates of population (population pressure) may be a situational factor that supports terrorism in society.

Second, the “rooted-in-poverty hypothesis” explains terrorism as “expression of socioeconomic discontent and desperation” (Piazza, 2006, p. 160). Instead, the theory here argues that —in general— population growth affects socioeconomic factors of specific regions (e.g., high income inequality and subsistence stress in society) that generate relative deprivation. This material disadvantage causes personal frustration and diffuse hostility and possibly terrorism as a result (cf., Nettler, 1984, p. 229).

Third, the previous theories fail to capture the important role that population growth plays in different geoeconomic regions to explain general drivers of terrorism worldwide. The theory here is a country-level analysis, based on N=132 countries, that suggests a possible relation between high growth rates of population and effects of terrorism in society. Results here can be interpreted as a matter of generalizability of one of the precipitating factors of terrorism between countries.

This theory here suggests main predictions: societies with low growth rates of population and ethnic fractionalization, low income inequality, low relative deprivation, high standard of living and quality of life of young generations are not likely to produce a high effectiveness of terrorism. This study also predicts that current trend of high growth rates of population, associated with high income inequality and political instability in some societies (and communities)
can continue to feed terrorism and terrorist threat for many years to come\(^2\).

Finally, terrorism activity of specific cities and metropolitan areas may be also explained per analogy by high density of population, combined with high income inequality that induces relative deprivation in society, rather than poverty alone. Overall, then, the simple and consistent theory here predicts that population growth may be a distal cause of terrorism in society that can explain and generalize, whenever possible some effects of terrorism between countries.

**Concluding observations and policy implications**

Terrorism and crime are alike (Rice, 2009) and are affected by demographic, socioeconomic and environmental features of particular locations (Cozens, 2008, p. 431). The scientific research shows that manifold factors support terrorism (Enders et al., 2016; Coggins, 2015; Crenshaw, 1981). On the basis of the argument presented in this paper, we can therefore conclude that –in average– terrorism is also associated with high growth rates of population, combined with poverty, high income inequality and subsistence stress in society, *ceteris paribus*. These problematic socioeconomic factors can disrupt the stability of societies/communities, generate relative deprivation and lead to terrorism as a result (cf., Butler, 2015).

The study here can clarify, as far as possible, some important situational factors of the evolution of terrorism in society. In particular, the results of this analysis are that:

1. The conceptual framework assigns a central role to high growth rate of population and structure of population, which are factors neglected by certain of dominant approaches to explain the general causes of terrorism in some regions of the globe.

2. The conceptual framework here is able to explain how and why terrorism thrives in certain environments by linking high growth rates of population, income inequality and relative deprivation in society to effectiveness of terrorist actions.

3. Statistical evidence reveals that high levels of the growth rates of population, combined with high income inequality, subsistence stress, and political instability, can explain the lethality of terrorism in some geoecomic regions, such as Middle East and North Africa, Sub-Saharan Africa, East and South Asia. However, in some developed nations, such as the USA, Germany, France, etc. terrorist attacks can be due to other manifold determinants possibly linked to political factors and foreign policy of these countries against non-state organizations of terrorism.

Since terrorism arises out of an inability to cope effectively with problematic socioeconomic and demographic risk factors of specific regions, there is a clear need to focus on a long-run strategy of diplomacy and carefully economic aid for a *conflict dissolution* of this critical problem in society: “means to redesign either the society that...
has the problem or its environment in such way as to eliminate the problems or the conditions that caused it” (Ackoff & Rovin, 2003, p. 10). The results here can also support fruitful insights for a policy of conflict resolution that ameliorates socioeconomic conditions of population, and indirectly reduces terrorism, such as programs of economic aid directed to reduce income inequality, improve the standard of living and work opportunities of young people in poor societies (cf., Ackoff & Rovin, 2003; Ehrlich & Liu, 2002; Frey et al., 2003; Spaniel, 2018). Put otherwise, this policy should provide education and socioeconomic opportunity for young people to contrast the anti-modernization advocated by fundamentalists in society (cf., Krieger & Meierrieks, 2010, 2011). This socioeconomic policy can support wealth and well-being in populated and poor regions of the globe to reduce situational factors of terrorism and political violence (cf., Rice, 2009). In particular, the rising economic prosperity of certain regions may help to lower high growth rates of population and subsistence stress in the long run that are possible distal causes of terrorism in society. In fact, Krieger and Meierrieks (2010, p. 902) confirm that social policies ameliorate short-run and long-run socioeconomic conditions of population (e.g., reduction of unemployment, poverty, income inequality, and social dissatisfaction), and indirectly can reduce relative deprivation of people and terrorism as a result. In short, domestic, transnational and international terrorism may also be fought by higher social spending in developmental programs and more generous welfare regimes for societies having high growth rates of population and subsistence stress. As a matter of fact, developmental programs can help to raise socioeconomic progress and wellbeing directed to lower growth rates of population, income inequality, poverty and relative deprivation that set the long-run stage for terrorism in society. Fajnzylber et al. (2002) also claim that economic growth and equal distribution of income reduce poverty, and the rate of poverty alleviation has a crime-reducing effect.

To sum up, findings of the study here can clarify whenever possible, one of the distal causes of terrorism that seems to be the high growth rate of population combined with deteriorated socioeconomic conditions in society. However, the current study here is exploratory in nature and findings need to be considered in light of their limitations. Overall, then, the conclusions of possible determinants of terrorism incidents due to high population growth rates, of course, are tentative, since we know that manifold factors associated with terrorism are often not equal over time and space. While studies in these research fields have made considerable progress, many pressing issues remain. The theory here is silent about some questions that will be analyzed in future studies, such as: what are the permissive conditions and the trigger factors of terrorism in some developed regions? How to explain the presence of all determinants discussed above in some (African) countries, but the absence of terrorism? How to explain the

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3 For Ackoff and Rovin (2003, p. 9, original Italics and emphasis): “problems can be treated in four different ways - absolution, resolution, solution and dissolution - and these form a hierarchy, meaning that each is less effective, in general, than the one that follows it. Absolution means to ignore a problem and hope it will solve itself...Resolution means to employ behaviour used in similar situations, adapted if necessary, so as to obtain an outcome that is good enough...it is the approach to problems most commonly used by those who govern and those who manage public processes....Solution, means to discover or create behaviour that yield the best, or approximately the best, possible outcome, one that ‘optimizes’. Problem solving usually involves research, often using experimentation, quantitative analysis, and uncommon sense. Moreover, solutions generally do not exist in isolation from other problems. Solutions obtained to problems isolated from the other problems with which they interact generally produce one or more new problems .... Dissolution [see above in the text]”.

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differences of terrorist attacks from one context to another?

To conclude, terrorism is due to complex factors mainly linked to the question of what human beings truly need and how they seek to address and satisfy human desires in society. There is need for much more detailed research into the relations between terrorism, demographic, economic and psychosocial risk factors to explain how different conditions interact with each other and what role specific geographical, social and cultural contexts play for triggering terrorism and terroristic incidents. This study here focuses on possible demographic factors of terrorism that are clearly important but not sufficient to understand the comprehensive reasons for and the general implications of terrorism in modern society.

Appendix: Sample of countries

Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Congo, Democratic Republic of Congo, Costa Rica, Ivory Coast, Croatia, Cuba, Czech Republic, Denmark, Djibouti, Dominican Republic, Ecuador, Egypt, Eritrea, Estonia, Ethiopia, Finland, France, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Jordan, Kazakhstan, Kenya, Korea, Republic of Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Macedonia, Madagascar, Malaysia, Maldives, Mali, Mauritania, Mexico, Moldova, Morocco, Mozambique, Myanmar (Burma), Namibia, Nepal, Nicaragua, Niger, Nigeria, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, United Republic of Thailand, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Venezuela, Yemen, Yugoslavia, Zimbabwe.

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