Heuristics, Uncertainty and Terrorism; Estimations of the Likelihood of Fatality due to Terrorist Events

"Do people overestimate the likelihood of fatality due to terrorist events?"

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Authors: Qingxuan, Harry
Yunru, Anab, Yuchuan

Abstract

The current threat level for international terrorism in the UK is severe. This implies that there is a high likelihood that a terrorist event will happen in the UK. However, the likelihood of fatality by a terrorist event as an individual in the UK is extremely low. If individuals overestimate the likelihood of fatality due a terrorist event they may be said to be unreasonably altering their behaviour in ways that have been shown to cause substantial social, economic and political costs. This paper seeks to determine whether people overestimate the likelihood of fatality due to terrorist events in the UK and the EU and to consider the reasons for this. Individuals' perceptions of the likelihood of fatality due to terrorist events is established through the use of surveys. The effects of uncertainty and the availability heuristic are proposed as the principal explanations for the overestimation of the likelihood of fatality due to terrorist events. These are explained through the use of surveys and with reference to the relevant literature.

Keywords: Terrorist Event, Likelihood, Estimation, Heuristic, Uncertainty

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Introduction

The terrorism threat level in the UK is severe. This implies that there is a high likelihood that a terrorist event will happen in the UK. However, the likelihood of fatality due to a terrorist event as an individual is extremely low. Due to the inherent uncertainty about the consequences of future terrorist events it cannot be determined whether individuals overestimate the risk associated with terrorist events. Yet if individuals overestimate the likelihood of fatality due to a terrorist event they may still be said to be unreasonably altering their behaviour in ways that have been shown to cause substantial social, economic and political costs. It is therefore important to understand whether individuals overestimate the likelihood of fatality due to terrorist events and to better understand the reasons for this in order to inform potential policy responses.

This paper tests the hypothesis that individuals overestimate the likelihood of death due to terrorist events and consider the reasons for this. A terrorist event is defined as an

event where violence or the threat of violence is used by an agent to incite fear into a wider population in pursuit of political, religious or ideological goals. The likelihood of fatality due to a terrorist event is defined as the long run relative frequency of fatality among a set of individuals. In this context, an overestimation is an approximate calculation of likelihood that exceeds the true likelihood. The long run relative frequency of fatality due to terrorist events is uncertain. However, it is possible to establish a reasonably justified benchmark. Any estimation that falls above or below this benchmark signals an overestimation or underestimation respectively.

Firstly, we consider the relevant literature. Then we outline the methodology used to test the hypothesis. From this we establish whether, from the gathered data, individuals overestimate the likelihood of death due to terrorist events. We then provide an analysis that looks at reasons for this estimation. We then present our conclusions.

Literature Review

I. Behavioural changes and associated costs

There are many examples of behavioural changes due to terrorist events. Goodwin and Gaines outline negative coping strategies and distraction from daily tasks (2009: 53). Psychological effects on the general community, including increased stress levels, decreased feelings of safety, heightened perceptions of threat (Rubin et al, 2007: 350). This is supported by reports that there was a widespread stress reaction in the first month after 9/11(Sjöberg, 2005: 45). There are also more tangible cost such as reduced per capita growth and increased welfare costs of terrorism, which are correlated with the psychological effects of terrorism (Vorsina et al., 2015). Strong emotions, especially intense fear are aroused by terrorist attacks which leads to large behavioural responses which are more likely to be triggered in comparison with statistically identical risks (Sunstein 2003: 126).

II. Overestimations of low probability events and explanations

There is established literature that argues that individuals are not good at assessing small risks and that these estimations are influenced by a number of factors (Tversky and Kahneman, 1974). Kahneman asserts that individuals either completely ignore them or give them too much weight (Kahneman 2011). However Aven and Jerjie (2015) argue that individuals cannot be said to overestimate the risk of terrorist events because there is uncertainty associated with the likelihood of potential terror events and their consequences. However it is feasible to argue that people overestimate the likelihood of fatality due to terrorist events because a likelihood can be estimated with a degree of confidence. When assessing low probability events, people often use heuristics which captures their uncertainty in the estimation (Aven, 2015). For example, when the assessor is using the availability heuristics to estimate future probability of terrorist

incidents he is prone to base his probability assignment on the ease with which recent terrorist incident can be retrieved from memory, which means that he is inclined to overestimate the probability of the occurrence of terrorist incidents.

There is some literature that argues that individuals may not even consider the likelihood of terrorist events. Sunstein argues that since terrorist incidents trigger strong emotions compared to other statistical identical risks people tend to focus on the badness of the outcome rather than probability that the outcome will occur. Sunstein writes that the word ‘terrorism’ elicits vivid images of catastrophe, thus dampening probability judgements (2003). However, it can be interpreted that individuals put excessive weight on the bad outcome while neglecting the importance of probability when treating low-likelihood events and this can still permit the overestimation of likelihood of an event.

III. Gaps in the literature

Extensive literature has been conducted that analyses people’s perceptions about the perceived risk of terrorism. However, our research is concerned with perceptions of likelihood rather. This is because risk is a function of the likelihood of an event and the measure of its consequence, which means that it cannot be reliably determined whether individuals overestimate or underestimate the risk. Although risk captures the concept of likelihood, existing literature does not directly address whether people overestimate the likelihood of potential terrorist events.

Moreover, there is established literature that discusses whether individuals overestimate the likelihood of low probability events but this has not been examined in the context of terrorist events. This is a particular context that merits further examination because of the societal costs associated with behavioural changes due to terrorism.

Methodology

I. Research Methodology

The likelihood of fatality due to a terrorist event in the future is uncertain because terrorist events are complex and unique. Therefore, it is not obvious how to determine whether people overestimate the probability of fatality due to a terrorist event because a true likelihood may not be able to be meaningfully defined. In response to this, our research establishes a benchmark for the current likelihood of fatality due to a terrorist event that is reasonably justified. Even in the event of extreme increases in fatalities due to terrorist events the likelihood of fatality faced by any given individual in the UK would remain very unlikely. This is justified because even a one thousand percent increase in the number of fatalities due to terrorist events still results in an extreme unlikelihood of fatality for any given individual as a result of that event. This benchmark is qualitative. An overestimation is therefore any estimate that exceeds that benchmark. The research applies this approach to determine whether people overestimate the current likelihood of fatality due to a terrorist event in the UK and in the EU within a given time period.

The research also aims to show whether people overestimate the historical probability of fatality due to a terrorist event in the UK and in the EU within a given time period. A benchmark for the historical likelihood is established by taking the number of fatalities due to terrorist events in a certain region over a 5 year period. An overestimate is therefore estimating a figure greater than the true number. Whilst it is true that the likelihood of fatality due to terrorist events can vary to a great extent among individuals, this research uses the simplifying assumption that the benchmarks used represents the relative likelihood of fatality due to a terrorist event faced by any individual within the relevant region.

The research then seeks to establish reasons for any overestimation. A survey is used to determine the role of demographic factors, perceptions of the likelihood of terrorist events, media, social media, perceptions of family and friends, government threat levels, recent terrorist events and anxiety as explanatory variables. The estimation of likelihood of fatality due to terrorist events is also compared to the estimation of likelihood of fatality due to car accidents in the UK and the EU.

II. Survey Methodology:

In order to determine whether individuals overestimate the current likelihood of fatality due to terrorist events the survey asked participants to state the current likelihood of fatality for an individual in the UK using a likert scale. To determine whether individuals

overestimate the historical likelihood of fatality due to terrorist events participants were asked to provide their best number estimate for the number of fatalities due to terrorist events in different regions. The survey included several other aspects which asked participants to provide basic relevant details, state their perception of the likelihood of a terrorist event in the UK, the relative importance of several factors in determining their estimation of the likelihood of fatality due to terrorist events, the frequency that they read the news and the extent to which they are concerned about terrorist events in the UK.

Focus groups were conducted prior to the formation of the survey. The information gathered was used to inform the qualitative survey questions. Each question was designed in a way as to avoid biases. The questions were phrased using sensitive language to abide by ethical practices. The questions were also carefully ordered in a way that avoided possible biases. The survey was carried out as an online survey and a face-to-face survey.

Analysis

I. Overestimation

According to the collected data, we found that around 80.5% people overestimated the historical likelihood of fatality due to terrorist events in the UK, while 17.5% underestimated and 1.9% gave the correct answer. The hypothesis that people overestimate the historical likelihood of fatality due to terrorist events in the UK was supported by the non-parametric one-sample Chi-square test. However, the results about the case in the EU differed, with 46.3% overestimating and 53.7% underestimating. Based on the same non-parametric test, we were unable to conclude that people overestimated the historical likelihood of fatality due to terrorist events in the EU. In comparison, we found people tended to underestimate fatalities due to car accidents in both UK and EU, with the percentage of people underestimating to be 80.2% and 88.7% respectively.

II. Demographic factors

Demographic factors might have affected people's perception of terrorism. Existing literature offers contradictory results. For example, Goodwin et al. (2005) suggested older samples exhibit greater anxiety about future terrorist events whilst Huddy et al. (2005) found the contrary. As such, we also analysed demographic factors in our study. Spearman correlation tests were conducted to find correlations between past fatalities estimates and various demographic factors, namely age, gender, ethnicity, education level and city of residence. We found people living in the UK but outside of London tended to overestimate the fatality in the UK ($r(257)= 0.135$, $p= 0.032$). Other factors namely age, gender, ethnicity and educational level have no statistically significant effects on estimates in both UK and EU.

III. Availability Heuristic

From participants reported answers, the media ($r(257)= 0.138$, $p=0.028$) and recent terrorist events ($r(257)= 0.138$, $p= 0.029$) positively affect estimates in the UK, with recent events ($r(257)= 0.142$, $p= 0.023$) also affecting estimates in the EU. This could be explained by the availability heuristic. The availability heuristic is the cognitive process which influences people's evaluation of a concept, decision or likelihood depending on the ease at which immediate examples may be recalled when making an evaluation. From this we might expect that people tend to base their estimations on the latest news. When an infrequent event can be recalled easily, people tend to overestimate its likelihood. In the context of terrorist events, they are extremely publicised and it is therefore understandable that they have a higher availability. However, common but unremarkable events, such as car accidents leading to fatality

are less well reported and so have lower availability, so their likelihood tend to be underestimated. We observed this effect.

On the other hand, we also observed that people who do not read the news think it is more likely that fatality will result from a terrorist event ($r(257)= .199$, $p<0.01$). Hence, we expect people who read the news less frequently will give higher estimates. This could show another effect which is that reading the news can better inform individuals which makes them more likely to give an accurate estimate. However, this correlation is not statistically significant ($r(257)= 0.064$, $p=0.313$ for the UK estimates and $r(257)= 0.041$, $p=0.514$ for the EU estimates).

These two results seem contradictory. However, they imply that reading the news more often will lead to individuals providing better estimates for the likelihood of fatality due to terrorist events. In other words, people who read news more often are less likely to overestimate the likelihood of fatality due to terrorist events. Yet, people who think the media impacts individual's estimations are more likely to overestimate the likelihood of fatality due to terrorist events. This could suggest that the availability heuristic has a greater impact on individuals that don't read the news very often.

Social media is an important factor that influences the estimation of fatalities due to terrorism. It can be seen that the effect varies amongst different regions. Individuals outside of the UK are affected differently to those within the UK excluding London region. Also, individuals within London have a different perception to those within the UK due to social media influences. By conducting Mann-Whitney Test, it is found that people in the UK, excluding London are more influenced by social media.

Effects of other four factors (media, perceptions of friends and families, etc) do not differ much across different regions.

IV. Uncertainty

Within social psychology, uncertainty is defined as 'Anxiety caused by unfamiliar circumstances (or discrepancies) that lead to a defensive response' (Jonas et al., 2014). Terrorist events are uncertain, which is a result of not knowing when and what form the future event will be (Aven et al. 2015). We used the level of concern as a proxy for anxiety, hypothesizing that people who were more concerned tended to overestimate the past probability of fatality. However, our study showed there was no correlation between the estimates provided by the participants and their level of concern of being affected by a potential terrorist event. (UK, $r(257)=0.048$, $p=0.0444$; EU, $r(257)= 0.011$, $p=0.855$). As such, we concluded that uncertainty was not a factor affecting people's estimations about the past probability of fatality due to a terrorist event. Nonetheless, a correlation was found between the level of concern and the perceived likelihood of fatality to any individual due to terrorist events ($r(257) = 0.359$, $p<0.01$). This result

supports the idea that uncertainties associated with terrorist events are significant in shaping people's perceptions about potential terrorist threats.

Conclusion

In conclusion, we have established that people do have the tendency to overestimate the likelihood of fatality due to terrorist events in the UK according to our data. This is consistent with the existing literature which demonstrates people often overestimate low probability events. However, our findings have shown that most demographic factors are not statistically significant in determining people's estimations, Media and recent terrorists events are statistically important in affecting estimations, which also supports the availability heuristics proposed by existing literature. Even though the level of concern is not correlated with estimations, it plays a significant role in shaping perception regarding the likelihood of fatality of future terrorist events.

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