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Indicators of Lone Actor Violent Events: The Problems of Low Base Rates & Long Observational Periods
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Abstract:	A burgeoning literature exists on indicators associated with lone-actor terrorism, spree shooters, mass murders and other forms of targeted violence. Such studies of low-likelihood, high-impact crimes largely suffer from two inter-related problems: low base rates and long observational periods. These studies largely fail to consider whether risk factors are driven by temporal-cohorts within the wider observation pool or are uniform across the expanses of time under consideration. This paper compares a cohort of violent lone actors (composed of lone-actor terrorists, and solo mass murderer attackers) from 1990-2005 with a cohort from 2006 to 2013. We found no significant differences in terms of socio-demographic variables across the two temporal periods. The 2006-2013 cohort is significantly more likely to use the Internet in their attack planning, have been previously imprisoned, engaged in multiple attack methods (e.g. a bombing and a shooting), and targeted ordinary citizens rather than a political or military target for example. The results also indicate that the 2006-2013 period contains fewer offenders who (a) had previous military experience (b) made verbal statements to family/friends/wider audiences about their intent and beliefs (c) socialized face to face with members of a wider network (d) experienced being degraded or the target of an act of prejudice or unfairness (e) experienced a recent stressor and (f) interacted face-to-face with others holding a similar grievance. The conclusion discusses the research and operational implications of these findings.
Suggested Reviewers:	
Opposed Reviewers:	
Response to Reviewers:	We would like to take the opportunity to thank the 3 reviewers for their comments which we feel have improved this paper. In addition to a robust proof reading we have also responded to each of the reviewers' requests. Below, we outline these changes. R1 made comments regarding the factual errors regarding other studies. We have

corrected these.

R1 made some suggestions regarding making the definitions clearer. We have added several paragraphs in the methods/data section outlining these distinctions and have cleaned the language to make it more uniform throughout the paper.

R1 asked for all non-significant variables to be included. We feel that this will take away from the narrative thrust and clarity of the paper. We have instead inserted a footnote outlining that these (and the codebook itself) are available from the first author by request.

R1 asked for greater clarity with regards the write-up of the result and we have done so. This included altering the results table itself.

R1 requested that table 2's title was changed and this has been done.

R1 requested we delete our discussion regarding 'black swan events'. This has been done.

R1 made several insightful comments regarding risk factors. We completely agree with these assertions and have amended the wording throughout that we are actually looking at 'indicators'

R2 requested that the abstract be changed to reflect the results and conclusions. This has been done.

R2 made several comments regarding the "literature review". Given the comments, we actually feel the reviewer is referring to the introductory section (which has been paired down and re-written to reflect some concerns). We also contest the reviewer's point that a good literature reviews job is to highlight why this study is important. The job for our literature review is to set up the theoretical reasoning for why we are carrying out these specific tests. The lit review looks at the findings from the general crime literature. We have re-written the intro section to more clearly state why this work is it important (which is really at the heart of R2's comments).

R2&R3 made some comments about the structure and headings of the methods sections. We have extensively re-written the data and methods section (adding around 800 words)

R2 made comments about the need for sub-headings in the Results section and this has been carried out.

R2&R3 made comments about the need to improve and flesh out the discussion/conclusion section. We have extensively re-written this section including more closely incorporating the implications of our specific results.

R3 makes a comment about outlining crime base rates and this has been added to our methods/data section.

R3 requests additional citations for paragraph 2 and these have been included.

R3 makes a comment about the phrase 'random behaviour' which led to some understandable confusion. We have corrected this to 'random chance'.

R3 requests that the sample size of the 2 cohorts is included and this has been carried out.

Indicators of Lone Actor Violent Events: The Problems of Low Base Rates & Long Observational Periods

Keywords: terrorism, violent extremism, lone actor, mass murderer, crime prevention.

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Keywords: terrorism, risk factors, indicators, lone actor, mass murderer, threat management

Abstract:
A burgeoning literature exists on indicators associated with lone-actor terrorism, spree shooters, mass murders and other forms of targeted violence. Such studies of low-likelihood, high-impact crimes largely suffer from two inter-related problems: low base rates and long observational periods. These studies largely fail to consider whether risk factors are driven by temporal-cohorts within the wider observation pool or are uniform across the expanses of time under consideration. This paper compares a cohort of violent lone actors (composed of lone-actor terrorists, and solo mass murderer attackers) from 1990-2005 with a cohort from 2006 to 2013. We found no significant differences in terms of socio-demographic variables across the two temporal periods. The 2006-2013 cohort was significantly more likely to use the Internet in their attack planning, have a history of previous imprisonment, engage in multiple attack methods (e.g. a bombing *and* a shooting), and target ordinary citizens rather than a political or military target for example. The results also indicate that the 2006-2013 period contains fewer offenders who (a) had previous military experience (b) made verbal statements to family/friends/wider audiences about their intent and beliefs (c) socialized face to face with members of a wider network (d) experienced being degraded or the target of an act of prejudice or unfairness (e) experienced a recent stressor and (f) interacted face-to-face with others holding a similar grievance. The conclusion discusses the research and operational implications of these findings.

Indicators of Lone Actor Violent Events: The Problems of Low Base Rates & Long Observational Periods

An increasing number of empirical studies focus upon the factors preceding violent acts that can be categorized as largely high-impact (in societal terms), low-likelihood events. These include offences like school shootings (Langman, 2009), mass murder (Bowers et al, 2010; Gill et al., 2017b), lone actor terrorism (Gill et al, 2014; Meloy & Gill, 2016) and spree shooting (Lankford, 2013). They are typically informed by studies that examine crimes (many of which are violent) that can be categorized as largely high-likelihood, low-impact events. They utilize similar methods and analyze similar risk factors. These high-likelihood, low- societal impact crimes vary from arson to stalking.

Whilst the burgeoning number and rigorous quality of data-driven approaches is to be welcomed, a key methodological factor differentiates these two types of crime studies. Studies of high-likelihood, low-impact crimes often utilize a sample of offenders that are highly clustered temporally. For example, they analyze offenders from a wider cohort born in the same year (and often in the same town) (see for example http://www.scopic.ac.uk/StudiesPADS.html). Such studies can afford to do so simply because of the high volume of observable offenders and offences. Such approaches can potentially highlight risk factors that are relevant to that cohort or geographic space (Kaplan, 1995). This is important because it allows outlier risk factors to be weeded out via replication studies conducted in very different locations and at very different times (Farrington, 2015).

The study of indicators associated with engaging in high-impact, low-likelihood violent events is afforded no such luxury because thankfully these crimes remain rare. Instead, these studies collect data on offenders across a large number of years. For example, Meloy et al. (2001) analyze offender characteristics of 34 mass murderers (individuals who killed three or more in a single event) over a 41-year period. Hempel, Meloy, and Richard's (1999) analysis of mass murderers focuses on 30 cases spread over 50 years. Gill (2015) analyzes 111 lone-actor terrorists from 1990 to 2014. Finally, Fein and Vossekuil's (1999) behavioral analysis of 83 assassins, attackers, and near lethal approachers stretches across a 50-year period. Each study highlights supposed indicators, yet fails to consider whether these factors are driven by temporal-cohorts within the wider observation pool or are uniform across the expanses of time under consideration. We never know if the high prevalence of one factor in the overall sample is due to it being universally present in a small time frame, or whether it is distributed evenly across time. This is potentially most worrisome in those analyses where the number of years of study is far greater than the number of individuals analyzed. In other words, though the complete descriptive results may indicate a large propensity for a behavior to occur, a temporal analysis may indicate that the propensity for the behavior to occur actually decreases (or increases) over time.

Consequently, and unless this is specified, there may be different implications for future investigations. The study of low-likelihood high-impact crimes therefore runs the risk of identifying risk factors and indicators heavily skewed toward older time periods (thereby

increasing false positives) or missing emerging risk factors associated with more recent times (thereby increasing false negatives). This has major repercussions for how threat management protocols are developed going forward. It may therefore be useful to determine whether facets of offender behavior are increasing/decreasing across time and whether this trend (if any) is statistically distinguishable from random chance.

This paper compares a cohort of violent lone actors (composed of lone actor terrorists, and solo mass murderer attackers) from 1990-2005 (n=79) with a cohort from 2006 to 2013 (n = 107). The latter period witnessed a step-change in the rate and intensity of lone actor mass violent events so a corollary to this exploration of whether indicators differ across time is to try and identify factors that may help explain this recent increase in events.

Do 'Indicators' Change Over Time? Learning from High-Likelihood, Low-Impact Crimes

In 1995, Kaplan lamented that studies have not demonstrated the association between risk factors and criminality for two different generational cohorts. Twenty years later, Farrington et al (2015, p. 48) outlined that a "key issue in criminology is to what extent are risk factors for offending similar over time", yet the "question has rarely been investigated". As mentioned previously, the risk factor and indicator literature related to violent and frequent crime is typically unworried by this temporality/generalizability issue because the volume of such studies can distinguish between risk factors that are

common or outliers. The alternative to such approaches is to compare similar crimes in similar contexts, but in different temporal eras. We are aware of only four such studies, three of which have been published since 2013. This section briefly outlines these studies.

Farrington et al (2015) investigated the extent to which a wide variety of risk factors can predict general offending across two generations. Utilizing the Cambridge Study in Delinquent Development they compared the original sample of 411 males from London collected in the 1960s with their children during the year 2004 to 2013. Risk factors for both generational cohorts were positively correlated. Eleven risk factors were significant predictors for offending in both generations. They included a convicted father and mother, harsh discipline, poor parental supervision, a disrupted family, low family income, large family size, poor housing, low school attainment, daring/risk-taking, and antisocial child behavior. The findings only distinctly differed on three factors: parental conflict, low social class, and hyperactivity/attention problems (although this last risk factor was measured differently across the two generations). The risk factors were therefore generally very robust across generations with the authors concluding, "most of the findings in one generation were remarkably replicable in the next generation" (2015, p. 60).

Menard and Johnson (2015) employed a similar research design to Farrington et al. (2015). They analyzed data from the National Youth Survey Family Study (NYSFS), which had an original sample of 2,360 youths aged between 11 and 17 in late 1976. Menard and Johnson compared the results of this original sample group with the sample

group's children in 2003-2004. They found similar inter-generational risk factor robustness in terms of delinquent peer bonding and offending. Differences emerged in terms of gender as a predictor between generations 1 and 2 (e.g. being a male is less important), while the impact of school strain (e.g. poor grades and lower expectations of gaining a college education) became an important predictor in the later generation.

Johnson et al. (2015) utilizes the same data as Menard and Johnson (2015) but tests a different series of predictor variables. Seven of the nine predictors demonstrated the same significance scores and direction in relationship inter-generationally. The earlier generation was more heavily influenced by negative life events (for example parental divorce/separation), whilst the later generation was more influenced by delinquent peer association.

Farrington and Loeber (1999) came to similar conclusions in their comparative study of the 411 London males from the 1960s (mentioned above) with a replication study entitled the Pittsburgh Youth Study, which examined 508 males in the 1980s. The results indicated that the risk factors were not only temporally robust but also geographically robust.

The four studies therefore illustrate that risk factors associated with general offending and delinquency have proven to be quite robust across generational cohorts. We are interested in whether a similar cross-sectional design produces similar robust findings in a sample

of lone-actor terrorists and mass murderers. In the next section, we conduct a series of analyses to investigate whether the same holds true for lone actor violent events.

Data and Method

Sample:

We used open source data collection methods to develop a unique dataset that categorizes the socio-demographic, developmental antecedent attack, attack preparation and commission properties of 71 lone actor terrorists and 115 mass murderers. The 71 lone actor terrorists include two individuals who displayed direct command and control links from a wider terrorist organization but engaged in their violence by themselves. This addresses the paucity of data that has long been noted in the study of terrorists and mass murderers (Silke, 2013). To reduce bias in the sample, we limit our focus to United States-based offenders. The level of available behavioral data is far higher than that of group-based offenders who operate on behalf of a prolific group. From experience of previous data- collection endeavors (Gill and Horgan, 2013), it is very difficult to obtain much more than the very basic socio-demographic information of such group offenders from open sources (see Gill, 2015 for a longer discussion).

Inclusion Criteria:

Despite the palpable rise in public anxiety following events such as Columbine, Aurora, and Sandy Hook, the fact remains that mass murder is a rare event in the U.S compared to homicides with fewer fatalities. From 1976 to 2000, the percentage of murders that

involved more than one victim ranged from 3% to 4% of homicides per year (Fox &

Zawitz, 2003). A review of the FBI's Supplementary Homicide Reports from 2000 to

2012 shows that the number of mass murders (four or more victims) was approximately

one-tenth of one percent of all murders (excluding the 9/11 deaths). Nevertheless,

perhaps because it occurs so infrequently but is so disturbing, there are few crimes that

receive more news coverage than mass murder (Duwe, 2000).

Prior to data collection, academic literature on lone actor terrorism was examined and

from there an actor dictionary was built. This actor dictionary encompassed a list of

offenders fitting the above criteria. Further names were also sourced through tailored

search strings developed and applied to the LexisNexis "All English News" option. More

individuals were also identified through the Global Terrorism Database developed by the

National Consortium for the Study of Terrorism and Responses to Terrorism (START)

and lists of those convicted of terrorism-related offences in the United Kingdom and the

United States. We also examined the academic literature on mass murderers and built an

actor dictionary, producing a list of names that fit our criteria (see below). Next, we

identified additional offenders through databases created by *Mother Jones, USA Today*

and Mayors Against Illegal Guns. Finally, we conducted searches on Lexis/Nexis using

specific terms and searched the Federal Bureau of Investigation's Uniform Crime Reports

for each year of the relevant time period to find other offenders who meet our criteria.

Our final sample comprises 115 mass murderers.

Definition:

A pervasive problem with research on mass murder is the shifting definition of what exactly is a mass murder. Some criteria that have been considered include offender motive (Hempel, Meloy & Richards, 1999), the type of weapon used (Hempel et al., 1999) and the number of wounded (Dietz, 1986). Generally, these criteria are not relied upon in the literature, perhaps because they appear to be arbitrary. There is, however, general agreement that a mass murder involves multiple victims killed at one location (or multiple but geographically close locations) over a relatively short period of time (Dietz, 1986: Holmes & Holmes, 1992; Hempel et al., 1999; Fox & Levin, 2003).

Nevertheless, there is less agreement about the minimum number of victims required to define a murder event as "mass". Some researchers use a threshold of two victims (Palermo & Ross, 1999), others use three (Dietz, 1986; Holmes & Holmes, 1992), and still others use four (Duwe, 2000; Fox & Levin, 1998). The definition used in this study is *four or more victims (not including the offender)* for the following reasons. First, four or more victims (not including the offender) is the demarcation line accepted by the Federal Bureau of Investigation in its 2005 report: *Serial Murder: Multi-Disciplinary Perspectives for Investigators*, released after a meeting of experts in various fields relevant to the study of multiple homicides. This definition of mass murder as involving four or more fatalities was the result of considered reflection by the leading academics (criminologists, psychologists, forensic psychiatrists), and practitioners (state and federal law enforcement officials and prosecutors) brought together by the FBI for the specific purpose of clarifying issues related to serial and mass murder.

Second, in studies such as the present one where data are collected via open source research methods, the number of victims is an important determinant of media coverage of multiple murder events. Research has suggested that media attention given to any mass murder is affected by certain factors, and high profile mass murders are significantly more likely to involve larger numbers of killed and wounded, stranger victims, public locations, assault weapons and workplace violence (Duwe, 2000).

Third, practical considerations necessitated a threshold of four victims instead of three. A review of the FBI's Supplementary Homicide Reports from 1976 to 1999 reveals that there are over three times as many cases of three victim homicides as there are four victim homicides (Duwe, 2004). Employing a mass murder definition of three or more victims would have necessitated reducing the time span of the study from approximately 24 years, to at most eight years. While that approach may be useful in future research, this study opts for the use of a greater time span that also matched the time span utilized in the previous lone actor terrorist data collection endeavors.

To facilitate comparison to lone actor terrorists who, by definition, act alone and without direction or support, the sample includes only mass murderers who acted alone. In keeping with that same principle, the study also excludes state-sponsored as well as gang and organized crime related incidents. Also, attacks that are solely family-oriented and took place within the offender's domicile are excluded, as these are frequently treated separately in the literature and appear to have a distinct genesis (Campbell, Glass, Sharps, Laughon, & Bloom, 2007).

Codebook and Coding Process:

The codebook used in this project was developed based on a review of literature on individuals who commit a wide range of violent and non-violent crimes, are victimized, and/or engage in high-risk behaviours as well as a review of other existing codebooks used in the construction of terrorism-related databases. The variables included in the codebook span socio-demographic information (e.g., age, gender, occupation, family characteristics, relationship status, occupation, employment, etc.), antecedent event behaviours (e.g., aspects of the individual's behaviours towards others and within their day-to-day routines), event specific behaviours (e.g., attack methods, who was targeted) and post-event behaviours and experiences (e.g., claims of responsibility, arrest/conviction details, etc.). Data were collected on demographic and background characteristics and antecedent event behaviours by examining and coding information contained in open source news reports, sworn affidavits and when possible, openly available first-hand accounts. The vast majority of sources came from tailored LexisNexis searches. Information was gleaned from relevant documents across online public record depositories such as documentcloud.org, biographies of a number of lone actors and all available scholarly articles. For a definition of different variables, see Gill et. al (2014).

Three independent coders coded each observation separately. After an observation was coded, the results were reconciled in two stages (coder A with coder B, and then coders A+B with C). In cases when three coders could not agree on particular variables, differences were resolved by a senior member of the research team based on an

examination of the original sources that the coders relied upon to make their assessments. Such decisions factored in the comparative reliability and quality of the sources (e.g., reports that cover trial proceedings vs. reports issued in the immediate aftermath of the event) and the sources cited in the report.

Method:

We set out to compare the prevalence of indicators across two temporal domains within this combined sample of lone-actor terrorists and solo mass murderers. We decided to split the sample from 1990-2005 (n=79) and 2006-2013 (n=107). This is because from 2006 onwards, there was a distinct scale shift in the number of actors per year. The period 1990-2005 averages 5 per year. The corresponding figure for 2006-2013 is 12.75.

We then used bivariate analyses (chi-square) to compare the prevalence of socio-demographic and behavioral differences. Those variables displaying significant differences (p<.05) and near significant differences (p<.1) were then entered into a logistic regression to illustrate which factors held the most predictive power as to whether they occurred within the phase 1990-2005 (0) or 2006-2013 (1).

Results

Bivariate Analyses

We found no significant differences in terms of socio-demographic variables across the two temporal periods. This included factors such as age, education, and socio-economic

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status. We then tested over 70 antecedent event variables.[1] Table 1 outlines those variables with significant differences.

<Insert Table 1 Here>

Overall, the results indicate that very few behaviors can be solely attributable to the upward scale shift in lone-actor and mass murdered incidents in the 2006-2013 period. Out of the vast number of behaviors tested, only four show a greater preponderance in the 2006-2013 era. Perhaps it is no great surprise that offenders are now significantly more likely to make use of the Internet in their planning given its ubiquity in routine activities for the whole population, but the percentage rise is still relatively small (17%) compared to the more than doubling of events in both time periods. The 2006-2013 cohort is also significantly more likely to have been previously imprisoned, engaged in multiple attack methods (e.g. a bombing *and* a shooting), and targeted ordinary citizens rather than a political or military target for example.

The results also indicate that the 2006-2013 period contains fewer offenders who (a) had previous military experience (b) made verbal statements to family/friends/wider audiences about their intent and beliefs (c) socialized face to face with members of a wider network (d) experienced being degraded or the target of an act of prejudice or unfairness (e) experienced a recent stressor and (f) interacted face-to-face with others holding a similar grievance.

_____

[1] Please contact the lead author for the codebook and list of variables tested.

Multivariate Analysis

The logistic regression shows that, in combination, the independent variables significantly impacted on temporal era, $X^2(14) = 54.965$, p <0.001. The model correctly predicted 72.6% of responses. Specific individual variables were significant predictors of year of attack as shown in Table 2. Odds of greater than one indicate a positive relationship between the predictor and dependent variable. Those individuals with military experience were more likely to carry out an attack in the years 1990-2005. Individuals who utilized multiple different weapons in an attack were more likely to carry out the attack in the years 2006-2013.

<Insert Table 2 Here>

Discussion and Conclusion

Together the results illustrate the need to think about temporal issues in the study of risk factors, indicators and low-likelihood events. Approximately 20% of the variables tested in a bivariate manner displayed demonstrably different prevalence rates across two eras. This has several implications. First, we should treat with caution some findings related to indicators in studies of low-likelihood, high-impact events. This is especially the case for those studies where the years under consideration are greater than (or even approximate to) the number of units of observation because there is likely a great variance within the sample. Because of this caution, studies should highlight this fact and draw some inferences about

which variables are on the increase/decrease. It should now be routine to carry out such temporal analyses going forward. Otherwise applications of these research endeavors may unexpectedly increase both false positives and false negatives in the field.

Second, the findings might necessitate moving away from looking at risk factors and indicators in isolation. Instead, perhaps we should look at how factors cluster, sequence and crystalize (Gill, 2015) and whether some risk factors and indicators act as substitutes in the absence of others (e.g. does the internet replace the need for face-to-face interaction with co-ideologues - see Gill et al., 2017a).

Third, the bivariate results illustrated that a number of risk factors and indicators that were significantly less prevalent in the later temporal cohort. This might be indicative that the crystallization of risk factors noted elsewhere (see Gill et al., 2014; Gill, 2015) has perhaps become more diffuse in the 2006-2013 period.

Fourth, some of the shifts in prevalence can be explained easily. For example, the internet has become ubiquitous in everyday life for all sorts of everyday purposes. It should be no surprise that some increasingly also use it for malevolent purposes. Other significant findings may be hypothesized to be a consequence of learning. For example, the decrease in leakage, both in terms of communicating intent and others being aware of the grievance, significantly decreased across the two time-periods. Potential offenders may simply have learned that similar offences were disrupted directly due to leakage and so they changed their behavior accordingly. Other significant findings could be explained as

being a by-product of other developments. For example, the increased use in multiple attack types may be due to the greater accessibility to bomb-making manuals via the Internet. The causal mechanism through which some behaviors significantly increased/decreased is very difficult to discern however. For example, it is not immediately obvious why the later temporal cohort was significantly less likely to experience recent stressors.

Fifth, it is worth re-iterating that prior military experience was one of only two significant factors in the multivariate analysis. Its presence is significantly less likely in the later temporal cohort. Whilst prior military experience is often noted in media reports regarding the increase in mass murder events, the statistics suggest this factor only appears a third as much in the current era than it did in the 1990-2005 era. This suggests that some so-called indicators may have cohort-effects, rather than having stable influences over time. This is particularly startling when we consider the base rate of military experience within the United States presumably increased following recent wars in Afghanistan and Iraq.

Finally, the results highlight the need for law enforcement and intelligence agencies to consistently update their threat and risk assessment protocols because some factors that underpin risk may be dynamic in nature. Although this is often implied within the wider threat management literature, the idea remained untested in a scientific manner until this article. The development of risk assessment tools of extremists (be they politically or personally inspired) has gathered pace in the past couple of years. Examples include

the development of the TRAP-18 (Meloy et al., 2015), the Identifying Vulnerable People tool (Egan et al., 2016), the ERG 22+ (Lloyd & Dean, 2015) and the VERA and its later iterations (Pressman, 2009). Each should place a temporal examination of their results at the heart of their next

examination. Technological, societal and environmental changes can open a gateway for a new generation of offenders or act as a deterrent and hence the indictors associated with these types of crimes can change. Relatedly, it calls for the need for continuous and systematic data collection procedures.

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Table 1: Bivariate Comparison of Behaviors between 1990-2005 and 2006-2013

						95% Confidence Interval	
Variable	**X²**	**1990-2005 (%) (n=79)**	**2006-2014 (%) (n=107)**	**p**	**Odds Ratio**	**Lower**	**Upper**
Military Experience	15.590	**38.0**	13.1	0.001***	0.246	0.119	0.506
Previous Imprisonment	4.274	21.5	**35.5**	0.039**	2.009	1.031	3.913
Verbalized Intent to Family	4.266	**50.6**	35.5	0.039**	0.537	0.297	0.971
Verbalized Intent to Wider Audience	9.035	**50.6**	29.0	0.003**	0.398	0.217	0.730
Others Aware of Grievance	9.611	**72.2**	49.5	0.002**	0.379	0.204	0.705
Experienced a Tipping Point	12.835	**65.8**	39.3	0.001***	0.336	0.183	0.615
Experienced being Degraded	9.923	**43.0**	21.5	0.002**	0.362	0.191	0.688

Target of Injustice	13.246	**45.6**	20.6	0.001***	0.309	0.162	0.589
Experienced Recent Stressor	4.951	**59.5**	43.0	0.026*	0.513	0.285	0.926
Multiple Attack Methods	4.510	12.7	**25.2**	0.034*	2.329	1.053	5.151
Non-Discriminate Target	5.309	26.6	**43.0**	0.021*	2.083	1.110	3.907
Face to Face Interaction	9.449	**31.6**	13.1	0.002**	0.325	0.156	0.678
Substance Use Prior to Event	2.991	8.9	**17.8**	0.084	2.221	0.884	5.577
Expressed Desire to Hurt Others	3.032	**63.3**	50.5	0.082	0.591	0.326	1.070

***=p<.001; **=p<.01; *p=<.05;

Table 2: Logistic Regression Determining Impact of Behaviors on Era

Variable	B (SE)	Significance	95% CI for Odds Ratio		
			Lower	Exp (B)	Upper
Military Experience	-1.272(0.438)	0.004**	0.119	0.280	0.662
Previous Imprisonment	0.616(0.407)	0.129	0.835	1.852	4.109
Verbalized Intent to Family	-0.283(0.417)	0.497	0.333	0.754	1.706
Verbalized Intent to Wider Audience	-0.345(0.426)	0.419	0.307	0.708	1.633
Others Aware of Grievance	0.379(0.463)	0.414	0.589	1.460	3.662
Experienced a Tipping Point	-0.605(0.409)	0.139	0.245	0.546	1.217
Experienced being Degraded	-0.586(0.412)	0.155	0.248	0.557	1.248
Target of Injustice	-0.586(0.412)	0.111	0.208	0.494	1.174
Expressed Desire to Hurt Others	-0.705(0.442)	0.595	0.369	0.808	1.771
Experienced Recent Stressor	-0.408(0.382)	0.286	0.315	0.665	1.406
Substance Use Prior to Event	0.218(0.577)	0.705	0.402	1.244	3.851
Multiple Attack Methods	0.871(0.495)	0.079	0.905	2.389	6.307
Non-Discriminate Target	0.442(0.398)	0.267	0.713	1.556	3.395
Face to Face Interaction	-1.137(0.484)	0.019*	0.124	0.321	0.829
Constant	1.426	0.003		4.162	

Note: B= regression coefficient, Exp (B)= odds ratio

***=p<.001; **=p<.01; *p=<.05;