Post September 11th Suicide Rates: Durkheim and Communal Bereavement

By

Ian Travis Lovejoy

Thesis submitted to the Faculty of
Virginia Polytechnic Institute and State University
In partial fulfillment of the requirements for the degree of
Masters of Science in Sociology

Committee Members:

Dr. Michael Hughes, Chair
Dr. Theodore Fuller
Dr. Anastasia Sue Vogt Yuan

May 10, 2006
Blacksburg, VA

Keywords: Durkheim, Suicide, Communal Bereavement, Social Theory
Post September 11th Suicide Rates: Durkheim and Communal Bereavement

By Ian Lovejoy

Department of Sociology

Abstract

The purpose of this study is to determine what, if any, effect the September 11th terrorist attacks had on national suicide rates in the time following the attacks. Two schools of thought seem to give contradicting proposals. The first is the classical Durkheimian model, which predicts that the national integration brought on by the attacks should cause a decrease in anomie and consequently a decrease in suicides.

The opposing viewpoint is that of communal bereavement, which proposes an increase in suicides after a public tragedy due to the tendency of individuals to be emotionally impacted by events which do not involve them directly.

To test which theoretical framework prevails, the suicide rates of one hundred days prior to September 11th, 2001 and one hundred days after were compared to the suicide rates of the days within the same time frame in the years 1999, 2000, and 2002 to test if there was a statistical change in the daily suicide rate. A series of regressions were conducted to determine if changes in suicide rates did in fact occur. Data was collected from the Center for Disease Control National Center for Health Statistics mortality database.

Analysis showed that suicide rates do not change significantly after September 11th, 2001, as compared to the same time periods in 1999, 2000, and 2002.
ACKNOWLEDGEMENTS

This thesis would not have been created had there not been countless people who have positively influenced my life. So many, it almost seems impossible to fairly list them all here, but I will try.

My parents, John Lovejoy and Catherine Cobb deserve first credit. Beyond the fact that without them I would not even exist, I want to thank them for the love they have shown me throughout my life. Choosing to live in the middle of the country had the adverse effect of teaching me to hate yard work, and as a result, set me on an academic trajectory. My mother, who through her entrepreneurial spirit and willingness to try new things, has encouraged me to think beyond what is, and to what is possible. In addition, my father has been a steady force throughout my life, whose steady guidance and encouragement is very much appreciated.

My grandmother, Nora Fisher, has also been a steady support, always there in rocky times. My aunt and uncle, Karen and Richard Mercer, through their generous spirit, have helped me see parts of the world in ways I cannot imagine, which has broadened my thinking more than any class.

Most obviously I would like to thank my committee members, Dr. Michael Hughes, Dr. Ted Fuller and Dr. Anastasia Vogt Yuan. Their collective efforts have made navigating the thicket of thesis writing an almost bearable experience. Special thanks needs to go especially to Dr. Hughes, my committee chair. He has helped shape the tone and focus of this research project, as well as serving as the finest mentor I could imagine.
# TABLE OF CONTENTS

Abstract ........................................................................................................... ii
Acknowledgements ......................................................................................... iii
Table of Contents .......................................................................................... iv
List of tables ................................................................................................... vi

Chapter 1. Statement of the Problem ................................................................. 1

Chapter 2. Review of Literature: Durkheim ..................................................... 3
  2.1 Modes of Integration ................................................................................. 3
  2.2 Alternate Explanations ............................................................................. 5
  2.3 Routine Activity Theory and Ceremony................................................... 7
  2.4 Other Research Regarding National Indicators and Events .................... 8
  2.5 Increased Sentiment after September 11th ............................................... 9

Chapter 3. Review of the Literature: The Communal Bereavement Hypothesis 11
  3.1 Communal Bereavement and September 11th ......................................... 12
  3.2 Post Traumatic Stress Disorder and September 11th ............................ 13

Chapter 4. Theoretical Models: Durkheim and Communal Bereavement 15
  4.1 Durkheim ............................................................................................... 15
  4.2 Communal Bereavement: Theoretical Model ......................................... 23

Chapter 5. Methods .......................................................................................... 27
  5.1 Analytic Strategy .................................................................................... 27
  5.2 Secondary Data Source .......................................................................... 31
  5.3 Validity of Secondary Data Source ......................................................... 32
  5.4 Unit of Analysis ...................................................................................... 32
  5.5 Independent Variable Nominally Defined .............................................. 33
  5.6 Independent Variables Operationally Defined ...................................... 33
  5.7 Dependant Variable Operationally Defined ......................................... 33
  5.8 Control Variables .................................................................................. 34
  5.9 Interaction Terms ................................................................................. 34
  5.10 Population and Scope ......................................................................... 34
  5.11 Statistical Analysis .............................................................................. 35
  5.12 Intra-year Analysis .............................................................................. 35
  5.13 Fourteen day Intra-year Analysis ......................................................... 35
  5.14 Inter-year Analysis .............................................................................. 35
  5.15 Fourteen Day Inter-year Analysis ....................................................... 36
  5.16 Control for Population Increase ......................................................... 36

Chapter 6. Results ........................................................................................... 37
  6.1 Intra-year Regression Model: 1999 ....................................................... 37
  6.2 Intra-year Regression Model: 2000 ....................................................... 37
  6.3 Intra-year Regression Model: 2001 ....................................................... 38
  6.4 Intra-year Regression Model: 2002 ....................................................... 39
LIST OF TABLES

Table 1. Intra-year Regression Models .................................................................56
Table 2. Inter-year Regression .................................................................57
Table 3. Fourteen Day Intra-year Regression Models ........................................58
Table 4. Fourteen Day Inter-year Regression .................................................59
CHAPTER 1
STATEMENT OF THE PROBLEM

The problem this study attempts to address what, if any, effect the September 11\textsuperscript{th} terrorist attacks had on national suicide rates in the time following the attacks. Two schools of thought seem to give contradicting proposals of what the actual effect will be. The first is the classical Durkheimian model, which predicts that the social integration brought on by the attacks will cause a decrease in suicides. Previous suicide trend research, like Boor’s research into suicide rates prior to elections and other national events, proves to be a strong foundation for this current study. Also, this study proves to be the natural extension of other projects, such as Trovato’s study of suicide trends during the time of the Stanley Cup. One of the specific questions this study hoped to answer is whether the September 11\textsuperscript{th} terrorist attacks were followed by a statistically significant dip in the daily suicide rate, as proposed by Durkheimian thought, or if perhaps they actually increased in accordance with communal bereavement.

Catalano and Hartig (2001) formalized the area of communal bereavement research in their study of low weight births in Sweden. Communal bereavement can be extended to propose an increase in suicides after a public tragedy due to the tendency of individuals to be emotionally impacted by events which do not involve them directly. Of special interest to this study is Knudsen et al.’s investigation into alcohol consumption and depression indicators post September 11\textsuperscript{th}.

To test which theoretical framework prevails, the suicide rates of one hundred days prior to September 11\textsuperscript{th}, 2001 and one hundred days after will be compared to the suicide rates of the days within the same time frame for the years 1999, 2000, and 2002. A series of regression
models were to determine if changes in suicide rates did in fact occur. Data was from the Center for Disease Control National Center for Health Statistics mortality database.

This research is important because, to date, no one has attempted to reconcile the seemingly contradictory prediction of Durkheimian theory and communal bereavement, in regards to suicide. It is extra rewarding to research this specific area, because it contributes to both Durkheim and communal bereavement separately.
CHAPTER 2

REVIEW OF LITERATURE: DURKHEIM

Suicide, or intentional self-termination, has long been a subject of sociological curiosity. Emile Durkheim conducted the first great sociological work on suicide, aptly titled **Suicide** in 1897 (Collins and Makowsky 1998: 108). In it, Durkheim examines suicide rates as they vary across several different strata, one of the most interesting and fruitful being religion. Durkheim found that suicide rates varied between religious groups (highest among Protestants, followed by Catholics, and in third, Jews). The obvious way to explain this stratification would be to argue that it is caused by the degree of disapproval suicide is assigned within each religion, but this is not what the data showed. Jews, having no stated restriction on suicide, had the lowest number of suicides, indicating some other social force must be influencing individuals. Ultimately, Durkheim proposed that the degree of social integration and regulation were the primary contributing factors, given Jewish social ties are generally stronger than Protestant or Catholic. According to Durkheim, “the more tightly integrated into society the individual is, the more he is prevented from committing suicide” (Collins and Makowsky 1998: 110). As such, social integration and regulation become the center of Durkheim’s suicide research, and from it he makes some interesting predictions, namely that suicide rates will decrease during times of “great social crisis” due to individuals being drawn together “into a common sentiment” (Durkheim 1893: 125).

**Modes of Integration**

The current research topic focuses on the social integration forces experienced by society after the September 11th terrorist attacks, on the notion that these forces created a decrease in
suicides. This general idea was explored in-depth by Marshall’s study on wartime suicide rates (1981). Marshall takes Durkheim’s principle of wartime political integration—social integration based on nationalist ideals—and tests it against actual historical records. Durkheim believed that war would create a swelling sense of patriotism in the minds of citizens, and result in higher integration and lower suicide rates (1892). Durkheim’s early work demonstrated this effect, as he found suicide rates decrease during wartime, and spike after the war’s succession—regardless of which side won. Durkheim further postulated that it would require a great national war, a war the nation was behind, to cause a marked decrease in the suicide rate (1897). “Political wars,” or wars which are fought for political reasons and lack major public support or sentiment, would not cause any appreciable change in the suicide rate.

Political integration is not the only variable that could affect the suicide rate during wartime; economic factors must be taken into consideration. During large wars, unemployment decreases, creating favorable economic conditions, which can cause a decrease in the suicide rates (Marshall 1981, Wasserman 1983). Marshall merges the two approaches, political integration and low unemployment, into a testable model from which he yields interesting results. A comparative analysis of suicide trends during World War II and peacetime indicated no substantial drop in the suicide rate, thus refuting Durkheim’s theory (Marshall 1981: 783). In addition, no changes in suicide rates were found to accompany “political wars” such as the Korean and Vietnam wars (782).

Much research has been conducted into which social events affect the general suicide rate and which do not. While studies that focus on socially integrating events and their effect on suicides are the most relevant to the current study, others should not be overlooked. One could argue that the social integration after a time of tragedy is not dissimilar to the effect of, what
Durkheim proposed, and Phillips and Feldman refer to as, “ceremonial occasions” (1893, 1973). Central to Durkheim’s theories is the idea that ceremony is crucial to maintaining social cohesion. Without individual members of society taking part in common events, individuals become separated from everyone else, increasing egoism. This concept is pertinent to suicide because participation in ceremonial events helps to maintain social bonds, and reinforce social integration, as a result, suicide rates should decrease leading up to ceremonial occasions (Feldman and Phillips 1973: 678). This is the subject of Boor’s research on the effects of the United States Presidential election on suicide (1973). The presidential election should present enough of a well-known and public ceremonial event that suicide rates will decrease preceding the actual election (Boor 1981: 616). Presidential elections might also foster a more specific type of integration, political integration, which is also thought to exist at wartime, and is the specific type of integration my study attempts to examine (Marshall 1981). Boor’s findings indicate that suicide rates do in fact decrease in October and September of election years, when compared to rates of non-election years. Likewise, studies conducted by Phillips and Feldman demonstrated a similar drop in mortality prior to other ceremonial events (1973). They found deaths in general usually dip prior to ceremonial events such as birthdays, presidential elections and for the Jewish community specifically, Yom Kippur (692).

Alternate Explanations

Isolating integration factors from other social trends has proven to be a difficult challenge for demonstrating integration’s impact. It has been shown that other events have an effect on suicide rates. Wasserman points out the trends of the political business cycle on suicide rates, independent of social integration (1983). The political business cycle demonstrates that the
unemployment rate will decrease towards the end of an incumbent’s term, as the incumbent pursues more vigorous employment related policies to help insure either re-election or the election of his party’s nominee (Wasserman 1983: 711). Past research demonstrates repeatedly that decreased unemployment rates lead to decreased suicide rates; presumably due to a decrease in stress on the individual (713). Pierce also demonstrates changes in the suicide rate based solely on economic variability (1967). To go further, Wasserman’s later studies indicate that rather than focusing on unemployment rate, more meaningful data could be derived from examining duration of unemployment (Wasserman 1984). Regardless of which perspective is superior, both demonstrate suicide rates shift because of events that are, arguably, unrelated to social integration. Wasserman offers the aforementioned political business cycle as an alternative explanation for an election year dip in suicide rates and as a refutation of the idea that the dip is caused by social integration (1983). This assertion was presented as a response to Boor and Phillips’ research into the election year dip and Boor and Philips responded by pointing out errors in Wasserman’s analytical techniques, so the issue is unresolved.

Although a great deal of research shows that economic cycles can influence suicide rates, and that such influence is not the result of social integration or regulation, one could argue that employment and income are antecedently linked to integration and regulation. Employment provides access to a social network of individuals working toward common goals, and sharing common sentiments, both contributors to integration. Also, income, as a result of employment, allows individuals to take part in social integrating endeavors, such as vacations, trips and other social functions.
Also, researchers who claim that economic factors explain suicide rates, and thus neutralize Durkheim, seem to be excluding the fact that Durkheim’s anomic theory of suicide predicts, in part, increases in suicide during times of economic downturn.

Routine Activity Theory and Ceremony

Other theoretical framework applies to understanding suicide trends and how they relate to ceremonial events. Trovato combines routine activity theory with a foundation in social integration in order to explore the ceremonial occasion of the Stanley Cup (1998). He proposes, as Durkheim would, that suicide rates prior to the Stanley Cup playoffs decrease (1998: 106). Rather than attributing the entire cause of the decrease to social integration, Trovato goes more in-depth and applies routine activity theory. Routine activity theory is most often applied to criminal behavior and its central assertion is “that people sharing similarity in their social backgrounds tend to also share similar interests and lifestyles and are therefore prone to participating together in social activates” (106). Applied to Trovato’s research, individuals develop a routine of group mingling and festivities centered on watching the Stanley Cup. This is pertinent to the question of suicide because suicide may be averted not only because of heightened levels of social integration, but also will drop when an individual congregates with friends and family as a part of routine action (118). Being around other people makes it more difficult to end one’s life. Trovato did not find compelling evidence that suicide rates decrease because of the Stanley Cup. In fact, he found suicide rates increase slightly in some age groups, and explains it through an increase in self-harm activities that can lead to suicidal tendencies, such as increased alcohol consumption during the Stanley Cup (117). These findings are in stark contradiction to the works of Boor (1981), Feldman and Philips (1973), and demonstrate a need
for more research, specifically into social integration as a stand alone to routine activity theory. It is difficult to imagine a widely celebrated social ceremony that does not have routine activities associated with it, as such, if one wishes to truly understand social integration, without the influence of routine activity theory; one must examine an event that comes unassociated with routine activity.

Other Research Regarding National Indicators and Events

Research into significant fluctuations in national indicators, as the result of a public event has not been limited solely to suicide. Earlier work by Udry (1970) attempted to determine if there was a significant increase in births following the Great Blackout of 1965, though no significant change was found. In addition, Philips (1980) has researched the immediate deterrent effect of capital punishment on the commission of new murders, and has found a significant decrease in murders following a well-publicized execution; however, his results are in dispute (Kobbervig et al.1982). Work by Nakonezny et al. (2004) demonstrates a statistical increase in the divorce rate in Oklahoma following the Oklahoma City terrorist attacks, and work by Philips et al. (2004) demonstrates an increase in cardiac mortality around Christmas and New Years.

Philips, alone and in work with Bollen (1982), has also demonstrated that suicides increase after a well-publicized suicide (1974). Philips et al. have also shown that after a well-publicized suicide, motor vehicle deaths increase significantly, theorizing that the increase in motor vehicle fatalities is accounted for by an increase in suicides by motor vehicle (1977, 1978, 1979, 1981).
Increased Sentiment after September 11th

For the current research to make sense in the context of Durkheim, an increase in integration must be reasonably demonstrated, as it is a key factor in the Durkheimian model of suicide decrease. Although it is not necessary to quantify specifically the levels of social integration for this project, it is necessary to support an argument for an increase. This increase was demonstrated by a Gallup poll conducted in June 2002, wherein 65 percent of respondents say that they are "extremely" proud to be American, up from 55 percent in January 2001 (Wellner 2002). Also, research by the Pew Center for the People and the Press (2002) indicates that President Bush’s approval ratings remained high after the terrorist attacks and also increased on the one year anniversary of the attacks. The federal government in general was also viewed positively after the attacks, with a high of 82% favorability, which dropped to 64% roughly one year later. Though favorability dropped 18 points, it was still much higher than pre attack levels (38% in 1997).

Research by Skitka (2005) argues that a demonstrable increase in patriotism followed the September 11th terrorist attacks, as evidence by increased displaying of the American flag on one’s home, car or person. Skitka found that 74% of those interviewed had engaged in American flag displaying behavior since the September 11th attacks. Her research also indicated that the reason for such displays were patriotic in nature (love of country and in group solidarity) rather than nationalist in nature (uncritical acceptance of national, state and political authorities and out-group antipathy) (2005).

Research also indicated an increase in the belief that the United States should be more active in world affairs (Pew 2002) and that military action was justified in conducting the war on terror (Pew 2002, Coryn et al. 2004, Huddy 2002).
The Durkheim model of suicide predicts a decrease in suicides following a national disturbance, however, the communal bereavement hypothesis makes way for the possibility that suicides might actually increase.
CHAPTER 3

REVIEW OF THE LITERATURE: THE COMMUNAL BEREAVEMENT HYPOTHESIS

Communal bereavement is a concept first framed by the work of Ralph Catalano and Terry Hartig (2001). They define it as “the wide-spread experience of distress among persons who never met the deceased”. Catalano and Hartig consider bereavement a healthy and natural result of a disruption in one’s social bonds. However, bereavement can lead to stress which in turn leads to physical illness. Catalano and Hartig propose that not only will individuals who lose someone close to them bereave, but individuals may also suffer bereavement even without meeting the deceased. This “communal bereavement” is most pronounced when the death “implies the failure of institutions essential to the normal functioning of the community” (p.334). Put more simply, not only does the death cause bereavement in strangers, but also the situation surrounding the death can heighten public distress. Though not expressly stated, Catalano and Hartig have effectively established a two-pronged test for determining if an event should lead to communal bereavement by the population at large. First, the event must be public, thus exposing the population to the event, and second, the event must imply a failure of institutional structures to provide safety and stability.

Catalano and Hartig not only propose that a psychological impact will occur following a public, traumatizing event, but also physical effects as well. Physical impact is proposed as the result of psychosomatic effects of stress caused by communal bereavement. Specifically, Catalano and Hartig sought to determine if stress from communal bereavement caused women who were pregnant at the time of a traumatic event to gave birth to infants of a lower than average birth weight. Lower birth weight was proposed to be the result of premature labor brought on by heightened stress.
For the purposes of their study, Catalano and Hartig examined birth weights of infants who were gestating during the Estonia ferry sinking, and separately, the birth weights infants who were gestating during the period following the assassination of then President of Sweden, Olof Palme. Both the assassination of Palme and the sinking of the Estonia pass the two pronged test for events that may result in communal bereavement, as they were both very publicly detailed, and each represented an event that could be construed as a lapse in the social structure to provide safety and stability. The societal effects of the Palme assassination were well documented as his likeability rating was actually higher after his death than before, and 90 percent of those polled said they were upset at the notion that such a death could occur within Sweden. The 501 deaths which occurred as a result of the sinking of the Estonia impacted the public psyche as well, as it represented a failure of a well trusted, publicly provided for, means of transportation. Catalano and Hartig found that the cohort of infants in gestation at the time of the tested events did in fact contain more than expected low weight births.

Communal Bereavement and September 11th

Research has also been conducted, specifically investigating the possibility of communal bereavement effects on the national population after the September 11th terrorist attacks. Like the Palme assassination and sinking of the Estonia from the Catalano and Hartig study, the September 11th terrorist attacks represented a publicly covered tragedy, and also a manifestation of the social structure failing to keep individuals safe and provide stability. Knudsen et al. sought to explore the after effects of the September 11th terrorist attacks, specifically, whether any communal bereavement like effects manifested. Rather than examine birth weights, as in the
Catalano and Hartig study, Knudsen et al. examined depressive symptoms and alcohol consumption.

To determine if the public exhibited behavior that would support communal bereavement theory, Knudsen et al. compared depression indicators and drinking patterns from before and after the terrorist attacks, their hypotheses being that both depressive indicators and alcohol consumption should have increased. They first approached their analysis by running independent sample t-test on the dichotomous pre and post September 11th data, but finding no significant change, moved on to run negative binomial regressions on the data. In doing so they did find a statistically significant increase in self reports of depressive symptoms in the two weeks after September 11th (the trend trailed off there after) and found a surprising decrease in reported alcohol consumption. This surprising decrease in alcohol consumption is described as possibly being the result of increased social integration after the attacks.

Post Traumatic Stress Disorder and September 11th

Knudsen et al. also discuss post traumatic stress disorder (PTSD) as a manifestation of the distress suffered by society as a result of communal bereavement (p 262). Several studies have been conducted linking the September 11th terrorists attacks to increased post traumatic stress disorder within Manhattan and nationally. Silver et al. conducted a web based survey into post traumatic stress disorder symptoms, wherein 3496 adults were sent a web survey, of which, 2729 (78%) took part. 1069 respondents living outside of New York were randomly selected and sent a follow up survey, approximately two months after the attacks, and finally a third survey was sent six months after the attacks. The survey questions centered background information, experiences during the attacks, and emotional response.
Silver et al. results indicate that 17% of those sampled experienced symptoms of post traumatic stress two months after the attack. This number decreased to 5.8% six months after the attacks. Though Silver et al. do not specifically mention communal bereavement, their research still follows a similar line as that of Catalano and Hartig and Knudsen et al. To quote Silver et al., the psychological effects of a major national trauma are not limited to those who experience it directly, and the degree of response is not predicted simply by objective means of exposure or loss from the trauma (1235).

The findings of Silver et al. are somewhat at odds with the findings of Schlenger et al. (2002). Similar to Silver et al., Schlenger et al. administered a web based survey based on the PTSD Checklist and Brief Symptom Inventory. Unlike Silver et al., however, Schlenger et al. administered the survey in a single wave, approximately two months after the attacks. They found that only although 11% of individuals within New York City experienced symptoms of post-traumatic stress disorder, and that the nation as a whole did not report symptoms more often than would be expected from a general community sample.

If post traumatic stress disorder is a manifestation of social distress and evidence of communal bereavement as Knudsen et al. propose, then the Silver et al.’s research supports the existence of communal bereavement as they found a nation wide increase in PTSD symptoms. However, Schlenger et al.’s research does not support the communal bereavement hypothesis as they found no such nation wide increase.
CHAPTER 4
THEORETICAL MODELS: DURKHEIM AND COMMUNAL BEREAVEMENT

Durkheim

Examining the September 11th terrorist attacks offers a unique opportunity to gain more useful knowledge about social integration’s effect on suicide rates, while avoiding some of the conflicting reports in past studies. Primarily, economic antecedents have been difficult to separate from other prevailing social trends as contributing factors in declining suicide rates. It is difficult to explain a wartime dip or a pre election dip in suicide rates as being a function of social integration, when there are clear, positive economic trends, which can serve as an alternate explanation. The economic climate in the months immediately following the September 11th attacks was decidedly negative, showing a marked decrease in almost vary across the board economic indicator. As a result, if a dip in the suicide rate is found post September 11th, it cannot be explained by standard economic functions.

Likewise, the September 11th attacks offer a venue for examination free of blatant interference of routine activities. As Trovato (1998) explored, suicide rates may decrease around periodic ceremonial events due to decreased opportunity for committing self-harm: one would not kill oneself while surrounded by friends and family at a Super Bowl party. September 11th is particularly interesting because the terrorist attacks represent a non-periodic, non-ceremonial event, which had no routine activity associated with it.

The notion that a well publicized event that focuses the public’s attention is not a wholly original proposition, and draws directly from Durkheim’s original work, but also strongly from Marshall’s research (1981). Marshall also helps to elaborate further on the basic relationships proposed by Durkheim (1893). It is important to point out that a national event does not directly
influence the suicide rate; rather, a two-stage process takes place. First, an event must cause an increase in the degree of political integration. This integration then in turn lowers the suicide rate.

**Durkheim: Integration**

Durkheim’s theory of suicide is comprised of two main variables: integration and regulation. Durkheim defined integration as the rates of interaction, shared beliefs, values, traditions and sentiments of members of a group (Pope, 1976). Integration is as a continuum, with egotistic groups on the low end and altruistic groups on the high end. Both egotism and altruism represent extremes on the integration scale, and are both theorized to be groups with high levels of suicide. Only the moderate middle has low levels.

Individuals in the egotistic group have low levels of interaction, do not share common beliefs, values, traditions and sentiments, and as a result, are more likely to commit suicide. To empirically study the effects of egoism, Durkheim examined religious, familial and most importantly to this research project, political society.

**Religious Society**

Religious society is examined first by Durkheim. Durkheim’s operating assumption is that religious societies with low levels of integration (high levels of egoism) will have more suicides than religious societies with more moderate levels of integration. By ranking religious societies by the degree to which they enforce collective beliefs, and thusly lack free inquiry, a suicidal hierarchy of religions takes shape. Durkheim predicts that Protestants are less integrated than Catholics, and that Catholics are less integrated than Jews, and that the respective suicide
rates for each group should vary accordingly. Durkheim found that Protestant states have an average suicide rate (per million) of 190, and Catholic states a rate of 58. However, Pope (1976) builds on Durkheim’s initial work by including more states in the analysis, and by introducing statistical controls for development, which neutralized the pattern Durkheim had discovered. Likewise, Pope discredits Durkheim’s finding that Jews commit suicide less than Catholics in part by pointing out Durkheim’s questionable selection of data. Durkheim’s original source contained data on twenty-five figures, which would allow Catholic-Jewish comparison, thirteen of which showed Jewish suicide rates surpassing Catholics. Of the thirteen, only three made it into Durkheim’s final analysis, “buttressing his case through selective presentation of data” (73).

**Familial Society**

Durkheim concludes that the level of familial integration is a function of family size, where more people mean more integration (less egoism). Familial relations are described as existing on two tiers: the rate of interaction and collective sentiments of the group. The basic linkage between the two tiers is rather straightforward: “the number of people determines the number of consciousnesses, which determines the number of consciousnesses reacting in common and sharing collective sentiments, which determines the strength of collective sentiments which determines the degree of social integration” (Pope 1976: 16). The two tiers reciprocate, in that, the second tier helps reinforce the first.

To test his family size-integration hypothesis Durkheim examined several different family types. Men married with children and married without children, women married with children and without children, women widowed with children and widowed without children, and men as widowers with children widowers without children. In the end, Durkheim had little
success showing that family size effected suicide rates, as half the aforementioned groups supported his prediction with the other half did not, leaving it at zero sum.

**Political Society**

Durkheim analyzed political society by using suicide rates in conjunction with political crisis. Durkheim asserts that “great social disturbances and great popular wars rouse collective sentiments, stimulate partisan spirit and patriotism, political and national faith, alike, and concentrating activity toward a single end, at least temporarily cause a stronger integration of society” (p 208). Following that assumption, he analyzed several “great national disturbances” and “popular wars” to determine if they coincided with a change in suicide rate. First, Durkheim analyzed the coup d’état by Louise Bonaparte in December 1851 and concludes that suicide rates did in fact decrease during and after the coup d’état, at least in Paris. However, as Pope points out, the national suicide rates for France as a whole actually show an increase in suicide, which seems to negate Durkheim’s assertion. Once again, it is argued that Durkheim selectively chose his numbers.

The next examination by Durkheim is perhaps the most relevant to the current study. It is an analysis of election crisis, which like the current study, is a study focusing on several months during an unpredicted event. Durkheim found that for the duration of the French parliamentary crises of 1877 there was a marked decrease in suicides (5.9%) as compared to the previous year. Also, the Boulanger election crisis of 1889 was accompanied by an 11.5% drop in suicides.

“Great national wars” were also a concern for Durkheim, who as mentioned before, felt that such events would increase collective sentiment, and therefore integration and reduce
suicide. After studying nine national wars, Durkheim found that each was accompanied by a clear decrease in suicides, with the exception of one.

Lastly, in regards to egoism, Durkheim examines what he calls “dynastic wars”, which are brief wars fought without popular support. Since such wars will not rouse collective sentiment, they will not effect integration and no change in suicide rates will occur. After analyzing four such wars, Durkheim concluded that there was no change in the suicide rate as the average change for each incident was a low, 1.6% (Durkheim 1897)

Altruistic Suicide: Primitive Society and the Modern Military

Just as the low levels of integration (egoism) is predicted to increase suicides, extremely high levels of integration, known as altruism, is predicted to increase suicides as well.

Durkheim asserts that in small, primitive societies the compact nature of daily life affords little privacy for individual development, as the focus is on common goals, which leads to extremely high levels of integration. To put more concisely if “excessive individuation leads to suicide, insufficient individuation has the same effect” (Durkheim: 217). Durkheim offers little mathematical proof of this assertion, and rather relies on written accounts of the suicidal leanings of various societies, less than scientific, from the ancient Greeks and Romans to religious missionaries and doctors. Durkheim also considers military society to be an example of ultra high integration, given the regimented life style, and as such, should have more suicides than civilian society. Durkheim confirms this theory by comparing military suicide rates to civilian rates, however, the results are disputed by Pope, sighting Durkheim’s lack of controls and selective data presentation.
**Durkheim: Regulation**

The second contributing variable of Durkheim’s analysis of suicide is regulation. Regulation refers more specifically to social regulation and control. Anomie is the term assigned to represent low regulation, and as Durkheim’s other extremes, is theoretically associated with suicide. Durkheim affirms that as individuals are freed from social control, their passions grow unchecked, and eventually outstrip their means. Having desires that go unmet results in frustration, and ultimately high suicide rates. Durkheim proposes several types of anomic configurations, acute economic, chronic economic and chronic domestic. Acute economic anomie is associated with sudden changes in the economic system, resulting in lost income which widens the gap between desires and means, as well as thrusting individuals into social situations wherein the old, known rules, do not apply. This results in a loss of social regulation, which results in a means-needs gap, and ultimately decreased happiness and suicide. Chronic economic anomie deals with the gradual erosion of social control institutions such as work groups, the church, and the state. Lastly, chronic domestic anomie is associated with how marriage effects individuals. More specifically, men benefit from the social regulation marriage brings with it so they commit less suicides, women; however, suffer from marriage so their suicide rates increase (Pope 124).

**Fatalism**

Fatalism is on the opposite end of the regulation continuum, but is nothing more than a theoretical afterthought designed to make Durkheim’s theory symmetrical. He only discusses it in eight sentences in a footnote in *Suicide*. Fatalism is the opposite of anomie and represents too much social control. Individuals in this group suffer the inability to make decisions and manage
their life outcomes due to oppression. One reason Durkheim spends little time on fatalism is his assertion that fatalistic situations no longer exist on the planet, as slavery, the best example, is no longer widely employed.

**One Cause Hypothesis**

Some have tried to argue that Durkheim’s integration/regulation model of suicide could actually be reduced, as integration and regulation are essentially the same thing. Barclay Johnson attempted such a reduction (1965). Johnson disregards Durkheim’s altruistic and fatalistic suicide on grounds that data does not exist to truly research either form. He then argues that integration and regulation are the same thing, citing Durkheim’s insistence that both integration and regulation often vary together. In addition, Johnson argues that they are the same since those who are egoistic lack interaction and common conscience, as a result will also lack societal regulation.

Pope (1976) refutes at least part of Johnson’s one cause theory by insisting that eliminating altruistic and fatalistic suicide because ample data does not exist to test them is not theoretically sound. He does not, however, refute Johnson’s combination of integration and regulation, stating that other researchers ignoring Johnson is “unfortunate because Johnson’s equation of egoism and anomie was an important step in the right direction”. Pope then goes on to explain how anomie can in fact be used to explain decreases in suicide rates after national upheavals, arguing that increased sentiment caused by an upheaval leads to increased social regulation. Conversely, egoism can be used to explain increases in suicides during economic upheaval, as such an occurrence causes individuals to act more in terms of their own interests, and not society’s, resulting in decreased life meaning and increased suicide. Pope concludes by
asserting that sense either theory can be turned to explain an increase or decrease in suicide for any given occasion, that anomie in fact serves as a tool to make Durkheim’s model unfalsifiable.

**Durkheim, Suicide and September 11th**

The most important aspect of Dukheim’s theory of suicide to this study is integration, and by extension, egoism. The theoretical assumption behind integration is that social integration influences the degree to which individuals act in service to social interest, which determines to which degree they find meaning in life, which ultimately affects the suicide rate (Pope 1967). More specifically, egoism, or a lack of integration, supposes that the lower the rate of social interaction, the weaker collective sentiment becomes, which leads to decreased focus on service to social interests which in turn leads to less meaningful lives, which results in increased suicides.

Although Durkheim does not specifically address sudden attacks in *Suicide*, he does make mention of “great social disturbances” as being candidates for decreasing suicides. To support his claims he analyses coups, electoral crisis and the most obvious of disturbances: wars. The increase in patriotic fervor and collective sentiment accompanying such events, according to Durkheim, increases social integration resulting in decreased suicide rates. Given the nature of the September 11th terrorist attacks, namely, the increase in patriotism, national faith and political faith following the event, it makes it an ideal candidate for research using the Durkheimian integration paradigm, especially the egoistic suicide portion of the model. Also, since so much of Durkheim’s work has been questioned, especially by Pope, researching September 11th will serve to either support or detract from the egoistic concept of suicide.
Communal Bereavement: Theoretical Model

In order for an event to cause communal bereavement affects in the general population two criteria must be met (Catalano and Hartig). First, the event must be well-publicized. This is logical because in order for the general population to be effected by an event, the general population must be made aware of it. The linkage between publicity over an event and impact on the general population has been explored in other ways, especially by Bollen and Philips (1982). Bollen and Philips examined the effect of well-publicized stories of suicide on general suicide rates in the population. They concluded that well publicized stores of suicide were in fact followed by significant increases in suicides, adding anecdotal support to the first criteria of the communal bereavement two-prong test.

The second criteria an event must meet in order to cause a communal bereavement effect is that the event must represent a failure of institutional structures to keep the public safe. Catalano and Hartig use the sinking of the Estonia and assassination of Olof Palme as test events, where as Knudsen et al. researched the September 11th terrorist attacks.

Bereavement is generally defined as “deep and poignant distress” (Clayton 2000: 304), and as Catalano and Hartig express is “an inevitable outgrowth of developing the strong social bonds essential to a healthy and productive life.” However, bereavement can also lead to stress, and stress can cause somatic physiological effects such as increased production of corticosteroids and compromise the immune system, and in the case of the Catalano and Hartig study, cause pregnant women into premature labor (Catalano and Hartig: 333). Catalano and Hartig stipulate that for many, the aforementioned stress is kept in check by individual social networks, however if an individual lacks such social networks, the stress may go undiminished.
Catalano and Hartig’s model of communal bereavement can be summarized as follows: an event which is made widely public to a national population and which represents a failure of the system to keep individuals safe or provide order leads to bereavement in the general population. Said bereavement leads to stress in individuals as they cope with either the loss of life of the event or the loss of stability the event represents. This stress is then mitigated by individual social networks, but for some who lack such networks, the stress can continue unabated, manifesting in physical symptoms.

**Communal Bereavement, Suicide and September 11th**

Bereavement is a naturally occurring reaction to loss, as Catalano and Hartig have stated, however, if bereavement causes a large increase in stress, not only may that stress cause physiological effects, but suicide as well. R. Vilhjalmsson et al. reviewed data from a survey that was administered to 1200 people living in the Reykjavik area of Iceland, a highly urban area. Of the 1200 surveys administered, 852 were completed and 825 were viable for R. Vilhjalmsson et al.’s study. The survey asked questions about general life stresses, coping mechanisms and suicide ideation. R. Vilhjalmsson et al.’s findings indicate that those with higher levels of general life stress showed a higher prevalence for suicidal ideation (1998).

Previous studies show a link between PTSD and suicidal ideation, planning, gestures and attempts. Kessler et al. (2005) compared results from the National Comorbidity Survey (NCS), which was conducted between 1990 and 1992 with results from the National Comorbidity Survey Replication (NCS-R), which was conducted between 2001 and 2003. The purpose of this comparison was to determine if suicide trends were changing over time. Within Kessler et al.’s findings is valuable information regarding the relationship between PTSD and suicide. Kessler et
al. found that of those surveyed who reported suffering from PTSD, 29% also experienced suicidal ideation in the NCS and 20% in the NCS-R. Likewise, in regards to planning of suicides, 40% of PTSD sufferers were likely to exhibit such behavior in the NCS and 31.7% in the NCS-R. In the NCS 23.2% of PTSD sufferers were likely to express suicidal gestures compared to 23.6% in the NCS-R. Of PTSD sufferers in the NCS, 21.6% actually attempted suicide compared to 30% in the NCS-R. These results show that a large portion of PTSD sufferers experience suicidal ideation, planning, gestures and attempts in both the NCS and NCS-R, in fact, the aforementioned percentages were either the larges or among the largest of all anxiety disorders. Oquendo et al. (2005) who found that sufferers of PTSD were more likely to attempt suicide than non-PTSD sufferers support Kessler’s findings.

Communal bereavement pertains to suicide and September 11th as follows: the September 11th terrorist attacks, representing both a public event and an event which called into question the ability of the system to keep individuals safe, led to bereavement, which in turn led to stress, which for many went unmitigated, and resulted in suicide.

**Durkheim and Communal Bereavement**

Durkheim’s model predicts that the September 11th terrorist attacks should be followed by a decrease in egoistic suicide. Counter to this is communal bereavement, which predicts that for some individuals bereavement leads to unabated stress, and as other research has shown, stress can lead to suicidal ideations. Durkheim and communal bereavement do share a cross over point, however, in the form of integration. According to Durkheim, egoistic suicide is the result of extreme lack of social integration, which is remedied by the swelling of national sentiment and patriotic cohesion resulting from a national incident. Integration is also a factor in the stress
resulting from communal bereavement, as Catalano and Hartig point out, physical manifestations of stress will occur in those who lack a social network (integration) to mitigate stress. As such, Durkheim and communal bereavement share the same “at risk” group: individuals suffering from low social integration. Where the theories diverge, however, is that Durkheim predicts that a national tragedy will work to alleviate lack of social integration, whereas, communal bereavement assumes that lack of social integration will fail to alleviate stress.
CHAPTER 5

METHODS

Analytic Strategy

The research question this project sought to answer was relatively straightforward. Do daily suicide rates change significantly after September 11th, 2001? To answer this question a set of time-series regressions were ran, following a similar design as Trovato (1998). The first set was designed to determine intra-year trends for 1999, 2000, 2001 and 2002, which proved useful in noticing what, if any, trends repeated from year to year. Next, two inter-year regressions were ran, the first to determine how trends between the one hundred days before September 11th, 2001 and the one hundred day after, compared with the same trends in 1999, 2000, and 2002. The second inter-year regression was ran to determine if the suicide rates between the fourteen days after September 11th, 2001 and one hundred days before were significantly different than the same trends in 1999, 2000, and 2002. The fourteen day window is of special interest because Knudsen et al. results indicated increased depression symptoms within the two weeks after September 11th.

The general intra-year regressions for 1999, 2000, 2001 and 2002 each followed the same model. First, daily suicide rate was constructed as a variable. Daily suicide counts were extracted from the Center for Disease Control- National Center for Health Statistics mortality database and converted into daily rates. The count to rate conversion followed a similar method as presented by Nakonezny et al. (2004). To convert from a count to a rate, daily population size had to be estimated, and this was accomplished by using Census Bureau monthly population estimates. Each month had a first of the month estimate from the Census Bureau, and by subtracting a given month’s first of the month estimate from the following month’s first of the
month’s estimate, the population increase for a given month was calculated. This procedure was repeated for each month within the two hundred and one day sample, creating a custom estimate of each month’s population increase. By dividing a given month’s population increase by the number of days within that month, a daily adjustment figure was created. By using the following equation, \( dp = b + c(s) \), where \( dp \) is the daily population, \( b \) is the beginning of the month population estimate, \( c \) is the afore mentioned daily adjustment figure, a custom daily population estimate was generated. The suicide rate for a given day was then divided by that day’s population estimate and multiplied by 10,000,000. Multiplying by 10,000,000 made the numbers easier to work with, as they are quite small otherwise.

Next, a dummy variable was constructed which represented whether or not a given day fell within the one hundred days before or one hundred days after September 11th. Before was coded as 0 and September 11th and after as 1. The suicide rate variable and before/after dummy variable were the only variables in the first regression model for the 1999, 2000, 2001 and 2002 intra-year regressions, wherein the dependant variable of suicide rate was regressed upon the independent variable before/after. Since the first model only contained a dummy variable, it was the same as conducting an analysis of variance.

The third and final model was designed to determine if any pre September 11th trend continued with the same intensity after September 11th. More specifically, the model was set up to determine if the slope of any post September 11th trend differed significantly from a pre September 11th slope.

This model involved the use of an interaction term, which was the result of multiplying two other variables. The first of these two variables was the aforementioned before/after variable and the second was a newly constructed variable representing each day’s temporal
location relative to September 11th. The temporal location variable may require a bit more elaboration. Each day in the sample has the quality of being some temporal “distance” from September 11th. The one hundred days before range from -100 to -1, and the one hundred days after range from 1 to 100, and were coded accordingly. By multiplying the before/after variable by the temporal location variable, an interaction term was generated, which when added to the regression in the third model, along with the temporal location variable, created a regression used for comparing the pre September 11th trend slope to the post September 11th trend slope.

Intra-year analysis was also conducted with the fourteen day after September 11th as a focal point. The previous regression models were adjusted as follows: the before/after term was replaced by a within fourteen day/not within fourteen day term. If a day fell within the fourteen days after September 11th 1999, 2000, 2001, and 2002 it was coded as 1, all days prior to September 11, one hundred for each year, were coded as 0, and all days after the fourteen day period were coded as system missing. September 11th was coded system missing so it was not included in the regression. Each interaction term was then recreated using the new fourteen day dichotomous variable in the place of the before/after variable.

Previous research demonstrates a pre-existing seasonal effect on suicide rates. Massing and Angermeyer (1985) demonstrated that suicides are typically high in spring and summer, and reduce through fall to a yearly low during winter. As such, just finding a reduction in suicide after September 11th is not conclusive in of itself, as it supports preexisting trends. To take this trend into consideration, inter-year analysis will be conducted as well.

The final two regressions were designed to determine specifically if the before/after trend varied significantly between 2001, and 1999, 2000, and 2002. They were set up as a three model regression involving the before/after variable, dichotomous year variables and interaction terms
and control for day of the week. The dichotomous year variables were designed following a process similar to the dichotomous day of the week variables. As an example, in setting up the 1999 variable, if a given day fell within the year 1999, it was coded as a 1, and all other days coded as 0. This process was repeated for each year. The interaction terms were created by multiplying each dichotomous year variable by the before/after variable.

The first model regressed suicide rate upon the before/after variable, in order to give a general understanding of the collective suicide trend which occurs when all four years are combined in an analysis.

The second model in the 1999, 2000, 2001 and 2002 intra-year analysis involved adding controls for day of the week to the previous model. Day of the week controls were added in the second model to neutralize any variance resulting from the fact that September 11th fell on a different day in each year in question. The control was accomplished by creating seven dummy variables, each one corresponding to a day of the week. For instance, if a given day fell on a Monday, it was coded as 1, while all other days were coded as 0. The process was repeated for the other six days of the week. Model two was then ran, with the addition of six of the day of the week control variables (Monday was excluded from the model to serve as a point of comparison).

The third model added the dichotomous year variables (excluding 2001 as a reference) and each interaction terms (again, excluding 2001), this model was constructed in order to determine if the 2001 before/after trend varied significantly from the 1999, 2000, and 2002 before/after trend.

The final regression followed the previously described model, however, the before/after term was replaced by a within fourteen day/not within fourteen day term. If a day fell within the
fourteen days after September 11\textsuperscript{th} 1999, 2000, 2001, and 2002 it was coded as 1, all days prior to September 11, one hundred for each year, were coded as 0, and all days after the fourteen day period were coded as system missing. September 11\textsuperscript{th} was coded system missing so it was not included in the regression. Each interaction term was then recreated using the new fourteen day dichotomous variable in the place of the before/after variable. The inter-year regression was ran as before, only the fourteen day variable replaced the before/after variable, and the new interaction terms were included. The purpose of this regression was to determine if the fourteen days immediately following the September 11\textsuperscript{th} terrorist attacks specifically experienced changed suicide rates. As mentioned before, this time period is of particular interest because of earlier research of Knudsen et al.

This research project has a positivist orientation. The general concept of social integration and its effect on the suicide rate is a perfect example of applying concrete, real life aspects of the social world to a more general theoretical framework. It also possesses a clear cause and effect pattern, crucial for positivist research. Through empirically testing the principles of Durkheim and communal bereavement, greater knowledge about broad social laws can be ascertained.

**Secondary Data Source**

Daily suicide counts were retrieved from the Center for Disease Control-National Center for Health Statistics mortality database. The information was not located in the CDC final year end report, but rather was retrieved from the individual data tables that are computed to make the report. The data tables are compiled using death certificate, which are officially filled out by doctors, coroners and mortuary owners from around the country. The information is then reported
to, and processed by the NCHS. The NCHS database serves as the government’s official record of mortality in the United States and makes use of standardized methods of collecting mortality data, including standardized death certificate issuance protocols (CDC 2006). The data was originally in portable document format (PDF), and had to be converted into a standardized column/row, tabs delimited format for easy data analysis. Data sets for 1999-20002 are present, with no reported gaps. As with all studies analyzing suicide data, the question of how accurately suicide data is reported is a chief concern which will have to be carefully evaluated.

Validity of Secondary Data Source

The validity of suicide data is an issue all suicide researchers must take into consideration. According to P.W. O’Carroll (1989) validity and reliability of suicide data must be considered across three dimensions. Firstly, are suicides misidentified between areas or points in time? Secondly, if suicides are misidentified between areas or points in time, how big is the difference? Thirdly, if suicides are misidentified, is it to such a degree as to call into question research validity? One must pay special attention to suicide rate validity when comparing suicides between different cultures, as different cultural treatments of suicide may effect how and if they are reported. Also, attention to validity of suicide reporting must be considered when comparing suicide rates from two points separated by a great deal of time, as cultural attitudes and record keeping methods my have changed over time. This study takes place within the same culture, and a relatively narrow time period, serving to negate the aforementioned concerns.

Unit of Analysis

Daily suicide rate is a quality of the day, as such; day will be the unit of analysis.
Independent Variable Nominally Defined

Multiple types of statistical analysis were used in this project, calling for different independent variables. Inter-year comparison of suicide data used year as the independent variable, whereas intra-year comparison called for temporal relation (falling before or after) September 11th, to be used. Also, in testing if the two weeks after September 11 were specifically affected, whether or not a day falls within that specific time interval will also be used as an independent variable.

Independent Variables Operationally Defined

The independent variable year is defined as the calendar year in which the dates in question fall. Four dummy variables for year were constructed, the year in question being coded as 1 and all other years being coded as 0. Before/after is operationally defined as a dichotomous variable, whether or not the day in question falls before September 11th, or after. Before September 11 was coded as 0 and after as 1. Falling within the fourteen day after September 11th was coded as 1, and falling before that time period was coded as 0 and all other days as system missing, in the “fourteen” variable.

Dependant Variable Operationally Defined

The dependant variable, daily suicide rate is defined as the number of daily deaths that are the result of self-termination, divided by the national average population for that day, multiplied by a 10,000,000.
Control Variables

Day of the week control variables were constructed. Seven dummy variables were coded with the day in question coded as 1 and all other days coded as 0.

Interaction terms

To determine if the general suicide trend found in 2001 was significantly different from trends found in 1999, 2000, and 2002, three interaction terms were used. Multiplying the aforementioned year dummy variables by the before/after variable produces an interaction term that suites this need.

Also, to determine if the slope of the change after September 11 is different than any slope preceding September 11, an interaction term was created using the before/after term multiplied by a variable which indicates continual temporal proximity to September 11 (September 11 coded as 0, and each day before as -100 to -1, and each day after as 1 to 100).

Population and Scope

The population in question includes one hundred days prior to, and one hundred days following September 11th, for the years 1999, 2000, 2001, 2002, as well as specifically the fourteen days after September 11 for those years. The sample size will vary depending on the statistical analysis, as described later in this section.
Statistical Analysis

Intra-year analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS). For each year, 1999 through 2002, a general intra-year regression was conducted. The goal of this set of regressions was to determine if suicide rates before September 11th 1999, 2000, 2001 and 2002 differed significantly from suicide rates post September 11th, in each year respectively. This allowed initial insight early into what types of suicide trends were present. The first model regressed the dependent daily suicide rate variable upon the independent dichotomous before/after time variable. The second model added the day control variables (excluding Monday) and was followed by the month control variables in the third model (September was excluded). The fourth and final model added the interaction term of before/after multiplied by the continuous time relative to September 11th variable, which was done to indicate if any trend that existed before September 11th was enhanced or weakened after September 11th.

Fourteen Day Intra-year Analysis

Intra-year analysis of the fourteen days after September 11th for 1999, 2000, 2001 and 2002 were conducted. The analysis procedure was identical to the aforementioned intra-year analysis procedure, with the exception that the fourteen day dichotomous before/after variable was used.

Inter-year analysis

Finding a statistically significant change in suicide rates after September 11th, 2001 was only important to this study if such a change was unique to 2001 in its size and direction. In
order to determine how suicide trends in 2001 compared to 1999, 2000 and 2002, an inter-year regression was conducted. This model included the interaction terms for year multiplied by the before/after variable. These interaction terms indicated if the change in before and after rates varied by year. By excluding the 2001 interaction term from the model, the results indicated differences between the 2001 trends and the trends of the other test years.

Fourteen day, inter-year analysis

Earlier research indicated that the two weeks after September 11th, 2001 may be of particular interest, so a regression was conducted, following the previously discussed inter-year regression model. However the dichotomous fourteen day variable was used in place of the dichotomous before/after variable.

Control for Population Increase

There are several intervening factors which could affect the outcome of any statistical analysis which must be taken into consideration. First, for any inter-year analysis, population size must be controlled. This was done by converting daily suicide counts, which is how the data is naturally stored in the CDC database, into suicide rates. This conversion was accomplished by dividing the daily suicide count for each day by that day’s population estimate, as projected using Census Bureau data, and multiplying by 10,000,000.
CHAPTER 6
RESULTS

Intra-year Regression Model: 1999

The first model in the 1999 regression (table 1) regressed daily suicide rate upon the dichotomous temporal before/after variable. As mentioned, the one hundred days prior to September 11th, 1999 were coded as 0 and the one hundred days after coded as 1, with September 11th included in the after group. The temporal before/after variable is significant at the .05 confidence interval, with a significance test score of .001. A regression coefficient of -0.172 indicates a statistically significant decrease in suicides in the one hundred days following September 11th, 1999, as compared to the one hundred days before. Alone, the before/after variable explains 5.4% of the variance in suicide rate. This result was expected given previous research by Massing and Angermeyer (1985), which indicated a seasonal trend in suicide, with lower rates in fall and winter as compared to spring and summer.

The second and final model involves the interaction term which is comprised of the before/after variable multiplied by the continuous temporal variable. This variable does not add significantly to the model, as its significance test score is .707. This result indicates that the slope of the suicide trend after September 11 is statistically identical to the slope of the suicide trend before September 11th.

Intra-year Regression Model: 2000

Like the 1999 regression, model one in the year 2000 regression (table 1) regressed daily suicide rate upon the before/after variable. Before/after was significant at the .05 confidence interval, with a significance test score of .017. A regression coefficient of -.122 indicates a drop
in suicide rates in the after time period as compared to the before time period. Before/after alone accounts for 2.4% of the variance in suicide rates.

In the second model for year 2000, the interaction term is not significant as its significance test score is .223, which indicates that the slope of the suicide trend after September 11 is not statistically different from the slope of the suicide trend before September 11th in 2000.

Intra-year Regression Model: 2001

As before, the first model of 2001 (table 3) regressed daily suicide rates upon the before/after variable. Before/after was significant at the .050 confidence interval, with a significance test score of .005. A regression coefficient of -0.156 indicates a drop in the suicide rate in the one hundred days following September 11th, 2001, as compared to the one hundred days before. Before/after alone explains 3.9% of the variance in suicide rate, which is demonstrated by an r-squared value of .039.

The second and final model adds the interaction term which is comprised of the before/after variable multiplied by the continuous temporal variable. This variable, like in the preceding regressions, does not add significantly to the model, as its significant test score is .254, which indicates that the slope of the suicide trend after September 11 is statistically identical to the slope of the suicide trend before September 11th in 2001. This is an important result because it indicates that although suicides did decrease after September 11th, they did not decrease at a faster or slower pace than before.
Intra-year Regression Model: 2002

The final intra-year regression model follows the same pattern as the previous three. The first model (table 1) regressed daily suicide rate upon the before/after time variable. Before/after was significant at the .05 confidence interval as the significance test score was .003. A regression coefficient of -0.175 indicates a slight drop in suicides in the post September 11th period as compared to the pre September 11th period. With an r-square value of .040, this model explains 4.0% of the variance in suicide rates.

The second and final model adds the interaction term which is comprised of the before/after variable multiplied by the continuous temporal variable. Unlike the previous regressions, the interaction term for this model is significant at the .05 confidence interval, with a significance test score .048. This indicates that in 2002, the slope of the suicide trend after September 11th was steeper than before, evidenced by a regression coefficient of -0.004.

Inter-year Regression Model

The purpose of this regression was to determine if any trend seen in 2001 was different from trends in 1999, 2000, and 2002. Three interaction terms were created by multiplying the three year variables by the before/after variable, and were included in the regression with the separate year variable and before/after variable, also day of the week was controlled for (table 2).

The first model regressed suicide rate upon the before/after variable. Before/after was significant at the .05 confidence interval, evidenced by its significance test score of .000. The regression coefficient was -.153, indicating a collective drop in suicides in the one hundred days after September 11th 1999, 2000, 2001 and 2002, as compared to the one hundred days before. This supports the findings of the intra-year regressions, as it makes sense that if each year
separately demonstrated a drop that they would do so collectively as well. Where a day falls within the test period (before or after) explains 3.9% of the variance (r-square value of .039).

Day of the week controls were added in the second model to neutralize any variance resulting from the fact that September 11\textsuperscript{th} fell on a different day in each year in question. Six of the seven day of the week dummy variables (Monday was used as the excluded variable) were included in the second model. The result was no change in the significance of the before/after variable, as significance remained at .000. Day of the week, did however, explain 2.2% more of the variance than the previous model, bringing total variance explained to 6.1%.

The final model in this regression included the year dummy variables and interaction terms. Dummy variables for 1999, 2000, and 2002 were added, and 2001 excluded. Like wise, the before/after by year interaction terms were included for each year, excluding 2001. The 1999, 2000 and 2002 interaction terms proved insignificant, with significance test scores of .831, .657 and .791 respectively. This finding, combined with the earlier regressions, indicates that the overall suicide trends in 2001 are no different than the trends in 1999, 2000, and 2002, and of key importance to this study.

Fourteen Day Intra-year Regression Model: 1999

The first model of the 1999 regression model (table 3) regressed daily suicide rates upon the fourteen day before/after variable. Fourteen day before/after was significant at the .001 confidence interval. A regression coefficient of \(-0.395\) indicates a drop suicide rates in the fourteen days following September 11th, 1999, as compared to the one hundred days before. Fourteen Day before/after alone explains 11.7% of the variance in suicide rate, which is demonstrated by an r-squared value of .117.
The second and final model adds the interaction term, which is comprised of the fourteen day before/after variable, multiplied by the continuous temporal variable. This variable, like in the preceding regressions, does not add significantly to the model, which indicates that the slope of the suicide trend in the fourteen days after September 11th, 1999 is statistically identical to the slope of the suicide trend before September 11th 1999.

Fourteen Day Intra-year Regression Model: 2000

The first model of the 2000 regression (table 3) regressed daily suicide rates upon the fourteen day before/after variable. Fourteen day before/after was not significant. This indicates that there was no statistically significant change in suicide rates in the fourteen days following September 11th, 2000, as compared to the one hundred days before.

The second and final model adds the interaction term, which is comprised of the fourteen day before/after variable, multiplied by the continuous temporal variable. This variable is significant at the .05 confidence interval, which indicates that the slope of the suicide trend in the fourteen days after September 11th, 2000 is statistically different from the slope of the suicide trend before September 11th 2000. This is an interesting finding, however, given it contradicts findings from the 1999 fourteen day intra-year regression.

Fourteen Day Intra-year Regression Model: 2001

The first model of the 2001 regression (table 3) regressed daily suicide rates upon the fourteen day before/after variable. Fourteen day before/after was significant at the .05 confidence interval. A regression coefficient of -0.240 indicates that there was a statistically
significant drop in suicide rates in the fourteen days following September 11th, 2001, as compared to the one hundred days before.

The second and final model adds the interaction term which is comprised of the fourteen day before/after variable multiplied by the continuous temporal variable. This variable is not significant, which indicates that the slope of the suicide trend in the fourteen days after September 11th, 2001 is not statistically different from the slope of the suicide trend before September 11th 2000.

Fourteen Day Intra-year Regression Model: 2002

The first model of the 2000 regression (table 3) regressed daily suicide rates upon the fourteen day before/after variable. Fourteen day before/after was not significant. This indicates that there was no statistically significant drop in suicide rates in the fourteen days following September 11th, 2002, as compared to the one hundred days before.

The second and final model adds the interaction term, which is comprised of the fourteen day before/after variable, multiplied by the continuous temporal variable. This variable is not significant, which indicates that the slope of the suicide trend in the fourteen days after September 11th, 2000 is not statistically different from the slope of the suicide trend before September 11th 2002.

Fourteen Day Inter-year Regression Model

The fourteen day inter-year regression was similar to the previously discussed inter-year regression model. The only difference was rather than using the before/after variable, the dichotomous fourteen day variable was used in the regression and in constructing the interaction
terms. The results of this regression were similar to the earlier inter-year regression. Of the three interaction terms, none were significant, indicated that the difference in the fourteen day period after September 11th 2001 as compared to the one hundred days before was not significantly different than the difference found in 1999, 2000, and 2002. The significance test scores for the 1999, 2000, and 2002 interaction terms were .227, .237 and .110 respectively (table 4).
CHAPTER 7
CONCLUSIONS

Conclusions

If one only examined the first model of the 2001 intra-year regression (table 3), they might conclude that the September 11th terrorist attacks did in fact induce a statistically significant decrease in suicides. After all, suicide rates regressed upon the before/after variable indicated a decrease of -0.156 between the before and after September 11th groups, with a significance test score of .005. These initial results seemed to support a Durkheimian model and perhaps were proof of communal bereavement’s lack of effect. The second model, however, called this assumption into question, as the interaction term indicated that the downward trend after September 11th, 2001 was no greater or smaller than the trend before September 11th, 2001. Also, these initial findings are not enough to draw a full conclusion as Massing and Angermeyer (1985) demonstrated such a seasonal decrease in suicide in previous research, independent of a nationally disturbing event.

Comparison of the 2001 intra-year regression to the intra-year regressions of 1999, 2000, and 2002 paints a clearer picture. Although there was a significant decrease in suicides in the one hundred days after September 11\textsuperscript{th}, 2001, such a decrease also exists in 1999, 2000, and 2002. The difference in suicide rates in the one hundred days before September 11th, and one hundred days after, in 1999, 2000, 2001 and 2002 were -0.172, -0.122, -0.156, and -0.175 respectively. All were significant decreases, but all were also statistically indistinguishable from one another as the inter-year analysis demonstrated. The inter-year interaction terms showed that the difference in suicide rate before and after September 11\textsuperscript{th}, 2001, does not differ significantly from the difference in suicide rates seen in 1999, 2000, and 2002. This finding is hugely
important as it shows that the trend in suicide rates in 2001 does not differ from the other years tested.

The suicide rates of the fourteen days after September 11\textsuperscript{th} 2001 were also not significantly different than the other test years. Of the three interaction terms, none were significant, indicating that the difference in the fourteen day period after September 11\textsuperscript{th} 2001 as compared to the one hundred days before was not significantly different than the difference found in 1999, 2000, and 2002.

To conclude: the September 11th, 2001 terrorist attacks did not cause a significant increase or decrease in suicide rates in the days following the attack. Although a change in suicide rates did occur after the attacks, the change also occurred in other proximate years and is not unique in strength or direction to 2001. Furthermore, the difference in suicide rate between the fourteen days after September 11th 2001, as compared to the one hundred days before, does not differ significantly from the same difference in 1999, 2000, and 2001.

**Discussion: Durkheim**

The results of this study do not support Durkheim’s egoistic theory of suicide. Durkheim predicted that a great national disturbance would increase shared sentiment, thus reducing egoism and ultimately suicides. This did not happen, however, after the September 11\textsuperscript{th} terrorist attacks. There are multiple possible explanations for why Durkheim’s predication did not come true in the case of the September 11\textsuperscript{th} terrorist attacks.

It could be argued that the September 11\textsuperscript{th} terrorist attacks, though tragic, do not rise to the level of a “great social disturbance”. Durkheim did not create a specific list of events, which should be accompanied by a decrease in suicide; rather, he created a broad definition including
disturbances which generate national sentiment, increased national and political faith and patriotism. This expansive definition is shown in *Suicide*, as Durkheim examines a broad range of events such as coups d’etat, election crisis and national wars. It is a given that Durkheim did not mention a sudden terrorist attack as a possible test event, however, as long as such attacks are accompanied by increased national sentiment, patriotic tendencies and the like, they meet the definition of “great social disturbance”. There is strong evidence, stated earlier, to support the assertion that the September 11th terrorist attacks were followed by increased national sentiment, patriotism and national/political faith, namely a ten percentage point increase in respondents who said that they were "extremely" proud to be American following the attacks (Wellner 2002), high approval ratings for both the president and congress (Pew 2002), and evidence indicating that 74% of individuals interviewed had engaged in some type of patriotic flag related behavior (Skitka 2005).

It is possible that the two hundred day timeframe used in studying September 11th was not in line with what Durkheim had in mind regarding great national disruptions. However, as Pope points out, Durkheim did not specify what the duration time of a great disruption is, or how levels of integration might change over time (1967: 97). As such, one must look at the examples Durkheim himself used in writing *Suicide*. In examining political crisis Durkheim examined between two months, in the case of the parliament electoral crises of 1877, to several years, when dealing with war. The two hundred days of this study fit within that time frame.

One could argue that the time frames Durkheim studied were based on the actual duration of the events in question, which is a sound argument since the electoral crisis actually took months to resolve and the wars lasted years. One could also argue that since Durkheim studied prolonged events, and September 11th was only one day, that perhaps the decreased suicide rates
which were expected would not occur. However, to refute this notion, one needs but to consider what Durkheim was ultimately concerned with. Durkheim’s concern was not the events themselves, but rather the social integration they generated, as such, as long as September 11th continued to cause a swelling of political sentiment and cohesion beyond the day of the attacks, it remains a viable target for study. As mentioned several times throughout this paper, the increase in political sentiment was notable and prolonged.

Given that the terrorist attacks meet Durkheim’s definition of a “great social disturbance”, what else could explain the lack of decreased suicide? It is possible Durkheim’s original egoistic framework is poorly formulated in regards to political integration. Pope (1976) demonstrated that Durkheim’s findings are suspect in several locations, especially regarding coups de’etat, wherein suicide data during coups de’etat do not support the existence of a decrease in egoistic suicide (p 94). Pope also concludes that Durkheim, even when presenting data which supports suicide decreases during great wars and electoral crisis, only samples a relatively low number of events, which makes it difficult to draw any viable conclusions. Marshall’s study on suicide during World War II also weakens evidentiary support for Durkheim’s theory, as he found no substantial decrease in suicides during the war (1981).

If Durkheim’s theory is wrong, then where does the error lie? Perhaps it is possible that individuals who are so poorly integrated into society lack the social networks and collective sentiment to be affected by a great national disruption in the first place. In order for an individual to become further engaged in the political cohesion following the attacks, one must have at least a minimal level of integration. Shared sentiment over the attacks grew out of individuals engaging each other about the events; talking to loved ones, co-workers, or even strangers. Individuals who are likely to commit suicide as a result of extreme lack of integration,
could also conceivably lack the “critical mass” of integration needed to be helped by the political integration others experienced after the attacks.

**Discussion: Communal Bereavement**

The September 11th terrorist attacks did not result in an increase in suicides. This result does not support the communal bereavement hypothesis, but there are several reasons for why this might be the case. It is important to point out that the original communal bereavement hypothesis, as presented by Catalano and Hartig, does not actually predict an increase in suicide. Communal bereavement theory does, however, predict increased stress in the national population, and it is that increased stress which was expected to cause an increase in suicides. Evidence supporting an increase in stress in the public after the terrorist attacks is mixed. Silver et al. (2002) found an increase in post traumatic stress symptoms, whereas Schlenger et al. (2002) did not. The results of this study may reflect that Schlenger et al.’s study more accurately reflected the stress rate in the public, as no increased suicides would be explained if there was in fact no increase in stress.

**Discussion: Possible Economic Trends**

The inter-year analysis indicated an interesting trend in suicide rates. In both the fourteen day inter year analysis and standard one hundred day analysis, 1999 and 2000 demonstrated statistically fewer suicides than did 2001. This is evidenced by the fourteen day inter-year regression coefficients of -.185 for 1999 (significant at the .05 confidence interval) and -.168 for 2000 (significant at the .01 confidence interval), and the one hundred day regression coefficients of -.127 for 1999 (significant at the .05 confidence interval) and -.168 for 2000 (significant at the
.01 confidence interval). Such changes may be accounted for by general economic conditions being better in 1999 or 2000, and can be dealt with in future research using economic controls.

Also, the fourteen day inter-year analysis, as well as the fourteen day 1999 intra-year analysis revealed that 1999 experienced a sizeable drop in suicides, as compared to the other years (-.395 for 1999 compared to -.020, -.250 and .00866 for 2000, 2001 and 2002 respectively). Such a decrease may be explained by improved economic conditions in September of 1999, and may be reduced using future economic controls.

Limitations of the Research: Mutual Cancellation

Given Durkheim and communal bereavement predict opposite impacts of the September 11th terrorist attacks, there is the possibility that each worked to cancel the other out, resulting in no change in the suicide rates. Both Durkheim and communal bereavement impact the same group of individuals: people with limited social networks. As such, it is possible that both Durkheim and communal bereavement influenced suicide rates, just in opposite directions. Communal bereavement and Durkheim would not have to cancel each other out perfectly in order to produce no change, but rather, would have to work against each other within the statistical margin of error. Possible evidence against mutual cancellation lies within contradictory evidence of communal bereavement’s impact on nation wide stress levels, as Silver et al. found evidence for such a stress increase, where as Schlenger did not. If stress levels did not increase nation wide as a result of the September 11th terrorist attacks, then suicides would not have increased.

An argument also exists, formalized by Pope (1967), that Durkheimian theory may contradict itself, independent of communal bereavement. Pope demonstrates how Durkheimian
theory can be argued to predict a decrease in suicides during a sudden economic downturn (depression), when classically it would predict an increase, using increased integration as a rebuttal to increased anomie. During a depression, people may become more integrated as they connect with other people who are in an equally unfortunate situation, and could likewise join in a common sentiment to work towards overcoming the depression. Likewise, Pope argues that great national disturbances can result in crises, which could lead to increased suicides, a point which is affirmed by Durkheim as he pointed out increased suicides prior to the French Revolution (54). Given the internal contradiction of Durkheim, it is possible that a lack of decreased suicides could be explained solely through Durkheim’s own model without communal bereavement.

**Fourteen Day Test**

The fourteen day regression was conducted to determine if the fourteen days after September 11th experienced a significant change in suicide rates. Knudsen et al. (2005), as evidence for communal bereavement, found that depressive symptoms increased in the fourteen days after September 11th, making that time frame of particular interest. No significant change was found, however, indicating that although depressive symptoms may have increased, it did not affect suicide rates. Had an increase in suicides been found it would have supported communal bereavement theory, however, since no such increase was found, this research offers no support.
Future Research

This research project could be duplicated using various national events as the focus. The recent Katrina hurricane disaster stands out as a prime example of what a follow up research project could focus on. Also, future research could focus on suicide trends after the Oklahoma City attacks, as the event was similar to the September 11th terrorist attacks. As mentioned earlier, mutual cancellation is a possibility in this research project. To avoid such a confound in the future, a multilevel research approach could be adopted. First, events which represent communal bereavement only could be analyzed separately from Durkheim only events. For instance, the death of Princess Diana would fit Catalano and Hartig’s framework for a communal bereavement event, but fall outside of the classical Durkheim framework. The death of Princess Diana would be expected to be followed by communal bereavement, but not integration as it does not represent a “great national disturbance or great war” as presented by Durkheim. Secondly, the first Gulf War could be analyzed as a Durkheim only event, as it represents a national military action but is not accompanied by extreme tragedy which represents a failure of the system to keep people safe, as would be required for communal bereavement. Lastly, this research design could end with this current research project: analysis of an event which represents both the possibility of communal bereavement and Durkheimian reduction in egoistic suicide. Such an approach would serve to independently verify the validity of each theory separately, and then see how they may interact on a single event.

There were natural limitations in the CDC data, as racial, geographic and socioeconomic information was not included. This area of interest would benefit greatly if future research analyzed suicide rates along racial, geographic and socioeconomic lines, so a more in-depth data set would have to be created. Even though Durkheim’s theories and communal bereavement are
broad theories, applying to societies as a whole, it would be interesting to see how suicide trends vary along the previously mentioned strata. Also, future research would benefit from the implementation of economic controls in the regression models, especially the inter-year regression, as such controls would help to neutralize any economic effect on suicide rates.
References


Durkheim, Emile. 1897. [1951]. Suicide. The Free Press.


<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Constant</td>
<td>2.908***</td>
<td>2.892***</td>
<td>2.868***</td>
<td>2.852***</td>
</tr>
<tr>
<td></td>
<td>(.036)</td>
<td>(.073)</td>
<td>(.036)</td>
<td>(.072)</td>
</tr>
<tr>
<td>Before/after</td>
<td>-0.172**</td>
<td>-0.173</td>
<td>-.122*</td>
<td>0.01496</td>
</tr>
<tr>
<td></td>
<td>(.051)</td>
<td>(.102)</td>
<td>(.051)</td>
<td>(.101)</td>
</tr>
<tr>
<td>Continuous</td>
<td>-</td>
<td>-0.00032</td>
<td>--</td>
<td>0.00031</td>
</tr>
<tr>
<td>Time</td>
<td>---</td>
<td>(.001)</td>
<td>---</td>
<td>(.001)</td>
</tr>
<tr>
<td>Before/after</td>
<td>-</td>
<td>0.00067</td>
<td>--</td>
<td>0.00212</td>
</tr>
<tr>
<td>* continuous</td>
<td>---</td>
<td>(.002)</td>
<td>---</td>
<td>(.002)</td>
</tr>
<tr>
<td>time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r-squared</td>
<td>0.054**</td>
<td>0.054*</td>
<td>0.028*</td>
<td>0.048*</td>
</tr>
<tr>
<td>statistic</td>
<td>201</td>
<td>201</td>
<td>201</td>
<td>201</td>
</tr>
</tbody>
</table>

Note: numbers in parentheses are standard errors.
*p<.05; **p<.01; ***p<.001
Table 2. Inter-year Regression

<table>
<thead>
<tr>
<th>Suicide Rate</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Constant</td>
<td>2.974***</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
</tr>
<tr>
<td>Before/after</td>
<td>-0.156***</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
</tr>
<tr>
<td>Sunday</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>Tuesday</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>Wednesday</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>Thursday</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>Friday</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>Saturday</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>1999</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>2000</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>2002</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>1999 * before/after</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>2000 * before/after</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>2002 * before/after</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
</tr>
<tr>
<td>r-square statistic</td>
<td>0.039***</td>
</tr>
<tr>
<td>N</td>
<td>804</td>
</tr>
</tbody>
</table>

Note: numbers in parentheses are standard errors.
* p<.05; **p<.01; ***p<.001
Table 3. **Fourteen Day Intra-year Regression Models**

<table>
<thead>
<tr>
<th>Suicide Rate</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Constant</td>
<td>2.906***</td>
<td>2.883***</td>
<td>2.868***</td>
<td>2.852***</td>
</tr>
<tr>
<td></td>
<td>(.036)</td>
<td>(.071)</td>
<td>(.034)</td>
<td>(.068)</td>
</tr>
<tr>
<td>Fourteen Day</td>
<td>-0.395***</td>
<td>-0.372</td>
<td>-0.020</td>
<td>0.327</td>
</tr>
<tr>
<td>Before/after</td>
<td>(.102)</td>
<td>(.216)</td>
<td>(.095)</td>
<td>(.179)</td>
</tr>
<tr>
<td>Continuous</td>
<td>---</td>
<td>-0.00045</td>
<td>---</td>
<td>-0.00031</td>
</tr>
<tr>
<td>Time</td>
<td>---</td>
<td>(.001)</td>
<td>---</td>
<td>(.001)</td>
</tr>
<tr>
<td>14 Day</td>
<td>---</td>
<td>0.00038</td>
<td>---</td>
<td>0.04713*</td>
</tr>
<tr>
<td>Before/after</td>
<td>---</td>
<td>(.024)</td>
<td>---</td>
<td>(.020)</td>
</tr>
<tr>
<td>continuous</td>
<td>r-squared statistic</td>
<td>0.117***</td>
<td>0.118**</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>114</td>
<td>114</td>
<td>114</td>
<td>114</td>
</tr>
</tbody>
</table>

Note: numbers in parentheses are standard errors.
* p<.05; **p<.01; ***p<.001
Table 4. Fourteen Day Inter-year Regression

<table>
<thead>
<tr>
<th>Suicide Rate</th>
<th>Models 1</th>
<th>Models 2</th>
<th>Models 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.974***</td>
<td>3.007***</td>
<td>3.068***</td>
</tr>
<tr>
<td></td>
<td>(.020)</td>
<td>(.048)</td>
<td>(.054)</td>
</tr>
<tr>
<td>Fourteen Before/after</td>
<td>-.153**</td>
<td>-.152**</td>
<td>-.212**</td>
</tr>
<tr>
<td></td>
<td>(.057)</td>
<td>(.056)</td>
<td>(.108)</td>
</tr>
<tr>
<td>Sunday</td>
<td>---</td>
<td>-0.0327</td>
<td>-0.0327</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(.067)</td>
<td>(.066)</td>
</tr>
<tr>
<td>Tuesday</td>
<td>---</td>
<td>0.0378</td>
<td>0.0378</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(.068)</td>
<td>(.066)</td>
</tr>
<tr>
<td>Wednesday</td>
<td>---</td>
<td>0.04366</td>
<td>0.0437</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(.068)</td>
<td>(.066)</td>
</tr>
<tr>
<td>Thursday</td>
<td>---</td>
<td>-0.0161</td>
<td>-0.0161</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(.068)</td>
<td>(.066)</td>
</tr>
<tr>
<td>Friday</td>
<td>---</td>
<td>-0.092</td>
<td>-0.0925</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(.068)</td>
<td>(.066)</td>
</tr>
<tr>
<td>Saturday</td>
<td>---</td>
<td>-.172*</td>
<td>-0.172**</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(.068)</td>
<td>(.066)</td>
</tr>
<tr>
<td>1999</td>
<td>---</td>
<td>---</td>
<td>-0.127*</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>(.054)</td>
</tr>
<tr>
<td>2000</td>
<td>---</td>
<td>---</td>
<td>-0.168**</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>(.054)</td>
</tr>
<tr>
<td>2002</td>
<td>---</td>
<td>---</td>
<td>0.0512</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>(.054)</td>
</tr>
<tr>
<td>1999 * 14 before/after</td>
<td>---</td>
<td>---</td>
<td>-0.185</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>(.153)</td>
</tr>
<tr>
<td>2000 * 14 before/after</td>
<td>---</td>
<td>---</td>
<td>0.181</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>(.153)</td>
</tr>
<tr>
<td>2002 * 14 before/after</td>
<td>---</td>
<td>---</td>
<td>0.245</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
<td>(.153)</td>
</tr>
</tbody>
</table>

r-square statistic

<table>
<thead>
<tr>
<th></th>
<th>Models 1</th>
<th>Models 2</th>
<th>Models 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>456</td>
<td>456</td>
<td>456</td>
</tr>
</tbody>
</table>

Note: numbers in parentheses are standard errors.

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