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CELEBRITY, MEDIA, AND SUICIDE

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Abstract

There is ample evidence that celebrity suicides may induce copycat suicides, with media coverage playing a critical role in mediating this relationship. This paper builds an economic model to explain this putative link based on the identity theory of Akerlof and Kranton (2000). The empirical analysis, using a Poisson regression model, demonstrates that Korean celebrity suicides, as well as media exposure to suicide stories, significantly increase suicide rates, especially for females and younger age groups. These findings provide some policy implications for media guidelines and their implementation in preventing suicides.

JEL: D03, Z13, Z18

1. INTRODUCTION

The "Werther effect" is a term coined by sociologist David Phillips in 1974 to describe the copycat phenomenon, whereby people copy other people's behavior. Ample evidence for copycat suicides exist in many countries, especially following the suicides of well-known public figures.[1]

The lives and behavior of celebrities become topics of great interest to others in society as media exposure increases (Morton, 1997). Through frequent media exposure, audiences come to feel that they know celebrities by their appearance, gestures, conversations, and conduct, despite having had no direct communication with them (Giles and Maltby, 2003; McCutcheon *et al*., 2002; Rubin and McHugh, 1987). In this way, celebrities become models with which some people identify, influencing their beliefs and behavior.[2] When a celebrity suicide occurs, people who are already in a vulnerable psychological state (i.e., suicidal people) may commit suicide by imitating the suicide of this "model" celebrity.

The impact of celebrity suicides on copycat suicides and the role of the media in this relationship have been studied intensively. Korea, too, paid attention to this phenomenon after seeing a dramatic increase in suicides following the suicide of actress Jinsil Choi in 2008.[3] However, few studies have examined the specific case of Korea, except for Lee and

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[1] After an episode of a popular TV drama showed a character perform deliberate self-poisoning with paracetamol, 20% of interviewed patients in emergency and psychiatric services said the drama had influenced their decision to overdose. Self-poisoning increased by 17% in the week following the broadcast and by 9% in the second week (Hawton, Simikin, Deeks et al. 1999). After a newspaper report in Hong Kong about a suicide involving the method of burning charcoal in a confined space, there was a dramatic increase in suicides using the same method, with the prevalence of such deaths rising from 0% to 10% within three years (Lee, Chan, Lee, and Yip, 2002).

[2] Boon and Lomore (2001) claimed that 59% of people who answered a survey said a celebrity had an influence on their attitudes or beliefs.

[3] Ms. Jinsil Choi was an icon of South Korean prime-time TV dramas. She committed suicide in October 2008 at the age of 39. On the day after her death, three women committed suicide in exactly the same manner as Choi, by hanging themselves with medical bandages. That year, October was the month with the highest number of

Hong (2012) and Jeong et al. (2012). Therefore, we examine the impact of celebrity suicides and media coverage on copycat suicides.

In this paper, we develop a model of a person's decision to commit suicide by considering the copycat effect in the context of identity theory and the role of media coverage. A regression approach is employed for empirical analysis, using data from the time period 1997-2009. We find that Korean celebrity suicides, and not non-Korean celebrity suicides, significantly increase suicide rates. The effect is larger for younger and female groups; this finding is consistent with the previous literature. However, the middle-aged group, considered stable and less susceptible to copycat suicides in previous studies, was also found to be vulnerable to celebrity suicides in Korea. Moreover, we find that the media play an important role in transmitting news of celebrity suicide events and inducing copycat suicides.

The contribution of this paper to the extant literature is three-fold. First, it is the first economic model to incorporate "identification with a celebrity" into a utility framework for suicide decision-making. Second, it is one of the few to investigate the presence of copycat suicides using data from Korea. Third, the use of a regression approach lends more credibility to the findings, as it controls for potentially confounding factors in suicides.

2. LITERATURE REVIEW

Many studies, mostly in the field of sociology, have investigated the impact of media coverage on copycat suicides. Most human behavior is learned observationally through modeling (Bandura, 1977). For copycat suicide behavior to occur, two fundamental conditions should be met (Bandura, 1986; Blood and Pirkis, 2001; Niederkrotenthaler et al., 2010; Stack, 1992): First, an individual identifies a model—this may be a friend from the

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suicides; there were 65% more suicides compared with September (calculated by authors).

individual's surroundings or a well-known figure in literature or the media—and imitates the model's behavior. Second, a society harbors a group of psychologically vulnerable or suicidal individuals. When these two conditions are satisfied, exposure to suicides in one's surroundings or to reports of suicides in the media may push an already vulnerable and suicidal individual to imitate the behavior.

Stack (1987) classifies individual identifications into two categories: horizontal and vertical. The former kind of identification is formed with people who are socially similar. The latter kind, meanwhile, is formed with the famous, rich, or other non-ordinary groups, such as celebrities.

Direct interaction with celebrities is not necessary to activate vertical identification. Through frequent media exposure, people come to feel that they "know" a celebrity (McCutcheon et al., 2002; Rubin and McHugh, 1987; Giles and Maltby, 2003). In the sociological literature, this type of attachment to celebrities is referred to as "para-social relationships" (Roberts, 2007). The behaviors of, and events surrounding celebrities influence common people's feelings and behaviors (Rubin and McHugh, 1997). This explains the importance of the media in building para-social relationships and magnifying the influence of celebrities.

Numerous studies have examined the impact of media coverage on copycat suicides (Hawton and Williams, 2002; Pirkis et al., 2006; Stack, 2005). Based on the notion of a "dose response mechanism," an increase in the amount of coverage of a suicide is correlated with an increase in the copycat effect. From the identification perspective, the impact of a suicide news item on copycat suicide depends on the degree of identification between the model and the observer (Stack, 1987, 1989, 1990, 1996; Wasserman, 1984). Hence, demographic characteristics such as similarity in age, gender, occupation, or other characteristics are expected to correlate with the copycat effect; this would be in line with the horizontal

identification theory. On the other hand, based on the concept of vertical identification, celebrity suicide tends to increase the copycat effect given that people are more inclined to identify with people of higher status than with those of lower status (e.g., criminals). Even if the degree of identification is not strong at first, news stories may strengthen the degree of identification and at the same time bring greater disutility, leading to a higher risk of suicide.

As mentioned earlier, celebrity suicides tend to motivate copycat suicides in vulnerable people. According to Hamermesh and Soss (1974), a "vulnerable individual" can be described as a person whose utility is close to a threshold level, *b*, where he (or she) is indifferent about being alive or dead (by committing suicide). However, they did not consider the influence of other behaviors on the decision to commit suicide in their utility framework. Akerlof and Kranton (2000) formally introduced the salient role of identity and interaction with members of society in an individual's decision-making process. The term "identity" describes how people feel about themselves (i.e., self-image) in association with social categories. People achieve utility gains (losses) when their behavior conforms with (departs from) the norms for particular social categories. Chen and Li (2009) provided empirical evidence that group identity matters in in-group members' utility and behavior. However, no economic research has linked identity (or identification with a celebrity) to an individual's decision to commit suicide. Therefore, this paper aims to fill this gap by providing a theoretical model and empirical evidence.

3. MODEL AND DATA

3.1 Theoretical Framework

Hamermesh and Soss (1974) were the first to develop an economic theory of suicide. In their model, individual *j* commits suicide if his (or her) discounted expected lifetime utility (U_j) decreases below a certain threshold (b_j).

(1) Hamermesh ad Soss (1974) model: $U_j = U_j(a_j, Y_{P_j}) < b_j$

where U_j is the present value of individual j's expected lifetime utility at age (a_j) and permanent income (P_j), and where b_j is an exogenously given random variable. Under the assumption that individual j's utility decreases with age but increases with permanent income, they hypothesize that the suicide rate increases with age but is inversely related to permanent income. Since this pioneering work, much empirical research has attempted to examine how socioeconomic factors affect suicide. However, there has been no theoretical work to model how identity/identification may lead to suicide and, further, what role media coverage may play in the process.

Akerlof and Kranton (2000) were the first to introduce identity (I_j) into a neoclassical utility function, where individual j's utility depends on his identity (I_j), as well as his actions (act_j) and others' actions ($act\text{-}_j$). Further, his identity depends on his assigned social category (c_j), how closely his own characteristics ε_j match the ideal characteristics for his assigned category, and his expected behavior (P). This P is a prescription or norm for behavior.

(2) AK (2000) mode: $U_j = U_j(act_j, act_{-j}, I_j)$ *where* $I_j = I_j(act_j, act_{-j}; c_j, \varepsilon_j, P)$

Chen and Li (2009) extended the concept of an individual's identity to group identity. In their study, group identity (or social identity) is defined as a person's sense of self or identity derived from perceived membership in a (social) group. This group identity influences the decision-making of group members, but not non-group members. To show the impact of group identity on preference and, hence, utility, Chen and Li (2009) extended Charness and Rabin's (2002) social preference model.

In their model, individual's utility is the weighted average of his own (monetary) payoffs

and others' payoffs, as in Equation (3).

(3) Chen and Li (2009) model: $U_j(\pi_j, \pi_{-j}) = w_j\pi_j + w_{-j}\pi_{-j} \quad where \quad w_{-j} = 1 - w_j$

They reported that the weight on others' payoffs (w_{-j}) is higher when individual -*j* is an in-group member compared with an out-group member.[4] This implies that the stronger an individual's identification to the group, the more significant is its impact on an individual's preference and utility.

In this paper, we modify previous identity theories to illustrate how identification with a celebrity influences a person's decision to commit suicide. First, we assume that individual *j*'s utility (U_j) is the weighted sum of her own utility (u_j), as well as other group members' utilities(u_{-j}), including her celebrities (*jc*), as enumerated in Equation (3). For simplicity, we assume that the weights are zero except for individual *j* and her model, as in Equation (4).

(4) $U_j = U_j(act_j, act_{-j}, I_j; c_j) = w_j u_j(act_j, act_{-j}, I_j; c_j) + w_{jc} u_{jc}(act_{jc}, act_{-jc}, I_{jc}; c_{jc})$

where w_j and w_{jc} are the weights on individual *j*'s own utility and her model's utility, respectively. We assume that w_{jc} is the product of the degree of individual *j*'s identification with celebrity *jc* (ρ_{jc}) and the degree of information transfer from *jc* to *j* through the media (v_{jc}): $w_{jc} = \rho_{jc} v_{jc}$.

Stronger identification with a celebrity increases utility, while weaker identification with

[4] In their experiments, participants were significantly more likely to reward an in-group match for good behavior and less likely to punish an in-group match for misbehavior.

a celebrity decreases utility. In particular, the sudden loss of identification following the suicide of a celebrity may cause greater disutility and ultimately lead to individual *j*'s suicide. This may be especially true for those individuals who are already near or "over the edge" due to other socioeconomic factors; a celebrity suicide may push them to commit suicide. Although it is possible for individual *j* to switch to an alternative celebrity as a model and build identification, this may be difficult to accomplish in the wake of an unexpected celebrity suicide. Indeed, the disutility caused by a celebrity suicide is likely to be greater for those who had stronger identification. When v_{jc} becomes large through media coverage, the impact of the (dis)utility of celebrity *jc* on individual *j* is magnified. This model implies that extensive media coverage of a celebrity suicide may increase an individual's disutility and trigger copycat suicides.

3.2 Empirical Model

To examine copycat effects, previous studies have employed two different methodological approaches. One approach is to use a "before and after" comparative strategy after controlling for seasonal changes for identical periods in earlier years. The other is to use regression analysis with celebrity suicide-related variables, such as celebrity dummy variables or media-related variables. This paper takes the following regression approach:

$$S_{it} = \beta X_{it} + \delta Z_{it} + \gamma T + \varepsilon_{it} \quad (5)$$

where S_{it} is the logarithm of suicide rate for group *i* and time *t*, and *X* is a vector of socioeconomic factors such as real GDP per capita, growth rate of real GDP per capita, Gini coefficient, national birth rate, and divorce rate for the age-gender specific group *i* in period *t*. *T* includes monthly dummy variables and a time trend variable.

Z includes variables of interest: celebrity suicide and/or media news-related variables. Because celebrity characteristics such as nationality, age, and gender may affect the degree of individual identification and, hence, the suicide rate, we include a number of celebrity suicides across nationalities, including Korean and non-Korean. Moreover, we include the number of Korean celebrity suicides by age and gender. The total number of news reports on suicides (*Tnews*), the number of news articles on suicides in national daily newspapers (*Newspaper*), and the number of television broadcast news stories (*TV*) are used as a proxy for the degree of media exposure to suicide stories.

The strength of the regression approach in this paper is to control for relevant socioeconomic factors, such as income and unemployment, which have been proven to increase the risk of committing suicide. After controlling for major potential confounding factors, the findings have substantially increased credibility. We use a Poisson regression model to analyze the data, a regression method that is often used to describe rare count data with a small number of observations or events, such as rare diseases or crime incidents.

3.3 Data

Individual-level suicide data and population data covering the time period 1997-2009 were obtained from Statistics Korea. Detailed demographic information on suicide victims such as age, gender, occupation, marital status, and education were included in the data set. Monthly suicide rates for each group (i.e., gender-age group) were calculated by the ratio of the number of suicides to the population of that group.

Tables 1 and 2 show the publicized suicides that were obtained for two groups of suicide victims: (1) Korean celebrities and (2) non-Korean celebrities. A list of celebrity suicides was constructed by searching the website *Mediagaon* (www.mediagaon.or.kr). Mediagaon is an internet portal provided by the Korea Press Foundation that contains articles

from the Korean Integrated Newspaper Database System (KiNDS), content from the Korean Press Foundation, and more than 20 Korean-media related organizations, media groups, and websites. A search was conducted on Mediagaon using the keywords "suicide" and "celebrities"; a total of 22 celebrity suicides were obtained during the sample period 1997-2009,[5] including 15 Korean celebrities and 7 international celebrities. Moreover, monthly totals for the number of news articles on suicides were obtained through KiNDS in Mediagaon. By searching the keyword "suicide," the total number of news items, the number of news articles in national daily newspapers, and the number of news reports on television were obtained as a proxy for the degree of media exposure to suicides.

The economic variables used in the regression analysis, such as GDP per capita, GDP growth rate, unemployment rate, and Gini coefficients, as well as demographic variables such as birth rate and divorce rate, were also obtained from Statistics Korea. All of these represent annual data for the pooled population.

The descriptive statistics displayed in Tables 3,4 and 5 show three important trends: Korea's suicide rate increased over the time period 1997-2009; the male suicide rate was much higher than the female suicide rate; and as people became older, the suicide rate increased. Table 6 presents a summary of descriptive statistics related to the media variables and other major socioeconomic variables.

To form an initial impression of the association between suicides and media coverage, three figures are provided. Figure 1 illustrates that both the total number of news items regarding suicide and the number of male and female suicides increased over the relevant period. Peaks in the number of news items on suicide (green color) seem to be followed by

[5] Other lists of celebrity suicides are also considered.

peaks in both male and female suicide rates. Figure 2 shows a similar pattern between the number of Korean celebrity suicides and the number of suicides among men and women; there appears to be no association, however, between the number of non-Korean celebrity suicides and the number of suicides. Finally, in Figure 3, the total number of news items on suicides appears to be highly correlated with Korean celebrity suicides, but there appears to be no correlation with non-Korean celebrity suicides.

4. EMPIRICAL RESULTS

We investigate the impact of media coverage on suicide and celebrity suicides by applying Poisson regression methods to pooled, gender-specific, and age-gender specific data.

4.1 Pooled Regression Estimation

We examine how individuals' exposure to suicide news in the media affects the suicide rate. To measure the degree of media exposure to suicide-related events or stories, we use the total number of news items, number of television news stories, and number of newspaper articles on suicide. Then, we regress the logarithm of the suicide rate on media-related variables, as well as other socioeconomic variables. The Poisson distribution is assumed as the underlying distribution due to its advantages in handling count data for rare events and skewed distributions typically found in phenomena such as suicide, crime, or rare diseases.[6] Table 7 shows that media exposure to suicide news stories is related to an increase in suicide rates. As the magnitude of the effect depends on the level of media exposure, the odds ratios are calculated.[7] The odds ratio in column 2 is the ratio of the suicide rates at the maximum

[6] We also tried a logistic regression model to analyze the data and obtained similar estimation results as with the Poisson regression.

[7] The odds ratio is calculated by taking an exponential function of the corresponding coefficient for a

level of media exposure relative to the average level of media exposure. The odds ratio in column 3 is the ratio of suicide rates at the maximum level relative to the minimum level. All of the odds ratios are significantly larger than 1 (the null value), which implies that greater media exposure to suicide news items leads to higher suicides rates. For instance, the suicide rate at the maximum number of suicide news items is almost 70% higher than that at the average level. This number becomes much larger, roughly 85%, in column 3, which examines maximum media exposure relative to minimum media exposure. We also find that newspaper articles on suicide have a greater impact than television news reports, although these media variables are highly correlated.[8] Stack's (2005) meta-analysis showed that research findings based on television suicide coverage were 79% less apt to report an imitative effect than those based on newspaper stories. While a television news report on a suicide incident can pass relatively quickly without much notice, newspapers articles on suicides can be saved and reread. According to Stack (2003) physical copies of relevant newspaper stories have often been found near the bodies of suicide victims in the wake of media coverage of suicide. Our results are also in line with these findings.

These estimation results confirm the influence of media on people's decision-making vis-à-vis committing suicide. Although many studies have shown a similar dynamic in European countries, the U.S., and Japan, this paper is the first to report the influence of media coverage of suicide by applying statistical regression analysis to Korean data.[9] In particular,

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binominal variable case. However, as the media variables in our analysis are continuous variables, we multiply the values of those continuous variables with the corresponding coefficients. For instance, for the odds ratio of suicide rates when the total number of news items is maximum relative to the average number is $exp(0.0002 \cdot (3{,}390\text{-}565))$, where the coefficient of the total number of news items is 0.0002 and the maximum and average of the total number of news items are 3,390 and 565, respectively.

[8] The correlation coefficient between the number of television news stories and newspaper articles is 0.53. The correlation between the total number of news items and television news is 0.88; the correlation coefficient between the total number of news items and newspaper articles is 0.79.

[9] For a detailed literature review, please refer to Gould *et al.* (2003).

this paper overcomes the problem of causality found in previous studies, as this study controls for potential confounding socioeconomic factors in the statistical analysis of the relationship between media coverage and suicide

Furthermore, we examine the impact of celebrity suicides on suicide rates. We take into account the nationality and gender of celebrities who committed suicide. Table 8 shows that Korean celebrity suicides increase suicide rates in Korea, while non-Korean celebrity suicides do not have any impact on suicide rates in Korea. The odds ratio indicates that one Korean celebrity suicide increases suicide rates by about 15.5%; a foreign celebrity suicide has little impact on suicide rates. This finding is consistent with Stack (1987; 1996), who showed that suicides of foreigners did not trigger copycat suicides in the U.S. and Japan, respectively. This implies that people tend to identify themselves with celebrities of the same nationality. However, it also may simply reflect less exposure to suicide stories in the case of non-Korean celebrities.

We also find that the impact of Korean male celebrity suicides on suicide rates is around 21.1%, which is larger than the impact of Korean female celebrity suicides, which is around 10%. Thus, people might have had a greater sense of kinship with Korean male celebrities who committed suicide. However, it is also possible that male celebrities who committed suicide were more influential than female celebrities who committed suicide. On the other hand, regardless of celebrity gender, people might have identified more with the reasons behind the suicides of male celebrities. These theoretical postulations need to be explored in future studies.

Our results show that both media coverage of suicide and Korean celebrity suicides increase suicide rates significantly. We also find that media coverage of suicide and celebrity suicides are highly correlated. That is, when there is a celebrity suicide, there are, on average, 966 news reports on suicide compared with an average of 528 news reports on suicide when

there is no celebrity suicide. When there is a Korean celebrity suicide, there are, on average, 1,072 news reports on suicide compared with an average of 710 news reports on non-Korean celebrity suicides and non-celebrity suicides. This implies that the media tend to cover celebrity suicides more heavily, especially Korean celebrity suicides. Therefore, the influence of media coverage of suicide may have originated mainly from Korean celebrity suicides.

Given this evidence of the media's influence on suicides, we cannot overstate the role of media coverage. The media can have a positive or negative influence on suicide. Indeed, the influence of the media in society may be more easily modifiable than some other factors that contribute to suicide, such as genetic vulnerability or even financial difficulties (Hawton and Williams, 2001). Therefore, many countries have established media guidelines to strengthen the possible preventive effects of appropriate reporting of suicide in the news media (Gould *et al*, 2003).[10] Korea also has established media guidelines in the reporting of suicides.

Regarding the relationship of economic variables to suicide, the GDP growth rate is negatively associated with suicide rates, while the unemployment rate is positively associated with suicide rates. Regarding the relationship of demographic variables, the birth rate is negatively associated with suicide rates, but the divorce rate is positively associated with suicide rates. However, the Gini coefficient as a proxy for income inequality shows a negative association with the suicide rate. Seasonal effects were observed in the data from March to October. This finding is consistent with Stack (1996), who reported seasonal effects in Japanese data from March to June, August, and October. U.S.-based studies also find a

[10] According to the International Association for Suicide Prevention, a number of countries have established guidelines for media coverage of suicides, including Australia, Austria, Belgium, Canada, England, Germany, Hong Kong, India, Ireland, Japan, New Zealand, Northern Ireland, Norway, Scotland, the UK, and the U.S.

peak in suicide numbers in the spring (Lester, 1992). According to Stack (1982), the spring is symbolic of a new "beginning" for many people; this may make individuals with suicidal ideations feel more vulnerable and isolated.

4.2 Gender-Specific Regression Estimation Results

The impact of celebrity suicide and media coverage may differ between genders; this is also known as effect modification. Thus, separate Poisson regressions were conducted for male and female groups. Regarding the impact of media coverage of suicide, Table 9 offers evidence that female suicides are more responsive to media exposure. For instance, regarding the total number of news items on suicides, the odds ratio between the maximum to minimum exposure is 1.647 for males and 2.255 for females. This result is consistent with the extant literature. Motto (1970) showed that females are more responsive to newspaper stories on suicide, and Stack (2005) demonstrated that studies focusing on female suicides were 4.89 times more likely to report a copycat effect than other studies. One hypothesis is that women may be more exposed to media, as women tend to spend more time at home. On the other hand, women are also more likely to experience depression and face a higher risk of committing suicide; therefore, the same degree of media exposure to suicides may result in more suicides for females. Recently, the Korean Ministry of Health and Welfare (MHW) reported on an in-depth survey of 6,022 people over the age of 18. One in six Koreans reported experiencing mental illness in 2011; about 4.3% of surveyed women and 1.8% of surveyed men suffered from major depressive disorder.[11] People with depression are known

[11] According to the U.S. National Iinstitute of Mental Health, depression affects twice as many women as men, regardless of racial and ethnic background or income. Depression can put women at risk of sui cide. While more men than women die from suicide, women attempt suicide about twice as often as men do. Census data from Statistics Canada in 2009 also reported that 16% of women and 8% of men from the ages of 15 to 64 suffer from depression.

to have a greater risk of committing suicide. In the same survey, 32% of women had suicide ideation, and 49.6% of women who attempted suicide suffered from mood disorders.

Table 10 shows the impact of a celebrity's nationality on the suicide rate. We find that, while non-Korean celebrity suicides have little impact on suicide rates in Korea, Korean celebrity suicides increase suicide rates by 10% for males and by 26% for females in Korea. Furthermore, when the gender of a Korean celebrity is taken into account, the male suicide rate is more sensitive to Korean male celebrity suicides, but is not very sensitive to Korean female celebrity suicides. However, the female suicide rate is sensitive to both Korean male and female celebrity suicides, with a somewhat larger magnitude in the case of male celebrity suicides. Men may identify themselves with the same gender, which is consistent with findings in the literature. However, women seem to be more receptive and able to identify with a celebrity regardless of gender.

4.3 Age-Gender Specific Regression

A certain (sub) group of people may have a greater degree of identification with celebrities or be more receptive and, hence, may be more influenced by the media or celebrity suicides. Thus, we examine the impact of media exposure on suicides across age-gender groups. Table 11 shows the coefficients of the media-related variables, as well as the corresponding odds ratios in each age-gender group. All coefficients are significantly positive, which means that media exposure increases the suicide rate. As in the pooled and gender-specific regression results, we find that newspaper articles have a stronger impact on suicide than television news and that women are more responsive to media exposure than men. The new finding is that younger male groups are more susceptible to media influence. On the other hand, among females, the media impact is the strongest for the 25-44 age group, followed by the 0-24, 65 and above, and 45-64 age groups.

Regarding the influence of celebrity suicides, Table 12 shows that Korean celebrity suicides increased suicide rates for all age-gender groups, except among males aged 65 and above. The magnitudes are larger for the 0-24 and 25-44 age groups relative to the other age groups. Younger age groups tend to be more affected by Korean celebrity suicides. In addition, across age groups, females are more susceptible to Korean celebrity suicides than males. For instance, in the 0-24 and 25-44 age groups, the female suicide rate increased approximately 45% with respect to a Korean celebrity suicide, while the male suicide rate increased approximately 20%. In the 45-64 and 65-and-above age groups, the same patterns exist, although the impact attenuates. On the other hand, non-Korean celebrity suicides do not have any impact on suicide rates, except among females aged 65 and above.

Therefore, our results are consistent with Phillips and Carstensen (1988) and Stack (1991) in that younger people show greater susceptibility to media coverage of suicide and celebrity suicide. Young people are generally considered to be emotionally susceptible and impulsive. In Korea, according to Statistics Korea, suicide is the leading cause of death among young people in the age groups of 10-19, 20-29, and 30-39, followed by transportation accidents and cancer.

On the other hand, Stack (1991, 2005) suggests that middle-aged individuals may be the least susceptible to copycat suicides because they are highly integrated into society through marriage and family and have higher income and lower unemployment relative to other age groups. However, our estimation results based on Korean data show that middle-aged people are also susceptible, although the magnitudes are smaller. This may reflect the specific circumstances of middle-aged Koreans who suffered from economic difficulties, especially after the nation's financial crises in 1997 and 2007, as such experiences could have led to family troubles and depression, leading to higher suicide rates.

Further, when the characteristics of celebrity, age, and gender are considered together, we do not find a specific pattern. Table 13 shows that, regardless of the gender or age of the celebrity suicide victim, Koreans tend to have emotional identification with celebrity suicides.

5. CONCLUSION

In this study, we examine the relationships among celebrity suicides, media coverage of suicide, and copycat suicides in the general populace. We apply a Poisson regression to Korean data from the period 1997-2009. The list of celebrity suicides and suicide-related news items from both television and newspapers were identified via *Mediagaon*, which is an internet portal site provided by the Korea Press Foundation

The results show that celebrity suicides and media coverage of suicide significantly increase suicide risk, especially for female groups and younger age groups. Moreover, the nationality of a celebrity matters. These results are mostly consistent with the existing literature. One exception is that, in Korea, middle-aged groups also show a higher risk of suicide as a result of celebrity suicides and media exposure. This finding may be attributable to the fact that, during the sample period (1997-2009), Korea experienced two financial crises, in 1997 and 2007; these crises affected the entire country, regardless of age and gender.

The paper's findings regarding the significant impact of media coverage of suicide in Korea underline the need for greater scrutiny regarding the role of Korean media. Korea, ranked first among OECD countries for suicide rate, established media guidelines for the reporting of suicides in 2004. However, according to a report by the Ministry of Health and Welfare, 52.3% of television reports and 47.5% of newspaper reports on suicides from January 2011 to August 2012 violated the media guidelines. The violation rate has been increasing along with the suicide rate. More efforts must be made to rein in media reports on suicide that do not meet existing guidelines.

The contribution of this paper is three-fold. First, we develop an economic model of suicide by incorporating the identity theory. In our model, identification with a celebrity and exposure to celebrities' actions through the media are considered in explaining suicide decision-making among ordinary people. Second, this paper is one of the few existing studies that show evidence of a copycat suicide effect in Korea. Third, this paper is the first to apply a rigorous regression analysis by taking into account potential confounding socioeconomic factors; this provides greater credibility to the results. However, more detailed characteristics of media reports – such as the degree of sensationalism in suicide coverage, the inclusion of "how-to" descriptions, the divulging of suicide methods, and the glorification of suicide or of people who commit suicide – are not covered in this paper. Thus, future research is required to provide deeper understanding and analysis regarding effective media guidelines and suicide policies.

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TABLE 1
List of Korean Celebrity Suicides

Name	Date of Death (Year/Month/Day)			Gender	Occupation	Method	Age At Death
Deok Jang	1990	2	4	F	Singer	Overdose	29
Sung Jae Kim	1995	11	20	M	Singer	Overdose	23
Kwang-seok Kim	1996	1	6	M	Singer	Hanging	31
Ji-won Seo	1996	1	1	F	Singer	Overdose	19
Mong-Hun Chung	2003	8	4	M	CEO	Jumping	54
Eun-joo Lee	2005	2	22	F	Actress	Hanging	24
U-Nee	2007	1	21	F	Singer/Actress	Hanging	25
Da-bin Chung	2007	2	10	F	Actress	Hanging	26
Jaehwan Ahn	2008	9	8	M	Actor	Gas poison	36
Jin-sil Choi	2008	10	2	F	Actress	Hanging	39
Chae won Jang	2008	10	3	F	Entertainer	Hanging	26
Ji-hoo Kim	2008	10	6	M	Model/actor	.	23
Seo-hyun Lee	2008	12	1	M	Singer	Hanging	29
Suk-Gyun Kim	2009	1	17	M	Actor	Hanging	30
Ja-yeon Jang	2009	3	7	F	Actress	Hanging	29
Chang Young Lee	2009	3	12	M	Singer	Hanging	37
Seung-yeon Woo	2009	4	27	F	Actress	Hanging	24
Moo-Hyun Roh	2009	5	23	M	Former President	Jumping	62
Daul Kim	2009	11	19	F	Model	Hanging	20

TABLE 2
List of non-Korean Celebrity Suicides

Name	Date of Death (Year/Month/Day)			Gender	Occupation	Method	Age At Death	Nationality
Kurt Cobain	1994	4	5	M	Singer	Gunshot	27	US
Pauline Chan	2002	7	31	F	Actress	Jumping	30	China
Shreesha Karki	2002	10	29**	F	Actress	Unknown	24	Nepal
Leslie Cheung	2003	4	1	M	Singer/Actor	Jumping	46	HongKong
Heath Ledger*	2008	1	22	M	Actor	Overdose	28	Australia
Ito Takahiro	2009	3	8	M	Actor	Gas poison	22	Japan
Stephanie Parker***	2009	4	18(19)	F	Actress	Hanging	22	UK
David Carradine*/***	2009	6	3(4)	M	Actor	Unknown	72	US
Jia Hongsheng	2010	7	5	M	Actor	Jumping	43	China
Makinoda Aya	2010	10	23	F	Actress	Jumping	30	Japan
Matsumoto Yuri	2010	11	15	F	Singer/Actress	Hanging	42	Japan

Notes: *controversial cases, ** the date of the news reports on his/her suicide, *** two dates exist because the reporting dates are different in his (or her) home country and the place of death.

TABLE 3
Annual Data on Total Number of Suicides and National Suicide Rate (per 100,000 people)

Year	Total Number of Suicides	Suicide Rate
1997	6,075	13.22
1998	8,646	18.68
1999	7,075	15.18
2000	6,460	13.74
2001	6,933	14.64
2002	8,631	18.12
2003	10,932	22.84
2004	11,523	23.99
2005	12,047	25.03
2006	10,688	22.13
2007	12,215	25.21
2008	12,891	26.52
2009	15,455	31.70

TABLE 4
Average Annual Suicide Numbers and Rates by Gender, 1997-2009 (per 100,000 people)

	Total number of suicides	Suicide Rate
Male	6,731	28.01
Female	3,235	13.60
Average	9,967	20.84

TABLE 5
Average Annual Suicide Numbers and Rates by Age and Gender, 1997-2009 (per 100,000 people)

Age Group	Gender	Total Number of Suicides	Suicide Rate
0-24	Male	479	6.64
	Female	363	5.59
25-44	Male	2,322	27.28
	Female	1,173	14.52
45-64	Male	2,448	46.79
	Female	753	14.13
65 and above	Male	1,481	88.87
	Female	946	37.20

TABLE 6
Descriptive Statistics for Media Coverage and Socio-Economic Variables

Variable	N	Mean	S.D.	Maximum	Mininum
Population (unit: 1,000)	156	47,614	875	48,746	45,953
Total Number of News	156	564.808	516.614	3,390.000	109.0
-Television News	156	64.929	138.312	1,199.000	0.000
-Newspaper Articles	156	277.788	139.487	1,002.000	87.000
GDP per capita (unit:1,000 won)	156	16,652	2,546	20,131	12,457
GDP growth rate	156	4.231	3.901	10.700	-5.700
GINI coefficient	156	0.304	0.019	0.345	0.268
Unemployment rate	156	3.985	1.206	7.000	2.600
Divorce rate	156	0.003	0.000	0.003	0.002
Number of Korean Celebrity Suicides	156	0.096	0.337	2.000	0.0
-N of Korean Male Celebrity	156	0.045	0.208	1.000	0.000
-N of Korean Female Celebrity	156	0.051	0.221	1.000	0.000
Number of Non Korean Celebrity Suicides	156	0.045	0.208	1.000	0.000

TABLE 7
Pooled Regression: Exposure to Media and Suicide

	Variables of Media Exposure on Suicide Stories		
	Number of News (*Aggnews*)	Number of Newspaper articles (*Newspaper*)	Number of Television News (*TVnews*)
Media Variable	0.0002***	0.0007***	0.0003***
	(0.000)	(0.000)	(0.000)
GDP per capita	0.0000	0.000	0.000
	(0.000)	(0.000)	(0.000)
GDP growth rate	-0.0182***	-0.014**	-0.019**
	(0.001)	(0.001)	(0.001)
GINI coefficient	-4.3877***	-1.666***	-4.749***
	(0.654)	(0.657)	(0.664)
Unemployment rate	0.1090***	0.069***	0.075***
	(0.007)	(0.006)	(0.007)
Birth rate	-0.4919***	-0.349***	-0.347**
	(0.053)	(0.053)	(0.053)
Divorce rate	20.9402*	-59.245***	32.416***
	(11.592)	(11.980)	(11.640)
Trend	-0.0544***	0.027*	0.032*
	(0.017)	(0.017)	(0.018)
Intercept	96.180***	-65.579**	-75.116**
	(34.476)	(32.644)	(34.697)
m1	-0.0287*	-0.023	-0.049**
	(0.015)	(0.015)	(0.015)
m2	0.0926***	0.098***	0.075***
	(0.015)	(0.015)	(0.015)
m3	0.2476***	0.255***	0.257**
	(0.014)	(0.014)	(0.014)
m4	0.3195***	0.309***	0.327***
	(0.014)	(0.014)	(0.014)
m5	0.3498***	0.357***	0.357***
	(0.014)	(0.014)	(0.014)
m6	0.3028***	0.312***	0.302**
	(0.014)	(0.014)	(0.014)
m7	0.2718***	0.276***	0.264**
	(0.014)	(0.014)	(0.014)
m8	0.2828***	0.277***	0.279***
	(0.014)	(0.014)	(0.014)
m9	0.2410***	0.261***	0.238**
	(0.014)	(0.014)	(0.014)
m10	0.2325***	0.248***	0.262***
	(0.014)	(0.014)	(0.014)
m11	0.1048***	0.102***	0.112***
	(0.015)	(0.015)	(0.015)
Odds Ratio[a] (Max vs. Mean)	1.698	1.605	1.387
Odds Ratio[b] (Max vs. Min)	1.849	1.818	1.414

Notes: 1. m1-m11 are monthly dummy variables. 2. The standard errors are in parentheses. *, **, *** indicate significance at the 10% level, 5% level, and 1% level, respectively. 3. [a]The odds ratio is calculated by taking an exponential function of the multiplication of the value of the variable and the corresponding coefficient. As the media-related variables are continuous, we multiply the coefficients with the difference between the maximum and average of the media-related variables and take the exponential of the result. For instance, the odds ratio of suicide rates in the case of the total number of news items is 1.689, where $exp(0.0002 \cdot (3{,}390\text{-}565)) = 1.698$, the coefficient of the total number of news items is 0.0002, and the maximum and average of the total number of news items are 3,390 and 565, respectively. [b]The odds ratio is the ratio when the media-related variable has the maximum value relative to the minimum value.

TABLE 8

Pooled Regression: Suicide and Celebrity Suicide

Parameter	Estimate	Parameter	Estimate
N of Korean Celebrity Suicides	0.144*** (0.008)	N of Korean Male Celebrity Suicides	0.191*** (0.012)
		N of Korean Female Celebrity Suicides	0.095*** (0.013)
N of non-Korean Celebrity Suicides	-0.011 (0.014)	N of non-Korean Celebrity Suicides	0.000 (0.014)
GDP per capita	0.000 (0.000)	GDP per capita	0.000 (0.000)
GDP growth rate	-0.017 (0.001)	GDP growth rate	-0.017 (0.001)
GINI coefficient	-3.444 (0.659)	GINI coefficient	-3.406 (0.659)
Unemployment rate	0.051 (0.006)	Unemployment rate	0.054 (0.006)
Birth rate	-0.327 (0.052)	Birth rate	-0.353 (0.052)
Divorce rate	36.770 (11.664)	Divorce rate	31.307 (11.720)
Trend	0.066 (0.016)	Trend	0.061 (0.016)
Intercept	-142.743 (32.399)	Intercept	-132.733 (32.504)
Odds Ratio			
N of Korean Celebrity Suicides	1.1549	N of Korean Male Celebrity Suicides	1.211
N of non-Korean Celebrity Suicides	0.989	N of Korean Female Celebrity Suicides	1.100
		N of non-Korean Celebrity Suicides	1.000

Notes: 1. All of the coefficients of socioeconomic variables, including monthly dummies, are significant at the 1% level.
2. All monthly dummies are included in the model.

TABLE 9
Gender-Specific Regression: Suicide and Media

	Variables of Media Exposure on Suicide Stories					
	Number of News (*Aggnews*)		Number of Newspaper articles (*Newspaper*)		Number of Television News (*TVnews*)	
	Male	Female	Male	Female	Male	Female
Media Variable	0.0002 (0.000)	0.0002 (0.0000)	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)
GDP per capita	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
GDP growth rate	-0.017 (0.001)	-0.019*** (0.002)	-0.014*** (0.001)	-0.013*** (0.002)	-0.018*** (0.001)	0.020*** (0.002)
GINI coefficient	-4.929 (0.791)	-3.293*** (1.163)	-2.660*** (0.794)	0.231 (1.173)	-4.909*** (0.804)	0.505*** (1.180)
Unemployment rate	0.099 (0.008)	0.122*** (0.011)	0.068*** (0.007)	0.067*** (0.011)	0.065*** (0.009)	0.091*** (0.012)
Birth rate	-0.531 (0.064)	-0.422*** (0.095)	-0.417*** (0.063)	-0.231*** (0.094)	-0.404*** (0.064)	0.238*** (0.094)
Divorce rate	26.444 (14.038)	7.824 (20.581)	-40.877*** (14.507)	98.101*** (21.262)	34.754*** (14.095)	24.453 (20.668)
Trend	-0.011 (0.021)	-0.128*** (0.030)	0.051*** (0.020)	-0.015 (0.029)	0.070*** (0.021)	-0.033 (0.031)
Intercept	10.975 (42.120)	241.023*** (60.222)	-112.970*** (39.783)	17.228 (57.323)	150.240*** (42.450)	52.649 (60.440)
Odds Ratio (Max vs. Mean)	1.537	2.014	1.497	1.827	1.238	1.699
Odds Ratio (Max vs. Min)	1.647	2.255	1.665	2.141	1.253	1.752

Note: All of the monthly dummies are included in the model.

TABLE 10
Gender-Specific Regression: Coefficients and Odds Ratios for Celebrity Suicide Impact on Suicide Rates

		Regression 1		Regression 2	
Gender	Variable	Coefficient	Odd ratios	Coefficient	Odd ratios
Male	N of Korean Celebrity Suicides	0.093***	1.101		
	N of Korean Male Celebrity Suicides			0.159***	1.173
	N of Korean Female Celebrity Suicides			0.024	1.024
	N of Non- Korean Celebrity Suicides	-0.015	0.986	0.001	1.001
Female	N of Korean Celebrity Suicides	0.233***	1.262		
	N of Korean Male Celebrity Suicides			0.247***	1.280
	N of Korean Female Celebrity Suicides			0.219***	1.245
	N of Non- Korean Celebrity Suicides	-0.003	0.997	0.000	1.000

Notes: 1. The odds ratio compares the suicide risk when there is a celebrity suicide to that when there is no celebrity suicide. 2. All of the socio-economic variables are controlled for.

TABLE 11

Age- and Gender-Specific Regression: Coefficients and Odds Ratios for the Impact of Media on Suicide Rates

Variable	Gender	Age	Coefficient	Standard Error	Odds Ratio max-mean	Odds Ratio max-min
Total Number of News	All	0-24	0.0003	0.0000	2.2303	2.5384
		25-44	0.0003	0.0000	2.2604	2.5783
		45-64	0.0001	0.0000	1.4831	1.5805
		65-	0.0001	0.0000	1.2459	1.2909
	Male	0-24	0.0003	0.0000	2.1452	2.4263
		25-44	0.0002	0.0000	1.8409	2.0314
		45-64	0.0001	0.0000	1.4402	1.5275
		65-	0.0001	0.0000	1.2054	1.2423
	Female	0-24	0.0003	0.0000	2.3338	2.6758
		25-44	0.0004	0.0000	2.9568	3.5220
		45-64	0.0002	0.0000	1.6172	1.7476
		65-	0.0001	0.0000	1.3138	1.3730
Number of Television News	All	0-24	0.0005	0.0001	1.7278	1.7827
		25-44	0.0005	0.0000	1.7233	1.7779
		45-64	0.0001	0.0000	1.1837	1.1952
		65-$^{+}$	0.0001	0.0001	1.1598	1.1697
	Male	0-24	0.0005	0.0001	1.7955	1.8567
		25-44	0.0003	0.0001	1.4142	1.4426
		45-64	0.0001	0.0001	1.1592	1.1690
		65-$^{+}$	0.0000	0.0001	1.0237	1.0251
	Female	0-24	0.0004	0.0001	1.6495	1.6974
		25-44	0.0007	0.0001	2.2658	2.3744
		45-64	0.0002	0.0001	1.2636	1.2807
		65-	0.0003	0.0001	1.4102	1.4382
Number of Newspaper Articles	All	0-24	0.0009	0.0001	1.9448	2.3172
		25-44	0.0009	0.0000	1.9585	2.3379
		45-64	0.0005	0.0000	1.4616	1.6153
		65-	0.0003	0.0000	1.2782	1.3636
	Male	0-24	0.0008	0.0001	1.7439	2.0191
		25-44	0.0007	0.0000	1.6699	1.9114
		45-64	0.0005	0.0000	1.4361	1.5798
		65-	0.0004	0.0001	1.2969	1.3888
	Female	0-24	0.0011	0.0001	2.2274	2.7506
		25-44	0.0006	0.0001	1.5440	1.7312
		45-64	0.0006	0.0001	1.5440	1.7312
		65-	0.0003	0.0001	1.2525	1.3291

Note: + indicates that these coefficients are not significant. All others are significant at the 1% level.

TABLE 12
Age- and Gender-Specific Regression: Odds Ratios for the Impact of Korean vs. Non-Korean Celebrity Suicides

		Korean		Non-Korean	
All	0-24	1.329	***	0.935	
	25-44	1.304	***	0.976	
	45-64	1.085	***	0.972	
	65-	1.026	*	1.037	
Male	0-24	1.221	***	1.021	
	25-44	1.195	***	0.974	
	45-64	1.072	***	0.978	
	65-	0.997		1.007	
Female	0-24	1.458	***	0.833	*
	25-44	1.464	***	0.985	
	45-64	1.124	***	0.952	
	65-	1.075	*	1.085	

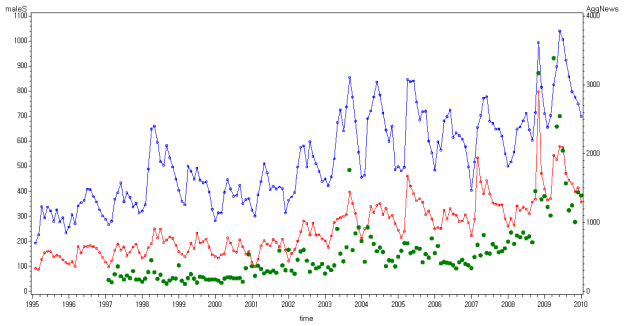
Note: *, **, *** indicate the significance level at the 10% level, 5% level, and 1% level, respectively.

TABLE 13
Age- and Gender-Specific Regression: Coefficients and Odds Ratios for the Impact of Celebrity Suicides

		Korean						Non-Korean	
		Same Age -Gender		Same Age -Diff.Gender		Rest			
Male	0-24	1.618	***	1.053		1.167	***	1.054	
	25-44	1.045	**	1.155	***	1.230	***	1.000	
	45-64	1.185				1.056	***	0.990	
	65-					0.997		1.007	
Female	0-24	0.895		1.475	***	1.473	***	0.838	**
	25-44	1.420	***	1.180	***	1.439	***	0.994	
	45-64			1.193	**	1.115	***	0.959	
	65-					1.075	***	1.085	**

Notes: 1. For some age-gender groups to which a celebrity who committed suicide does not belong, the coefficients of the corresponding celebrity dummy variables cannot be obtained. 2. *, **, *** indicate significance at the 10% level, 5% level, and 1% level, respectively.

FIGURE 1
Total Number of News Items (both print and television) and Suicides

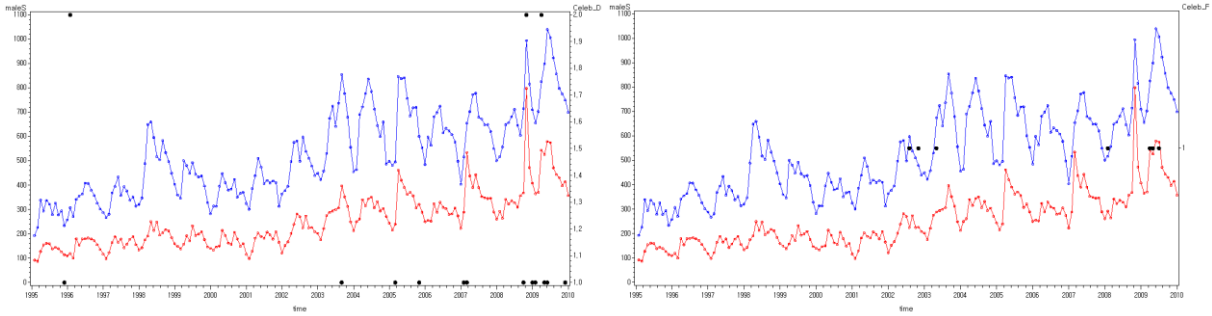


Notes: The top and middle lines indicate the numbers of male and female suicides, respectively. The dots indicate the total number of news items on suicides.

FIGURE 2

Number of Celebrity Suicides and Number of Total Suicides

< Number of Korean Celebrity Suicides > < Number of non-Korean Celebrity Suicides >

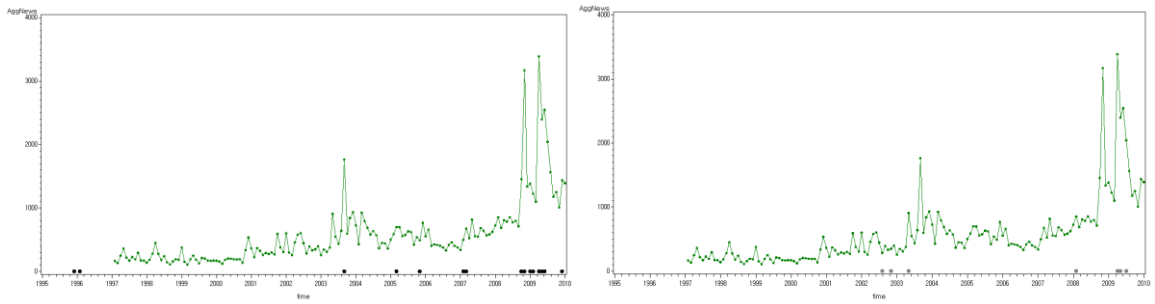


Notes: The upper and lower lines indicate the numbers of male and female suicides, respectively. The dots indicate the number of celebrity suicides.

FIGURE 3

Dates of Celebrity Suicides and Total Number of News Items on Suicides

< Korean Celebrity Suicides > < Non-Korean Celebrity Suicides >



Note: The green line indicates the number of news items on suicides, and black dots indicate celebrity suicide events.