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RESEARCH NOTE

IMITATION AND SUICIDE: A REEXAMINATION OF THE WERTHER EFFECT*

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The study reexamines Phillips's findings regarding the linkage between the appearance of news stories on prominent suicides and the subsequent monthly rise of national suicides—the Werther effect. Extending Phillips's original data set to 1977, and employing the quasi-experimental method, it is found that stories on prominent suicides are likely to trigger a subsequent rise in national suicides. However, this rise may be related to the linkage of suicide with the business cycle, and the fact that more prominent suicides may occur in years when there is a downturn in the economy. This study analyzes suicide rate data with a multivariate time-series model and controls for seasonal effects, the average duration of unemployment and war. No significant linkage is found between the national suicide rate and stories on prominent suicides on the front page of the New York Times. Employing Boorstin's definition of celebrities, the prominent suicides on the front page of the New York Times between 1947 and 1977 are differentiated as celebrity and noncelebrity suicides. Examining only celebrity suicides, it is found that a significant rise in the national suicide rate occurs in the month after a celebrity commits suicide. Suicidal imitation by the public is more selective than originally hypothesized by Phillips.

In many social science disciplines (e.g., psychology, economics, mass communications) there has been an ongoing concern with the question as to whether imitation and suggestibility influence individual behavior. Tarde (1903) argued that all human progress could be explained by imitation. Elites in society (e.g., kings, nobles) initiate patterns of behavior which are emulated by the masses in such areas as fashion and family life (Tarde, 1903:215). In regard to mass public behavior Park and Burgess (1921:419) maintained that elite leaders (e.g., Jeanne d'Arc, Napoleon) influence the behavior of the masses by establishing standards of conduct for them. The process can also be examined among larger social organizations, as illustrated by Walker's (1969, 1971) study of the manner in which American states imitate the public policies of other states. For the study of social deviance Durkheim ([1897] 1951:123–42) defined imitation and suggestion as involving the behavior of individuals not influenced by their intimate social bonds, and examined suicidal data geographically in Denmark, France, Germany and Italy to determine if imitation was operative. If

it were present, one would expect suicide levels to be highest in nuclear centers of the nations (e.g., Paris for France), and then decrease as one moved away from these centers. Durkheim found no such patterning, and concluded that suicide did not involve a moral contagion. Pope (1976:181–84) reexamined Durkheim's analysis, and concluded that he had not adequately tested the imitation hypothesis, since it is not geographical patterning, but whether the suicide of one person triggers other suicides that determines if the process is operative. Employing a quasi-experimental method to examine the influence of suicide stories that appeared on the front page of the *New York Times* between 1947 and 1968 on the subsequent-month suicide patterns, Phillips (1974) formulated a new test of the imitation theory. Contrary to Durkheim, he found a significant rise in the number of suicides in the month after these stories appeared in the *New York Times*. Phillips (1979, 1980a, 1980b, 1982, 1983) has extended his examination of imitation to include homicides, motor vehicle fatalities and airplane accidents.

This paper reexamines Phillips's findings for imitative suicide (the Werther effect), extending the time period from 1968 to 1977. It is shown that Phillips did not adequately specify what type of individual suicides are likely to be imitated. Only the suicides of national celeb-

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rities who provide potential role models for individuals contemplating suicide cause an increase in national suicides. Furthermore, the quasi-experimental methodology comparing the number of suicides in the month after a publicized suicide with the expected number of suicides in that month, determined by averaging suicides in the previous and subsequent year, has two serious weaknesses: (1) it is not a very powerful technique, since it only compares experimental periods with control periods, thereby not utilizing all available information; (2) it does not allow controls for other factors which may simultaneously influence the suicide rate (e.g., the national suicide rate in any particular year is linked with the state of the economy, and a downturn in the economy may significantly influence the expected number of suicides in the month after a publicized story in the *New York Times*).

IMITATION AND SUICIDE

In the context of the study of aggregate suicide, imitation and suggestibility have traditionally been restricted to social actors separated over space and time. It is necessary to distinguish various types of individual suicide¹ that might be imitated. One type of suicide relates to some symbolic or group activity which creates group pressure(s) that cause an individual to kill oneself (a form of altruistic suicide; see Durkheim, [1897] 1951:217–40). Examples publicized by the national media include the suicides of Buddhist monks in Vietnam in 1963 and the suicide of Daniel Burros in 1965 (Phillips, 1974:341–42). A second type that might trigger imitative suicide involves individuals prominent in specialized occupations, e.g., a well-known artist or businessperson. It is possible that such suicides might cause suicide among individuals with similar occupational backgrounds who have experienced crisis or failure. However, this imitation is only likely to occur among a small subgroup of the population. A third category that might trigger imitative suicide is the suicide of national celebrities, i.e., individuals who are well known and recognized by name and pictorial image by the larger American public. These individuals have

usually achieved prominence in an occupation subject to significant public exposure, but some social actors may become celebrities through their social connections with other prominent celebrities (e.g., Jackie Kennedy). The defining characteristic of celebrities is that they are known for being known. Boorstin (1962) sees the development of this human type in modern American society as resulting from the growth of the modern mass media (e.g., the national press, magazines, radio and television), and their projection of a multitude of verbal and pictorial images to the American public.

This study hypothesizes that not all stories about prominent suicides on the front page of the *New York Times* lead to a subsequent increase in suicides, but only stories about the suicides of national celebrities.

METHODOLOGY

Table 1 extends Phillips's (1974:344) findings that relate suicides on the front page of the *New York Times* to subsequent rises in suicide from 1968 to 1977.² Table 1 also indicates whether the persons who committed suicide were national celebrities or not.³ In the original study there was a rise in suicides (observed – expected) in the month after the publicized suicide story in 26 of the 33 cases, and a binomial probability test indicated, under the assumption of independence, that the probability of this number of increases occurring by chance was .00066 (Phillips, 1974:342). Table 1 shows that in 34 of the 46 cases there was a rise in suicides: the probability of this many increases occurring by chance is .00027. The updated results appear to further substantiate Phillips's findings. However, in only 8 of 13 cases after 1969 was there a rise in the number of suicides. The reason is related to the fact

² Bollen and Phillips (1982:804) consider the death of Salvadore Allende, President of Chile, to be a suicide. This story was on the front page of the *New York Times* in September of 1973. Many in the United States believed that his death was murder and not suicide. This study accepts this interpretation, and his suicide is not included in Table 1.

³ Table 1 also included ex-celebrities. For example, in the 1950s Senator William Knowland of California was a national political celebrity, becoming Senate majority leader in 1953 with the death of Senator Robert A. Taft. However, by 1974 he was no longer a national celebrity, as evidenced by the fact that the national news media did not present stories to the public about him. On the assumption of a short collective memory, ex-celebrities are classified as noncelebrities. The means of determining whether an individual is a celebrity or not is illustrated in a subsequent portion of this section of the paper.

¹ It is possible that media presentation of general suicide trends (e.g., increased teenage suicides) could increase suicide levels. However, Bollen and Phillips (1982:803) argue that it is unlikely that such stories trigger imitative suicides. This study accepts this assumption, which explains Stack's (1983) recent finding of no linkage between the 1978 Jonestown massacre and subsequent monthly suicide fluctuations.

Table 1. Rise in the Number of U.S. Suicides after Suicide Stories Publicized on Page 1 of the *New York Times*

Name of Publicized Suicide	Date of Suicide Story	Observed Number of Suicides in Month after Story	Expected Number of Suicides	Rise in U.S. Suicides Observed-Expected
Lockridge, Author	March 8, 1948	1510	1521.5	-11.5
Landis, Film star ^a	July 6, 1948	1482	1457.5	24.5
Brooks, Financier	August 28, 1948	1250	1350	-100.0
Holt, Betrayed Husband	March 10, 1949	1583	1521.5	61.5
Forrestal, Ex-Secretary of Defense ^a	May 22, 1949	1549	1493.5	55.5
Baker, Professor	April 26, 1950	1600	1493.5	106.5
Lang, Police Witness	April 21, 1951	1423	1591.5	-96.5
Soule, Professor	August 4, 1951	1321	1342	-21.0
Ademic, Writer	September 5, 1951	1276	1258.5	17.5
Stengel, N.J. Police Chief	October 7, 1951	1407	1296.5	110.5
Feller, UN Official	November 14, 1952	1207	1220	-22.0
La Follette, Ex-U.S. Senator	February 25, 1953	1435	1412	23.0
Armstrong, Inventor of FM Radio	February 2, 1954	1240	1227	13.0
Hunt, Senator ^a	June 20, 1954	1458	1368.5	89.5
Vargas, Brazilian President ^a	August 25, 1954	1357	1321.5	35.5
Norman, Canadian Ambassador	April 5, 1957	1511	1649.5	-138.5
Young, Financier	January 26, 1958	1361	1352	9.0
Schulper, NYC Councilman	May 3, 1958	1672	1587	85.0
Quiggle, Admiral	July 25, 1958	1519	1451	68.0
Zwillman, Underworld Leader	February 27, 1959	1707	1609	98.0
Bang-Jansen, UN Diplomat	November 27, 1959	1477	1423	54.0
Smith, Police Chief	March 20, 1960	1669	1609	60.0
Gedek, Turkish Minister	May 31, 1960	1568	1628.5	-60.5
Monroe, Film star ^a	August 6, 1962	1838	1640.5	197.5
Graham, Publisher ^a ; Ward, Implicated in Profumo Affair	August 4, 1963	1801	1640.5	160.5
Heyde & Tillman, Nazi Officials	February 4, 1964	1647	1584.5	62.5
Lord, NJ Party Chief	June 17, 1965	1801	1743	58.0
Burros, KKK Leader	November 1, 1965			
Morrison, War Critic	November 3, 1965	1710	1652	58.0
Mott, American Russian Jail	January 22, 1966	1757	1717	40.0
Pike, Son of Bishop Pike	February 5, 1966	1620	1567.5	52.5
Krovchenko, Russian Defector	February 26, 1966	1921	1853	68.0
LoJui-Ching, Chinese Leader	January 21, 1967	1821	1717	104.0
Amer, Egyptian Field Marshall	September 16, 1967	1770	1733.5	36.5
Mayrock, UN Protestor	May 30, 1969	1774	1830.5	-56.5
Rothko, Artist	February 26, 1970	1944	2035.5	-91.5
Twinning, Police Murderer	April 7, 1970	2094	2054.5	39.5
Redmond, Jr. Missionary	July 11, 1970	1887	1868.5	18.5
Mishima, Japanese Author	November 25, 1970	1859	1882.5	-23.5
Cabell, H.S. Principal	March 8, 1972	2130	2125	5.0
Kawabata, Japanese Scientist	April 17, 1972	2176	2131	45.0
Knowland, Ex-U.S. Senator	February 24, 1974	2275	2204	71.0
Gregg, Youth Murdered Parents	February 3, 1975	2130	1950.5	179.5
Mr. and Mrs. Van Dusen, Members Euthanasia Society	February 25, 1975	2382	2265.5	116.5
Ries, Engineer Spy	March 1, 1976	2256	2430	-174.0
Piloscowe, NYC Council Candidate	October 22, 1976	2179	2557	-178.0
Prinze, Entertainer ^a	January 29, 1977	2315	2135.5	179.5
				1395.5

^a Individuals listed in the *New York Times Index* in at least two of the five years preceding their suicide.

that the number of monthly suicides at any time is linked with the state of the national economy, and in the period 1969 to 1977, unlike the earlier 1947 to 1968 period, the national economy was subject to more frequent economic shocks (e.g., the oil embargo of 1973). A number of studies (Pierce, 1967; Brenner, 1976; Vigderhaus, 1977) have shown that the national suicide rate increases with increased unemployment. To illustrate how this economic effect might influence the results in Table 1, consider the particular case of Freddie Prinze. One month after he committed suicide there was a rise in suicides (179.5). However, computations using the quasi-experimental method show that in every month in 1977 there was a rise in expected suicides because of the large decrease in unemployment in 1978 after the previous recession. The quasi-experimental method cannot control for temporal shifts in the level of unemployment. Rather, a multivariate time-series model is required to accomplish this task.

In employing the quasi-experimental method, Phillips examined relative changes in suicide counts between adjacent years. In a more recent study of imitative suicide linked with television news stories, Bollen and Phillips (1982) used daily suicide counts. By contrast, the multivariate time-series technique employed in this study uses months, rather than days or years, as the unit of analysis. A number of studies (Tiao and Wei, 1976; Wei, 1978; Abraham, 1982) show that utilizing larger aggregate units significantly influences the causal relationship between the dependent and independent variables. For example, a study of economic business cycles (Burns and Mitchell, 1946:203–69) showed that the use of yearly rather than monthly data made it impossible to examine cyclical effects. While even smaller time units (e.g., days) yield more accurate results in relation to the cyclical effects, they are subject to high measurement errors. For all trauma (physical injury) deaths, which include suicide, it has been shown (Trunkey, 1983) that these types of death have a trimodal peak, with 50 percent of them occurring instantly, 30 percent within hours of the event, and 20 percent occurring days, weeks or months after the event. By employing monthly rather than yearly data one can better determine the cyclical effects, while by employing monthly rather than daily data one minimizes daily measurement errors.

The two previously cited studies employ frequency counts that either compare relative shifts in suicide (the quasi-experimental method) or examine changes in suicide in a short time period (1972 to 1976). By contrast, this study examines changes in United States suicides in a time period (1947 to 1977) when

there was a significant population growth. In order to control for this population shift the monthly suicide rate rather than the number of monthly suicides is used as the dependent variable. Information on the number of monthly suicides in the United States between 1947 and 1977 (U.S. Public Health Service, 1947–1977) and estimates of the total monthly population of the United States (U.S. Bureau of the Census, 1947–1959, 1979)⁴ were obtained. Employing this information, the monthly suicide rate standardized per 100,000 was computed.

In order to test the previously stated hypothesis, it is necessary to operationalize the concept of a national celebrity. Boorstin (1962:66–73) suggests how to do this in his examination of the changing celebrity status of Charles Lindbergh between 1927 and 1958. Lindbergh was a significant national celebrity until 1942, as shown by the number of stories about him that were listed in the *New York Times Index* between 1927 and 1942. However, after 1942 there were fewer stories about him in the *New York Times*, and by the 1950s almost no stories, indicating that he had become an ex-celebrity.

The *New York Times* yearly index is employed in this study to determine whether an individual who committed suicide between 1947 and 1977, and had the event reported on the front page of the *New York Times*, is a celebrity.

The celebrity status of individual social actors will show a wide range of variation. As an illustration of this variation, consider the number of stories five years prior to the suicides of Marilyn Monroe and George Sanders, two prominent entertainers. Marilyn Monroe was a widely known celebrity, while George Sanders was less well known. Prior to his suicide, three stories about George Sanders appeared in the newspaper, and they were mainly concerned with his movie and stage activities (entertainment-centered). By contrast, there were 28 stories concerning Marilyn Monroe's career activities and private life (marriage, business, illness). A thorough study of individual celebrity status would require the development of a scale differentiating levels of celebrity status. However, this study is only concerned with determining whether an individual is a celebrity or not, and individuals in this study are considered celebrities if any

⁴ Between January 1, 1947, and January 1, 1950, only yearly population estimates are available from the Census Department. However, it is possible to assume uniform population growth within the individual years and estimate by linear interpolation the monthly population.

story about them appears in two of the five years prior to their suicide. This study arbitrarily assumes a five-year collective memory for the American public,⁵ and also arbitrarily assumes that if an individual is mentioned in two of the five years prior to his/her suicide in the *New York Times*, the public will recognize their name.

In order to develop a multivariate time-series model it is necessary to introduce a number of control measures. Although a recent study for the United States between 1933 and 1976 (Marshall, 1981) showed that wars have no effect on the suicide rate after unemployment is controlled, that study employs yearly rather than monthly suicide data. In order to control for possible war effects, a war dummy variable is created such that if a particular month occurs during a war⁶ it is coded as 1, and 0 otherwise. Boor (1981) showed that presidential elections influence national suicides, but Wasserman (1983) demonstrates that no relationship is present after unemployment is controlled, and presidential elections are not considered in this study.

A number of studies (Hamermesh, 1974; Hamermesh and Soss, 1974; Brenner, 1976; Vigderhaus, 1977) have linked the unemployment rate and suicide. However, it is questionable whether the unemployment rate is the best indicator for determining the social consequences of a downturn in the economy. Blalock (1982:251) argues that macro-level measures should be related to the micro-level process they are explaining. Catalano and Dooley (1977) and Brown (1982) show at the micro-process level that the average duration of unemployment is a better predictor of stressful life events, which may lead to suicide, than the unemployment rate. Given this, the average duration of unemployment, determined from government statistics (U.S. Bureau of the Census, 1947–1959; Bureau of Labor Statistics, 1959–1977), is utilized as an indicator of shifts in the business cycle. This variable should be seen as representing a social indicator of aggregate changes, while at the same time better reflecting micro-level processes than does the unemployment rate.

A time-series model⁷ was developed to ex-

amine the linkage between the monthly suicide rate, suicide stories on the front page of the *New York Times* and average duration of unemployment, controlling for seasonal effects, wars and autocorrelation. Previous studies (Brenner, 1976; Eyer, 1977) have shown a distributed lag between economic shifts and national suicide patterns. The Almon (1965) technique is utilized for analyzing the distributed lag. The technique involves fitting the slope coefficients by a finite-length lag polynomial approximation of a specified degree (Johnson, 1972:294–98; Koutsoyiannis, 1973:289–94; Stewart and Wallis, 1981:205–212). To use the Almon technique properly it is necessary to specify a priori the length of the lag (n) and the degree of the polynomial (r). If these restrictions are not valid, the technique produces biased and inconsistent estimates (Schmidt and Waud, 1973:11). As noted, there are reasons to believe that a distributed lag is present between average duration of unemployment and suicide. By contrast, it is not reasonable to assume a lag in monthly terms between front page or celebrity stories and suicide, since Bollen and Phillips (1982:806–809) found, using daily data to examine imitation in relation to television news stories on suicide, only a ten-day lag. The length of the lag for average duration of unemployment was determined by introducing a number of lag terms, and choosing the one (n) which leads to a minimum standard error (Schmidt and Waud, 1973:13). Many studies (e.g., Stewart and Wallis, 1981:208–212) which use this technique employ an endpoint constraint, but this restriction should not be employed without a priori justification (Schmidt and Waud, 1973:12). Since no a priori reasons exist for this study, this constraint is not imposed. With regard to the degree of the polynomial, Gujarati (1978:275–76) has shown that the degree of the polynomial can be determined by an iterative process that compares the significance of the coefficients of the transformed Z values. For example, if one uses a third-degree polynomial and obtains significant coefficients for the transformed Z variable, but finds that the additional coefficients are not significant for the fourth-degree polynomial, one would employ a third-degree polynomial.

Equation (1) indicates the mathematical model employed for relating the monthly suicide rate to the independent variables,⁸

⁵ It is likely that such collective memory is shorter, as illustrated by national political behavior (Hibbs, 1979).

⁶ The war months were between July of 1950 and July of 1953 (the Korean War), and July of 1965 and January of 1973 (the Vietnam War).

⁷ The time-series model in this study is similar to the one employed in a previous work (Wasserman, 1983). The model controls for seasonal effects, and the first-order Cochrane-Orcutt (Orcutt and Cochrane, 1949) technique is found appropriate for removing autocorrelation.

⁸ The following codes are used to define the variables: SUIC = Monthly Suicide rate; JAN = January of a particular year; FEB = February; MAR = March; APR = April; MAY = May; JUN = June; JUL = July; AUG = August; SEP = September; OCT = October; NOV = November; WAR = War months; FRNT = Month after a front-page story on

which includes front page and celebrity stories in the *New York Times*, where B_n is the sum of all the slope coefficients, μ_{t-1} is the error term lagged by one period, ρ is the correlation between the first-order lagged error term, v_t is a random white noise residual error term satisfying the assumptions that its mean value is 0 and it has a constant variance, and W_i 's are the weights for the various lag terms.

$$\begin{aligned} \text{SUIC}_t = & A_0 + A_1 \times \text{JAN}_t + A_2 \times \text{FEB}_t \\ & + A_3 \times \text{MAR}_t + A_4 \times \text{APR}_t \\ & + A_5 \times \text{MAY}_t + A_6 \times \text{JUN}_t \\ & + A_7 \times \text{JUL}_t + A_8 \times \text{AUG}_t \\ & + A_9 \times \text{SEPT}_t + A_{10} \times \text{OCT}_t \\ & + A_{11} \times \text{NOV}_t + A_{12} \times \text{WAR}_t \\ & + A_{13} \times \text{FRNT}_t \\ & + B_n \sum_{i=0}^n W_i \times \text{AVER}_{t-i} + \rho \times \mu_{t-1} \\ & + v_t \end{aligned} \quad (1)$$

A similar type of model is employed to examine celebrity stories in the *New York Times*, replacing FRNT with CELB. FRNT and CELB are dummy variables that determine the influence of front-page suicide stories on the suicide rate, with controls for war, seasonal effects and shifts in the business cycle.

ANALYSIS OF RESULTS

In examining imitative suicide in conjunction with national television stories on suicide, Bollen and Phillips (1982:804–805) employ the quasi-experimental method, and then use regression analysis because of the limited power of the former method. The findings of this study may differ from Phillips's not because he failed to control for economic factors, but because his use of quasi-experimental analysis influenced them. To determine if this is so, the average duration of unemployment is omitted from equation (1). Table 2 indicates the slope coefficients and the t-values. The results show that front-page stories on suicide in the *New York Times* do not trigger subsequent suicide rises when regression analysis is used. Seasonal effects are present, and consistent with other studies (Durkheim, [1897] 1951:119–22; Bollen, 1983), the rates are highest in March, April and May. The results are also consistent with Marshall's (1981) study on the effect of war on suicide, indicating that war has no effect on suicide.

suicide in the *New York Times*; CELB = Month after a front-page story on the suicide of a celebrity in the *New York Times*; AVER_i = Average duration of unemployment (i = the time period of the average duration of unemployment, where i goes from 0 to n). The war variable, the months, the front-page variable and the celebrity variable are all dummy variables.

Table 2. Slope Coefficients and t-values Relating the National Suicide Rate to Front-Page Suicide Stories between 1947 and 1977, Controlling for Seasonal Effects and War

Coefficients	Estimate	t-value
Constant Term	8.74	72.75*
JAN	.33	4.01*
FEB	-.32	-3.00*
MAR	1.03	8.52*
APR	1.08	8.44*
MAY	1.19	8.98*
JUN	.51	3.80*
JUL	.59	4.47*
AUG	.51	3.95*
SEP	.24	1.99
OCT	.48	4.51*
NOV	-.02	-.23
WAR	-.09	-.68
FRNT	.03	.51
ρ		.715
$R^2 = .786$, SE = .420, D-W = 2.020, df = 357.		

* Significantly different from 0 at the .01 level.

Since other studies (e.g., Adams, 1981) demonstrate that average duration of unemployment influences the suicide rate, the omission of this variable from equation (1) causes a specification bias in the findings. Including the variable, and employing the Almon technique, a four-month lag with a first-order polynomial is found to be appropriate for employing the model in equation (1). Table 3 indicates the values of the slope coefficients, the t-values and the weights for the four time periods. The inclusion of average duration of unemployment in the model does not lead to a linkage of front-page stories on suicide and the monthly suicide rate. For the distributed lag it is found that 72 percent of the effect of economic change is felt one month after the shift, a result consistent with Vigderhaus's (1977:42), using the Box-Jenkins technique, that unemployment has an instantaneous impact on suicide.

While front-page stories on suicide have no impact on subsequent suicides, it is possible that celebrity suicides do have an impact. To test this hypothesis, CELB is substituted for FRNT in equation (1). Initially not including AVER into the model, a significant linkage is found between celebrity suicides in the *New York Times* and subsequent suicides. Introducing AVER into the model, Table 4 indicates the values of the slope coefficients, the t-values and the weights, where the model uses a first-order polynomial and a four-month lag for the Almon technique. Publicized celebrity suicides significantly increase subsequent suicides. One can determine the increased number of suicides that result from publicized celebrity

Table 3. Slope Coefficients, t-values and Time-Lag Weights Relating Suicide Rates to the Independent Variables between 1947 and 1977 for Front-Page Suicide Stories

Coefficients	Estimate	t-value	Time Period for the Average Duration of Unemployment	Slope Coefficient Estimate Bi	t-value	Weights
Constant Term	7.85	20.01*	AVER0	.031	1.59	.42
JAN	.34	4.08*	AVER1	.022	2.04	.30
FEB	-.30	-2.75*	AVER2	.015	2.35*	.20
MAR	1.02	8.25*	AVER3	.007	.61	.09
APR	1.04	7.95*	AVER4	-.001	-.07	-.01
MAY	1.12	8.30*				
JUN	.48	3.57*				
JUL	.58	4.33*				
AUG	.51	3.94*				
SEP	.24	2.00				
OCT	.47	4.40*				
NOV	.02	-.24				
WAR	.06	.42				
FRNT	.03	.56				
$\sum_{i=0}^4 \text{AVER}_i$	.0736	2.35*				
ρ	.705					

$R^2 = .785$, $SE = .419$, $D-W = 2.026$, $df = 351$.

* Significantly different from 0 at the .01 level.

suicides by examining its slope coefficient (.47), which represents the impact of celebrity suicide stories on subsequent suicides, controlling for all other variables. Since CELB is a dummy variable, if one removes it from equation (1), with all other variables unchanged, the constant term becomes equal to $7.86 - .47 = 7.39$ (Gujarati, 1978:278-311). The introduc-

tion of CELB, *ceteris paribus*, increases the suicide rate by $.47/7.39 = .0635$. In the 1940s the average number of monthly suicides was approximately 1350, while in the 1970s it was approximately 2300. As a first-order approximation the average number of monthly suicides can be computed as $(1350 + 2300)/2 = 1825$. Using this approximation, it is found that

Table 4. Slope Coefficients, t-values and Time-Lag Weights Relating Suicide Rates to the Independent Variables between 1947 and 1977 for Celebrity Suicide Stories

Coefficients	Estimate	t-value	Time Period for the Average Duration of Unemployment	Slope Coefficient Estimate Bi	t-value	Weights
Constant Term	7.86	20.39*	AVER0	.0315	1.66	.43
JAN	.34	4.16*	AVER1	.0231	2.11	.32
FEB	-.31	-2.92*	AVER2	.0147	2.39*	.20
MAR	1.03	8.59*	AVER3	.0062	.58	.08
APR	1.04	8.11*	AVER4	-.0022	-.12	-.03
MAY	1.10	8.34*				
JUN	.46	3.54*				
JUL	.57	4.30*				
AUG	.48	3.79*				
SEP	.23	1.93				
OCT	.47	4.47*				
NOV	-.02	-.25				
WAR	.07	.48				
CELB	.47	3.68*				
$\sum_{i=0}^4 \text{AVER}_i$	.0733	2.39*				
ρ	.705					

$R^2 = .793$, $SE = .411$, $D-W = 2.004$, $df = 351$.

* Significantly different from 0 at the .01 level.

celebrity suicides on the front page of the *New York Times* raise the number of monthly suicides by $.0635 \times 1825 = 116$ suicides per month. It is likely that the actual impact of this variable was lower, since this number is obtained by controlling for all other variables in the model.

An alternative interpretation of the findings in Table 4 is that some social event (e.g., political crisis) that influences both groups causes both the suicides of celebrities and other individuals. To test this hypothesis, the suicide rate in the model was lagged by one month. If this alternative hypothesis is correct, the lagged suicide rate should be positively related to CELB. A negative relationship was obtained, thereby disproving this alternative interpretation of the findings.

DISCUSSION

Using multivariate time-series analysis rather than the quasi-experimental technique, this paper reexamined Phillips's (1974) data, controlling for economic shifts, seasonal effects and war, and found no significant linkage between suicide stories on the front page of the *New York Times* and subsequent suicides. By contrast, for celebrity suicides there was a significant relationship between this type of suicide and subsequent suicides.

One possible explanation for the previous finding is that celebrity suicides are more likely to generate mass-media publicity than all the other front-page suicides in the *New York Times* between 1947 and 1977. Many of the suicides listed in Table 1 were individuals from the New York City area, or were known to only a small subgroup of the American population. The *New York Times* is a national and international newspaper with a significant readership among middle- and upper-class elites, and front-page suicides in the paper may not be typical of suicides publicized by the national mass media. By contrast, the suicide of a celebrity that appears on the front page of the paper is likely to be highly publicized nationally. This explanation assumes that celebrity suicides lead to increased monthly suicides not because of the unique quality of the celebrities, but because their suicides are highly publicized. Support for this explanation is shown by the effect of various categories of celebrity suicides on subsequent suicides. The six celebrity suicides can be differentiated as the suicides of (1) entertainment celebrities (Landis, Monroe, Prinze), (2) national political celebrities (Forrestal and Hunt), and (3) an international celebrity (Vargas). One would expect that the most publicized suicides would be those of entertainment celebrities, then na-

tional political celebrities, and finally the international celebrity. If this explanation of the finding is correct, then the subsequent change in suicides should be related to the assumed national publicity generated by the suicides. An examination of Table 1⁹ indicates that there was a mean rise of 133.8 suicides after the suicides of entertainment celebrities, a rise of 98.0 for national political celebrities, and a rise of 35.8 after the suicide of the international celebrity. These findings indirectly support the publicity interpretation.

A second possible explanation of the findings is that celebrities possess certain social characteristics that cause individuals to identify with them, and their suicides increase the probability that these individuals commit suicide. This explanation assumes that it is the publicly defined characteristics of celebrities that cause an increase in monthly suicides, rather than the high national publicity of their suicides. Bollen and Phillips's (1982) analysis on the impact of individual publicized television suicide stories between 1972 and 1976 on subsequent suicide patterns lends support to this hypothesis. Their study examines seven individual suicides, and finds that the suicide of the one celebrity in the group (George Sanders, the actor) causes the largest increase in subsequent suicides. Since all seven suicides were heavily publicized by the television media, the findings suggest that public identification with celebrities is a factor in explaining suicide increases.

The available empirical evidence offers support for both hypotheses. Because this study and Bollen and Phillips's (1982) study employs aggregate data, it is difficult to test the two interpretations adequately. In analyzing aggregate data there is always the danger of an "ecological fallacy" (Robinson, 1950), which involves making individual-level inferences from aggregate findings. Some aggregate data (e.g., voting data) allow individual inferences, but the rareness of suicide makes such individual-level inferences impossible (Selvin, 1965). One means of testing the two hypotheses, both of which may be partially valid, would be to examine the suicide patterns of subgroups of the population (e.g., racial groups, class groups) over time. United States daily mortality statistics, currently available between 1972 and 1977, provide a data source for examining the suicide behavior of subgroups of the population. If the characteristics

⁹ The suicide changes measured in Table 1 are different from the results obtained from the regression model, and should be seen as a first-order approximation of the more sophisticated analysis.

of celebrities influence suicide patterns, one would expect greater increases in suicide among the subgroups that identify with them. For example, if survey studies showed that women were more likely to identify with Marilyn Monroe than men, and the hypothesis that individual identification with celebrities influences subsequent suicide patterns is assumed to be true, then one would predict that only female suicides would rise significantly after her suicide. A second possible means of testing the two interpretations might involve case studies of individual suicides after celebrity suicides. Future studies of the findings of this paper will have to employ a variety of methodological techniques with disaggregated data to interpret the meaning of the results.

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