

The Effect of Birthday on the Fluctuation of Suicides in Hungary (1970–2002)

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ABSTRACT: The authors have not found any studies that show an unambiguous and close relation between the date of suicide and the birthday of the victims. They made an analysis on the Hungarian suicides between 1970 and 2002 with a method known from the literature and also with a modern, more sophisticated one. It was found that Hungarian men show explicit sensitivity to their birthday's date: significantly more men commit suicide on their birthday in all age groups than on any other day of the year. Among women, a relation of weak significance appeared only in the older age group. The authors suggest the special sensitivity of Hungarian men which they interpret in the framework of Gabennesch's "broken promise effect", but they think it necessary to do further research on this theme in Hungary.

Introduction

Researches in the past decades have revealed several circumstances in the background of a particular suicide that are generally typical and almost identical in every fatal action, but many circumstances and relationships that are interpretable or understandable with difficulty are discovered during the precise reconstruction of a tragic action. The decision of self-destruction is composed of a complicated mesh of numerous life events, injuries and constellations of personality development. It is known that certain biographical dates affect the personality to a greater or lesser extent. Such a very personal date is the *birthday*.

A large number of studies can be found in the literature that have studied the relationship between the date of suicides and seasons, months, days of the week, religious and state holidays, elections, etc., but there are surprisingly few studies on the connection or occasional coincidence between the date of suicide and birthday. Philips found close interval between the date of birthday and death of 1200 celebrities, which could not be proved for the average population. Philips gave the explanation that the latter does not set such a high value on birthdays as celebrities (Philips 1972). A British research on 247 suicides showed the tendency (Barraclough 1976) that the victims tend to commit suicide within 30 days of their birthday, but it appeared only among people over the age of 75. Other authors

found that suicide is more frequent in the 3 months around birthday than in other months of the year (Kunz 1978; Shaffer 1974). Others (Bradshaw 1981; Dannee, 1975, 1977; Lester 1986, 1997) could not confirm the above. Lester claimed that there is no reality of the so-called "Birthday Blues" phenomenon. However, later he studied the 74 suicides of the US Baseball League's well-known players and found that there was only a month between the birthday and the date of suicide in more cases than expected (Lester 2005). Wasserman and Stack (1994) studying 3948 suicides and Taiwanese researchers studying 4712 suicides (Chuang & Huang 1996) did not find it significant that people would commit suicide more frequently near their birthday than in other days of the year. Jessen et al. (1999) studied the fluctuation of suicide around birthday on a larger sample (32,291 cases). The expected frequency decreased on the week before the suicide and increased on the week after the suicide, which correlated well with Gabennesch's "broken promise" effect. Calculated with a daily base they have not found any difference, and there was no gender or age-group difference either (Jessen & Jensen 1999). A recent communication that studied quite a large sample has not found significant relationship between birthday and the day of suicide. In the authors' opinion there is no evidence of the so-called "Birthday Blues" effect (Reulbach et al. 2007).

Methods

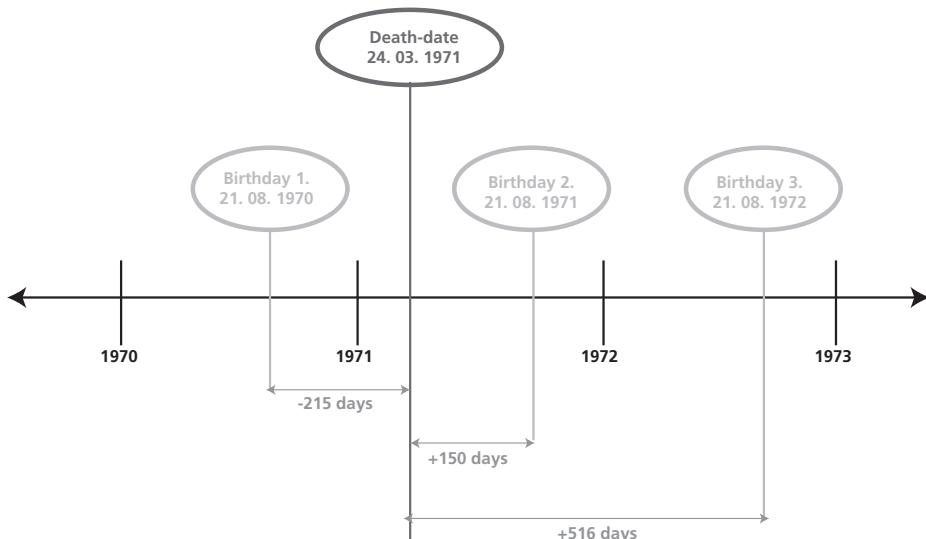
According to mortality data of the Hungarian Central Statistical Office (KSH 1970–2002), altogether 133,699 suicides were committed between 1 January 1970 and 31 December 2002. Since in the register of the Hungarian Central Statistical Office the exact birth and death date of the person committing suicide are also indicated, we had the opportunity to study the distance between the date of suicide and the date of birthday. However, due to blankness of data and the logic of the study, we had to leave out some cases from the analysis, whose number depended on the applied counting method. Logically, we left out the cases with incomplete data from our study (110 persons). Since in the literature we could read mainly about the simpler studies (that count from the differences between expected and perceived cases), we applied several assessment methods with regard to the available, uniquely large sample. We did it also because of the fact that counting with the usual method, we came to a surprising result not published in the literature so far, and we wanted to approach and validate our calculations with several other methods as well.

Method 1

Besides the 110 cases with incomplete data, we had to leave out 78 cases in this procedure because the birthday fell on leap day, and further 90 cases because the suicide was exactly 183 days distant from the two birthdays. So here we had to leave out altogether 278 persons from the analysis, but in 133,421 cases (95,181

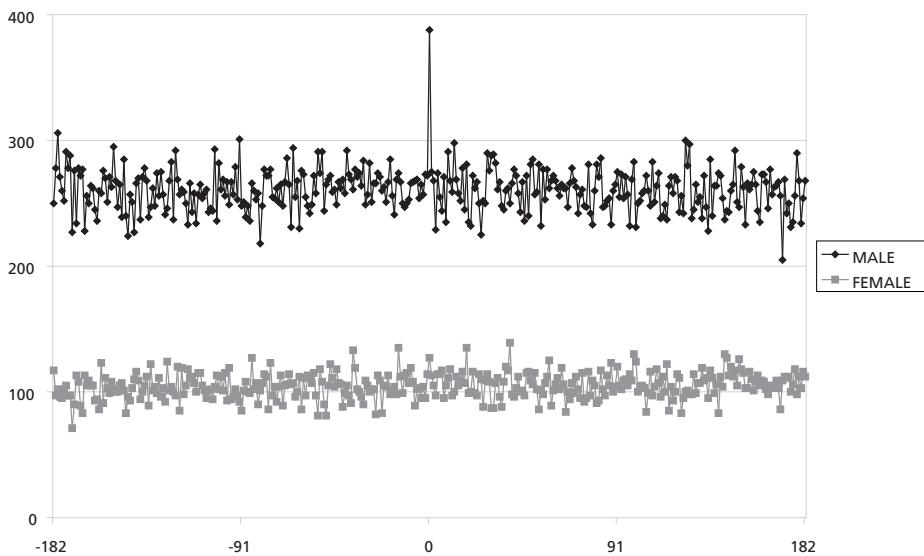
men, 38,240 women) it was possible to calculate the distance between the date of suicide and birthday.

Figure 1. The calculation of the distance between suicide and birthday



The birthday that stands nearest to the date of suicide can be 1) in the year before the incident, 2) in the year of the incident, 3) in the year after the incident (see Figure 1). Among the three birthdays we regarded as relevant the one that stood nearest (in positive or negative direction) to the date of the suicide. The suicide illustrated in Figure 1 was committed exactly 215 days after the birthday of the previous year and 150 days before the birthday of the base year, so we could determine easily the exact date of the relevant birthday. If the incident happens after 21.08.1971 (the birthday of the base year), the incident range (the range between the birthday before the suicide and the birthday after the suicide) will expand up to 366 days because of the interpolation of a leap day in 1972. Only among birthdays with a 366-day incident range could have happened that the suicide was committed exactly between 2 birthdays and we had to leave them out (the above mentioned 90 suicides) from our analysis. Figure 2 shows the frequency of distance in days between the birthday and the date of suicide for men and women.

Figure 2. The frequency of suicides according to the distance between suicide and birthday (1970–2002, male and female, in Hungary.)



Method 2

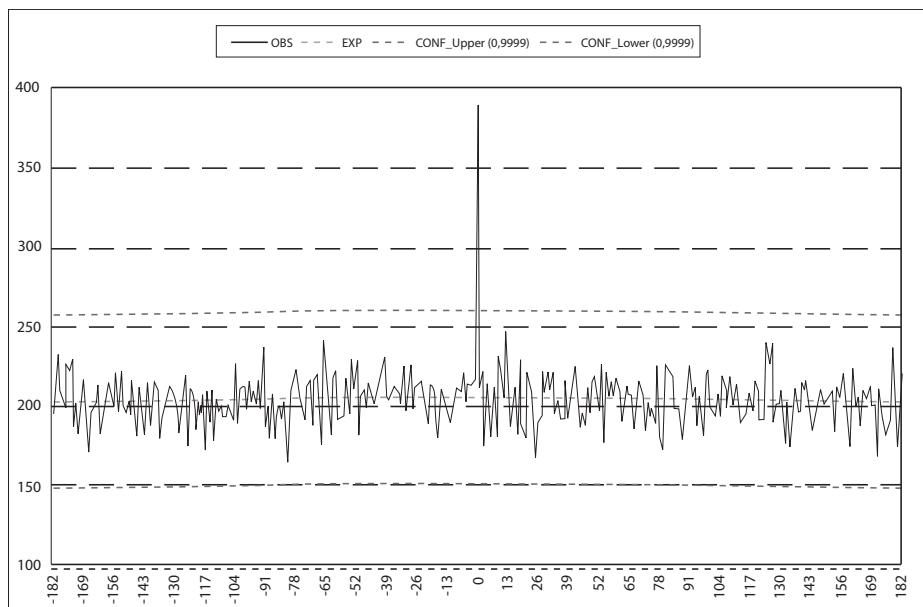
If we are not content with the descriptive account of the distances between the date of suicides and birthday, we have to determine the theoretical probabilities (and/or frequencies) belonging to the particular distances and the confidence intervals belonging to the theoretical values. Theoretical value is the value that we would get if the frequency of birthdays were independent from the frequency of the date of suicide. That is, the birthday would have no effect on the date of suicide. To calculate the theoretical value, we need the matrixes of the possible dates of birthdays and suicides. The products of multiplication of their margin distributions are the expected theoretical probabilities, and summarizing them for given distances of days, we get the theoretical distribution of the distance of days. The 182nd case contains the number of suicides expected one day before the birthday and the 184th case contains the number of suicides expected one day after the birthday (and so on).

As there are also leap-years in the examined period, and the victims also could have been born in a leap-year, basically 4 matrixes would be needed representing 4 kinds of incident ranges: $A=365 \times 365$, $B=366 \times 366$, $C=365 \times 366$ and $D=366 \times 365$. The available number of cases enables only the estimation of the A-type theoretical matrix, the bulk of the cells of matrixes B, C or D is empty, so we have to disregard their estimation. Fortunately, matrix A contains 100,610 cases, that is, 75% of the total cases. Though our further analysis concerns for technical reasons only these 100,610 cases, we have no reason to assume that our conclusions are not true for the whole multitude.

If we leave out all the suicides that have non-A-type incident range, (32,811 cases in total), and we know the date of a) the suicide and b) the birthday, we can accurately count the position of suicide in the incident range. For example, in the case illustrated in Figure 1, as a) the suicide fell on the 83rd day of the year and b) the birthday fell on the 22nd day of the year, the distance of the birthday and the suicide is 150 days. If we are considering a 365-day incidence range, from the distance between the suicide and the birthday of the base year we can easily count the distance from the other pole of the incidence range. Consequently, two parameters can prove to be enough to place the suicide into a 365-day incidence range.

Taking the expected value as starting point, we examined with interval estimation – with a probability of 99.99% – on which days the number of suicides is higher than the expected value. It is necessary to work on such a high confidence level, because an accidental difference from the expected value can occur in the case of any elements of the 365-day incidence range. If we work with such a high confidence level, there will be a probability of maximum 5% that an accidental fluctuation diverges even one day from the confidence interval (as it can be proved by a short calculation). Our results relating to men are illustrated in Figure 3.

Figure 3. *The frequency of suicides according to the distance between suicide and birthday (1970–2002, male, in Hungary)*



Method 3

In this method we limited the analysis – following the common method in the literature – to answer the question whether the risk of committing suicide on a birthday is significantly higher than on any other day. To study this question, we

left out only those cases (besides the 110 cases with insufficient data) where the birthday fell on 29 February (78 cases) and those who committed suicide on a leap day. We examined the multitude of 133,427 cases together and also in a breakdown by gender and age to be able to give a differential answer to this question. Table 1 illustrates the Chi²-statistics calculated from the empirical and expected frequencies. We defined the expected frequencies by reducing the matrix method (see Method 2). Here it was not necessary to leave out the 32,811 cases with B, C or D-type incidence ranges, because we did not want to determine the exact distance between birthday and suicide.

We aimed only at categorizing these cases as birthday or non-birthday type. The theoretical frequency of birthday suicides derives from aggregating the elements in the main diagonal of the matrix that contains the theoretical frequencies. To determine the theoretical frequencies of non-birthday suicides, we had to aggregate the elements outside the main diagonal. The empirical frequencies arose from aggregating the elements on and outside the main diagonal of the empirical matrix. Table 1 contains the Chi²-statistics belonging to the theoretical and empirical frequencies, the appropriate significance levels and the relating quotients of chances.

Table 1. Odds ratios and significance levels of birthday effect in different demographic groups of Hungarian suicide victims.

	Chi square	Df	Odds ratio	Significance
Total	58.85	1	1.40	0.000
Male	59.82	1	1.48	0.000
Female	4.49	1	1.20	0.034
Under 40 male	22.57	1	1.55	0.000
40–59 male	8.83	1	1.29	0.003
60+ male	35.49	1	1.65	0.000
Under 40 female	0.03	1	1.04	0.868
41–59 female	0.79	1	1.15	0.374
60+ female	5.01	1	1.31	0.025

Results and discussion

First, we studied our data with a simpler, robust method known from the literature. In the sample consisting of many elements we obtained a surprising result not yet experienced in the literature, thus we thought it reasonable to examine the validity of our results with a more sensitive and sophisticated method. We arrived at the same results with all 3 methods, according to which: 1. It is clear that among the Hungarian suicidal victims in the period of 1970–2002 that men showed explicit sensitivity to the date of their birthday, that is significantly more

suicides were committed on this day than on any other day of the year, considering all age groups. 2. Among women, this connection appeared only in the case of older women, with far less significance.

As for *gender difference*, it is already textbook data that significantly fewer women commit suicide than men, which can be explained by biological, genetic and social psychological reasons resulting in totally different psychic working methods, mentality and reactivity compared to men. Women are more tolerant, circumspect, more inclined to consideration, compromise-seeking. However, in the present case the problem is not to detail the gender difference and to present it in the frequency of suicides in general, but to answer the question: what can be the reason for the frequent coincidence between the date of suicide and the birthday of the victim in the Hungarian population? In this relation, the perceived gender difference remains in the background, although we have to mention one or two partial reasons. On the one hand, a mathematical partial explanation is the significantly less number of women in the sample. Due to the less number of elements, the confidence intervals are larger, which may conceal the birthday effect, even if it does exist (although weaker than in the case of men). On the other hand, the frequencies of suicide in the older age-groups of both genders come strongly close together, in Hungary it is almost identical in the agegroup of 70 years and above (men: 51%, women: 49%). It can to a certain extent explain the similar tendencies in the older age group's behaviour relating to birthdays. Finally, the well-known and frequently studied fact is hardly negligible that *alcohol consumption* often contributes strongly to the final decision about suicide. Hungarian and international studies found high alcohol levels in a high percentage of suicide completers' blood, but these cases were significantly rarer among women (Cherpitel et al. 2004; Razvodovsky 2007; Nemtsov 2003; Zonda 1999, 2006). Either the victim "drinks up courage" to commit the act, or the fatal decision is generated more easily as a result of "non-reconsidered" injuries that break forth due to the loosened cognitive control. The birthday celebrations are often accompanied by alcohol consumption of high quantity (many times unrestrained), which is *predominantly characteristic of men* also on such occasions rather than women.

With respect to both genders, the effect of a tradition may arise that is specific to Hungarian society. In the Hungarian sociological, ethnographic and cultural anthropological literature we have not found any works discussing the special role of birthdays. Under Hungarian circumstances it is well-known that celebration of frequent names (Steven, Joe, John) is louder and more significant, and the celebration of name-days is also more widespread, while that tradition went out of fashion in the West European countries.

No doubt the birthday is of special importance in the individual's life. It is one of those dates when we experience the passage of time more sharply and sensitively, with its irrevocable signals and consequences. Many people take vows and set expectations for themselves on this day, and probably they attach too much importance to this anniversary, sometimes with a bitter resignation that shows

expressly the passage of life. On the birthday (or on the days around this date), there may be an increased inclination to reinterpret or reevaluate the past life period, often with a negative overtone, comment, and according to observations, it is especially characteristic of Hungarian men's mentality. On individual level, the assumption is also righful that there is a greater chance for committing suicide on the birthday if the individual has a psychic or physical burden, injury or crisis that is associated with this date (in time and space). The above mentioned death-dip theory described by Philips – which says that well-known persons tend to postpone their suicide to their birthday for demonstrative reasons, while this behaviour is not typical for the majority of the population (Philips 1972) – cannot be valid in our case, because this phenomenon appeared at the population level and that is why we have to search for another explanation, if it is possible from our numerical data at all.

We have examined earlier the connection between Hungarian suicides (1970–2002) and the religious and public holidays and found marked evidences for Gabennesch's frequently cited "broken promise effect" theory (Zonda et al. 2008). It is reasonable to draw this theory into the findings of our present study, which is emphasized also by a Danish research working also with a large sample (Jessen and Jensen 1999). Gabennesch set up his "broken promise" theory on the basis of the temporal, seasonal

fluctuations of suicides (Gabennesch 1988), which seems to be valid also for the shorter periods. In his interpretation, the personality experiences most sensitively the first days of every time period, when he sets expectations for himself (more or less consciously), anticipates positive happenings as a "promise". If life does not fulfil these expectations, it will be followed by disappointments, the promise and the hope will "break". Spring means one of the most prominent time periods in one's life, the beginning of the realization of dreams and plans cherished in winter, but this mechanism refers to the beginning of smaller periods (weekends, holidays), after which suicides rise suddenly (not during the holiday), in the time when the personality confronts his unrealized hopes, vanished expectations, and failures. The personal turning point, the day which shows the beginning of personal life also fits into the broken promise theory, when during the usual "review" the failures, the unfulfilled promises and broken "hopes" of life accumulate. All these (in the given case associated with the "loosening" effect of alcohol) can suggest the personality that after the life period just ending he should say "no" to the new life period and its continuation.

However, it remains a question in the future why the very attractive broken promise theory was confirmed on the population level in connection of suicides and holidays in the study of Hungary (Zonda et al. 2008) and other countries (Schmidtke 1994; Nakamura et al. 1994; Nishi et al. 2000; Bradvik et al. 2003; Kalediene & Petruskine 2004; Corcoran et al. 2004) and why the relationship between suicide and birthday appeared only in the Hungarian context, and almost exclusively among men.

Consequently, we can interpret our findings only in the following way: Hungarian men are sensitive to their birthday in a more pronounced way, they attach greater significance to it, the passage of time wears them more deeply than Hungarian women or the men of other nationalities. Gabennesch's "broken promise effect" theory can fit well into this explanation.

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