

大震災が幸福度、寄附行動やボランティア活動に与えた影響

**The Effect of the March 11 Disaster on Happiness, Volunteering and Donations in Japan:
A Mediation Analysis**

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近年、幸福度に関する研究が盛んになってきたが、災害が幸福度にもたらす影響を分析する論文はまだ数が少ない。本論文は東日本大震災が日本国民の幸福度、寄附行動やボランティア活動にどんな影響を与えるかという分析を目的としている。今までの研究では大震災の幸福度への影響がある程度まで分析されてきたが、先行研究と違って、本論文では、大震災の幸福度への直接的な影響だけではなく、ボランティア活動や寄附行動の幸福度への間接的な影響が媒介変数として分析される。2010年から2012年までの国民選好度調査のデータを様々な統計学的方法で分析して、本論文では先行研究より詳細な分析が行われる。結果として、大震災の幸福度への直接的な負の影響とボランティア活動や寄附行動経由の間接的な正の影響、が両方見つかる。

Happiness and life satisfaction have received increasing attention by academic scholars as well as policy makers around the globe in recent years. The aim of this paper is to analyze the effects of 3-11 on happiness in Japan while controlling for the mediating effects of volunteer activities and donation behavior. We argue that disasters have negative, but also positive effects on happiness and life satisfaction through an increase in prosocial activities such as donations and volunteering. To test our hypothesis of this mediating effect of prosocial behavior on happiness after a major disaster, we analyze a large scale national survey NSLP 2010-2012. Our results suggest that 3-11 (1) had a negative effect on the happiness level of the Japanese, (2) that it positively influenced donation behavior and volunteer activities and that by this (3) the negative direct effects are partially mitigated by the effects on prosocial behavior.

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1. Introduction

Happiness and life satisfaction have received increasing attention by academic scholars as well as policy makers around the globe in recent years (Frey and Stutzer 2009; Layard 2011). The aim of this paper is to analyze the effects of 3-11 (the triple disaster that occurred on March 11 2011 in Japan) while controlling for the mediating effects of volunteer activities and donation behavior. We argue that disasters have negative, but also positive effects on happiness and life satisfaction through an increase in prosocial activities such as donations and volunteering. To test our hypotheses of this mediating effect of prosocial behavior on happiness after a major disaster, we analyze a large scale national survey NSLP 2010-2012.

2. Literature and Hypotheses

Within the field of happiness economics, there is a small but growing strand of research on frequently occurring events such as *war and terrorism* (Frey, Luechinger and Stutzer 2007; Romano, Zussman and Zussman 2012) as well as on *floods, forest fires and droughts* (Luechinger and Raschky 2009; Kountouris and Remoundou 2011; Carroll, Frijters and Shields 2009). Apart from that, there are also a number of studies investigating the effects of single events like *Hurricane Katrina* (Kimball et al. 2006), the *terror attacks of 9-11* (Metcalf, Powdthavee and Dolan 2011), the *Chernobyl Accident* (Berger 2010) and recently *3-11* (Ishino et al. 2012; Rehdanz et al. 2013; Uchida, Takahashi and Kawahara 2013).

While most of the literature suggests a negative effect of disasters on the happiness level of the population in the respective country, the studies on 3-11 so far report inconclusive results. Uchida et al. (2013) find no statistically significant effect on people's happiness on average. However, differentiating between persons who did and those who did not think about the earthquake when responding to the happiness question, they find that the former show significantly higher levels of happiness after 3-11. Ishino et al. (2012) analyze retrospectively perceived changes in happiness levels after 3-11. For whole Japan they find that 60% of the respondents do not report a change, while 35% report an increase and only 5% report a decrease in their happiness level. Nevertheless, their regression analysis still shows a significant tendency that those living in the disaster area as well as the Kanto area around Tokyo are more likely to report a decrease in individual happiness. Finally, Rehdanz et al. (2013) show in their spatial analysis that the proximity to Fukushima is negatively correlated with happiness after 3-11, whereas no such correlation can be observed before the event.

Apart from the effect on subjective well-being, another effect of disasters is that they tend to lead to increased prosocial behavior in terms of charitable donations and volunteering activities (Brown, Harris and Taylor 2012; Penner et al. 2005). At the same time, a number of studies report a positive correlation between happiness and volunteer activities (Meier and Stutzer 2007; Frey 2008) and donations (Dunn, Aknin and Norton 2008; Aknin, Dunn and Norton 2012; Aknin et al. 2013).

Based on previous research we expect happiness to be negatively affected by 3-11, but at the same time we also can expect an increase in donations and volunteering which have a positive effect on happiness. Although we assume that the happiness effects of 3-11 are mitigated by the effects on prosocial behavior, we still expect the negative effect of the disaster to be stronger, since only a certain percentage of the population has the resources and willingness to engage in donating and volunteering. We thus hypothesize:

H1: 3-11 had a negative effect on the happiness level of the Japanese people.

H2: 3-11 had a positive effect on the donation behavior and volunteer activities of the Japanese people.

H3: The effect of 3-11 on the happiness level of the Japanese people is partially mediated by their volunteering activities and donation behavior.

3. Data

The present study uses regression analysis to analyze data from the National Survey on Lifestyle Preferences (*kokumin seikatsu senkôdo chôsa*) of the years 2010 to 2012 in Japan. The population of the survey includes men and women in Japan between 15 to 80 years of age and the sample is generated via a 2-stage randomized stratified procedure and includes 4000, 5000 and 4000 persons respectively for the years 2010, 2011 and 2012. Pooling the three datasets from 2010 to 2012 yields a sample size of 9280 completed questionnaires available for analysis.

4. Variables of interest

Our dependent variable is the current happiness level of the respondent. The corresponding survey item reads: "How happy are you currently?". Answer options range from 0 to 10 on an 11 point scale. On the right hand side of the equation we are mainly interested in the effect of 3-11. Viewing the disaster as a natural experiment, we thus include a time dummy which takes the value "0" for the survey years 2010 and 2011 and the value "1" for the post 3-11 year 2012. Although the 2011 survey was conducted from March 3rd to March 29th, Tiefenbach and Kohlbacher (2013) find no effects on happiness directly after the disaster. Further, considering that the effects on volunteering activities and donation behavior take time to kick in, we decided to treat the year 2011 survey as "pre 3-11".

In order to control for distortions we further introduce a number of control variables that are common in happiness estimations. Apart from basic socio-demographic variables (income, age, age squared, gender) we also control for family relations (cohabitation with spouse, number of children, children under 6 years dummy), employment relations (student, housewife, without work) as well as for prefectures. In a next step of the analysis we then include two items regarding volunteer activities and donations. The items ask the respondents, (i) how many hours a month they engage in volunteering activities and (ii) whether they make donations (yes/no).

5. Analytical strategy

Our analytical strategy is as follows. In a first step we estimate our baseline specification by using OLS regression on the pooled data of the years 2010 to 2012. Since volunteer activities and donation behavior are likely to be affected by the disaster, we do not include those variables in our baseline specification (the "independent variables" would correlate with each other not be independent anymore). To test whether volunteer activities and donation are indeed affected by 3-11 we run a chi-square test for donation behavior (yes/no) and a t-test for volunteer activities (measured in hours per month). Finally, we run a mediation analysis with 3-11 as the independent variable, volunteer activities and donation behavior as mediating variables, and happiness as the dependent variable.

6. Results

Table 1 shows our baseline specification estimated by using OLS regression on the NSLP 2010 to 2012 data. The first model estimates the control variables excluding the 3-11 time dummy. Model 2 shows that the estimates are more or less the same when including 3-11. The coefficient indicates that people in average are 0.184 points (on a scale from 0 to 10) less happy in the year after 3-11. Considering that the effect of being without work is similar in size (-0.146), the impact of 3-11 on the happiness level is not only statistically (0.1% level), but also practically significant. Since the effect of 3-11 is only accounted for by the use of a time dummy, it is highly likely that apart from the disaster, the coefficient also includes other changes between the year 2012 and the years before. As a robustness check we estimate model 3 which also includes the year dummy of the year 2010. Compared to the “After 3-11 (year 2012)” coefficient, the “Year 2010” coefficient is much smaller in size (0.028) and it also is not statistically significant. In this light, it seems plausible that large parts of the negative effect are due to 3-11.

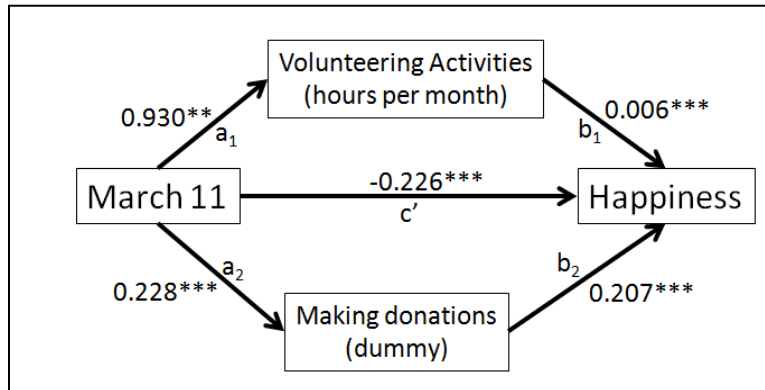
Table 1: OLS regression results using NSLP pooled cross section data from 2010-2012.

VARIABLES	(1) model1 Happiness	(2) model2 Happiness	(3) model3 Happiness
After 3-11 (year 2012)		-0.184***	-0.171***
Year 2010			0.028
Household income (10,000 JPY / year)	0.002***	0.002***	0.002***
Age	-0.062***	-0.063***	-0.063***
Age squared	0.001***	0.001***	0.001***
Women	0.404***	0.393***	0.393***
Co-habitation	0.432***	0.432***	0.433***
Number of children	0.053*	0.053*	0.053*
Children under 6 years	0.741***	0.729***	0.729***
Student	0.243+	0.234+	0.234+
Without work	-0.163*	-0.146*	-0.145+
Housewife/men	0.124+	0.162*	0.162*
Prefectures controlled for	yes	yes	yes
Observations	7,995	7,995	7,995
Adj. R-squared	0.116	0.118	0.117

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

Although we discovered a rather big negative effect after 3-11, we assume that the disaster itself did not only have negative, but also positive effects, such as for example on the willingness to donate to or to participate in volunteer activities. To further disentangle the positive and negative effects of the disaster we first tested whether donation behavior and volunteer activities in general are indeed higher after the disaster. Looking at the raw data we find that the percentage of people who reported to make donations rose from 14% (in the years 2010 and 2011) to 37% in the year 2012. A chi-square test shows that this increase is statistically significant [$\chi^2(1) = 607.0478, p \leq 0.000$]. Similarly, the average hours a month of conducting volunteer activities rose from 2.4 (in the years 2010 and 2011) to 3.2 hours in the year 2012. A two-sided t-test shows that this increase, too, is statistically significant [$t(9234) = -2.81, p \leq 0.01$]. Following the last step of our analytical strategy, we use a parallel multiple

mediator model with two mediators, volunteer activities (M_1) and donation behavior (M_2), to disentangle the direct and indirect effects of the disaster.



*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$

Figure 1: A parallel multiple mediator model with two mediators (volunteering activities and donation behavior) of the effects of 3-11 on happiness.

Figure 1 shows the results of our mediation analysis. The direct effect c' of the disaster on happiness is -0.226 . The total indirect effect of the disaster on happiness is calculated by $a_1*b_1 + a_2*b_2$ which equals 0.053 . Adding both coefficients ($c' + a_1*b_1 + a_2*b_2$) reveals that the total effect c of the disaster is -0.173 . Not only all single coefficients (a_1, a_2, b_1, b_2, c'), but also both mediating channels (a_1*b_1 and a_2*b_2) as well as the total indirect effect ($a_1*b_1 + a_2*b_2$) meet the 5% level of statistical significance.

As the results of our mediation analysis show, we find that the direct negative effects of 3-11 on happiness are *partially* mediated and mitigated through the effects on donation behavior and volunteering activities, which in turn, positively influence the happiness level. As expected, the mediation is only partial, since the ratio of the indirect effect to the direct effect, $R_M = 23\%$, is rather small (however, this does not necessarily mean that the result is *practically* insignificant, see Hayes 2013).

7. Concluding discussion

7.1 Hypotheses

First, we find that according to our hypothesis H1 3-11 had a negative effect on the happiness level of the Japanese population. We further find, in line with our hypothesis H2, that the disaster not only affected the happiness level negatively, but that it also positively influenced the donation behavior and the volunteer activities. Finally, the results confirms our main hypothesis H3 by showing that the negative happiness effects of the disaster are mitigated by the indirect positive happiness effects induced by a higher participation in donations and volunteering. However, the mediation is only partial, and the negative direct effects outweigh the indirect positive effects by far.

7.2 Insights and Limitations

Large-scale disasters do not only have a negative impact on the happiness level, but they can also indirectly make people happier by encouraging people to join in or donate to volunteer activities. Further, our analysis reveals that, because of those indirect effects, only controlling with a time dummy for the event of the disaster does not reveal its true – i.e. its direct – impact on the happiness level. Hereby we do

not claim to have unveiled the “true” impact of 3-11, since apart from donation behavior and volunteer activities there may be many other variables, which are not captured in the NSLP survey, but which are likely to have mitigating effects on happiness. In fact, while a natural experiment such as 3-11 offers the opportunity to analyze the impact of disasters, we have to keep in mind that – given the nature of the ‘experiment’ – there are still many other influences that cannot be filtered out properly.

Nevertheless, our analysis is the first to show how indirect happiness effects of natural disasters can be accounted for. Further, we are able to quantify the effect size of direct and indirect effects, and by this, we gain a better understanding of how interacting effects can be disentangled and what their relationship is.

7.3 Contribution to the state-of-the-field

Our findings are largely consistent with Ishino et al. (2012), who find three different groups of people: one group being happier after 3-11, one group reporting to be unhappier and a last group which shows no changes in happiness after the disaster. Analyzing the determinants and characteristics of each group they report that donation behavior has a statistically significant effect on the likelihood of belonging to either the “happier” or “unchanged” group. Similarly, Uchida et al. (2013) find not only the people who were thinking about the earthquake when responding to the survey were happier, they were also more likely to make in-kind donations or engage in voluntary work.

However, contrary to Uchida et al. (2013) we find a nation-wide drop in happiness. A reason for this might be the different sample, since Uchida et al. are using an online sample restricted to respondents between the age of 20 and 39 years.

Finally, Rehdanz et al.’s (2013) findings are inconsistent, since in their baseline specifications no nation-wide drop in happiness is reported, but once they control for interaction effects between the distance to the Fukushima power plant and 3-11 (year 2012 time dummy) they find not only the interaction effect, but also the year 2012 time dummy itself to be statistically significant. While not controlling for spatial interaction effects, our analysis suggests a nation-wide drop in happiness. Whether this nation-wide drop in happiness can be explained by spatial interactions needs to be confirmed by further research.

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