세월호 참사와 생활만족도

김 현 식[*]

국가적 재난이 생활만족도와 같은 주관적 안녕에 영향을 주는가에 대한 소수의 선행 연구들이 있었으나, 여전히 그 수는 미미하며, 분석 결과 또한 일치하지 않았다. 이 연구에서는 이러한 선행 연구에 기초하여 사회과학적 가설을 도출하고, 세월호 참사 전후 여러 영역의 생활만족도 변화를 살펴봄으로써 이러한 가설을 검정한다. 한국노동패널 2014년 자료가 수집되던 중 세월호 참사가 발생했다는 관찰에 근거하여, 방법론적 엄밀성을 높이기 위하여 2013년과 2014년 자료를 활용하여 개인 수준의 시간 불변 혼동 변수(confounding variables)를 통제하는 이중차분(differences-in-differences) 모형을 추정하였다. 분석 결과 세월호 참사 전후 가족의 수입 만족도, 여가활동 만족도, 주거환경 만족도, 친인척 관계 만족도, 사회적 친분 관계 만족도와 전반적 생활만족도에 유의미한 차이가 나타나지 않았다. 하지만 가족관계 만족도에서는 통계적으로 유의미한 차이가 발견되었다. 성별과 교육 수준 및 18세 이하 아동 혹은 청소년과의 동거 여부를 기준으로 하위 집단에 있어서 세월호 전후 생활만족도의 변화를 살펴본 결과, 여타의 모든 만족도 영역에서 유의미한 변화를 발견할 수 없었으나, 18세 이하 아동 혹은 청소년과 거주하는 응답자의 경우 세월호 참사 이후 가족관계 만족도가 유의미하게 낮아졌다. 이러한 연구 결과는 생활만족도가 정서적 측면만이 아닌 삶의 의미나 목표와 같은 측면을 내포하고 있어 외부의 충격에 쉽게 변하지 않는다는 선행 연구를 지지하는 것이지만, 그럼에도 불구하고 세월호 참사 같은 국가적 재난이 일반 국민의 생활만족도에 주는 영향이 적지 않았다는 것을 보여준다. 이에 더해, 세월호 참사의 주요 피해자가 단원고 학생이었다는 점을 감안하면, 자녀와 동거하고 있는 응답자에서 가족 관계 만족도가 떨어졌다는 것은 피해자와 유사한 처지에 놓인 응답자들이 더 많은 공감을 했다는 것을 의미한다.

주요용어 : 세월호 참사, 생활만족도, 가족관계 만족도, 이중차분

I. Introduction

Do a national disaster have an impact on people's level of subjective well-being? Is some people's subjective well-being more sensitive to a national disaster than that of the others? If so, who are they that would be more vulnerable to a national disaster?

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* 경희대학교 사회학과 부교수

There have been some research endeavors documenting adverse impacts of a national disaster such as a terrorist attack on subjective well-being. Using European Social Survey, for instance, Kim and Kim (2017) revealed that the Charlie Hebdo shooting in Paris decreased the probability of feeling happy of French respondents. Interestingly they also found stronger adverse impacts of the shooting for immigrants and low-income individuals. Krueger (2007) found a big spike of sadness among residents of Wisconsin on the day and following day of September 11 attack even though increased sadness returned to the previous level after four days of the attack. More directly related to the current paper is Woo and her colleagues' report showing that emotional utterances in Twitter such as "anger", "anxiety", and "sadness" sharply increased during the five days after the Sewol Ferry Disaster in 2014.

However, there is also a handful research documenting no significant association between a national disaster and subjective well-being. Uchida, Takahashi, and Kawahara found no statistically significant difference in levels of negative emotions before and after the Great East Japan Earthquake of March 2011.

Against the background of this line of literature, this paper attempts to assess the impact of a national disaster on subjective well-being of national people. We goes beyond the previous research articles in several respects. Our measure of subjective well-being, first of all, consists of seven dimensions of self-reported life satisfaction: household income, leisure life, housing environment, family relations, relations with relatives, social relations and overall life satisfaction.

To examine the effects of a national disaster on subjective well-being, we use a two-year longitudinal dataset which contained the same subjective well-being measures in both years. More importantly, the Sewol Ferry Disaster, the national disaster we use as a natural experiment in this paper, occurred while the survey in the latter year was being fielded. This unique feature of our data enables us to employ the differences-in-differences method which controls for unobserved time-constant individual effects.

In addition, we are interested in group-level heterogeneous effects of a national disaster on subjective well-being. Particularly, we investigate effect heterogeneity by gender, education levels, and household structure. Some previous research showed that socially disadvantaged groups might be more compassionate or sympathetic with other people's misfortune (Kim and Kim, 2017), We expecct gender and educational level to be a good proxy for distinguishing socially disadvantaged people from the others.

More important is the household structure meaning whether respondents lived with at least one adolescent or child aged below 19. There were 325 high school students onboard on the Sewol Ferry who was sailing towards Jeju Island for academic trip, among whom 250 were

dead or missed by the Disaster (Kim et al., 2016). By contrast, 75 out of 151 persons who included teachers, general guests, and sailors were dead or missed. Disproportionate numbers of victims of high school students who were widely known as having been raised in socioeconomically disadvantaged family background have been highlighted almost always in every reports or articles related with the disaster. Therefore, we anticipate stronger impacts of the national disaster on people who would simulate their emotion with the high school victims whenever they saw adolescents or children living with them.

II. Data, Measurement, and Methods

1. Data

To examine our theoretical hypotheses, we draw data from the Korea Labor and Income Panel Study (KLIPS) 1998-2017 (Kim et al., 2018) that is an ongoing panel study that has traced respondents every year. KLIPS started collecting information in 1998 from nationally representative samples of more than 13,000 respondents from 5,000 households living in urban areas except Jeju Island, To further enhance national representativeness of respondents, KLIPS added refreshed samples from 1,415 households living in rural areas or Jeju Island. KLIPS registered a 67.1% retention rate of the 1998 original samples in the 20th wave, which is quite comparable with the Panel Study of Income Dynamics (PSID) of the United States.

To obtain our analytical samples, we extract data from 2013-year and 2014-year respondents and apply the listwise deletion method, which excludes observations with at least one missing value in the variables that will be described soon (Allison, 2002). We also discard respondents who answered the survey only one time because we are concerned with the possibility that response pattern across years and response timing within a year might be correlated with unobserved time-constant variables. To draw inferences from concrete population of 2014 Koreans, we use the cross-sectional weight "sw17p_c" in all analyses reported in this paper (Nam et al., 2010).

2. Measurement

Dependent variable, subjective well-being is measured using the question "how satisfied or dissatisfied are you with the following aspects of our life?" There have been six following

aspects: household income, leisure life, housing environment, family relations, relations with relatives, and social relations. After the six area, the separate question has been asked "Overall, how satisfied or dissatisfied are you with your life?" Choice set for each area consisted of five-point scale spanning from 1 "very satisfied" to 5 "very dissatisfied" and we reverse-coded the original scale by subtracting respondents' answer from 5. That way, higher value of the life satisfaction variable means more satisfaction with life.

Main causal variable is the indicator carrying 1 if respondents participated in the survey after the Sewol Ferry Disaster which occurred on April 16, 2014 and 0 otherwise. Since we use regression framework with an interaction term to recover point estimates and standard errors, the value of the year 2013 is the same as that of 2014 for the same respondent. Time variable is also an indicator with 1 denoting 2014 and 0 otherwise.

To assess heterogeneous effects by groups, we measured gender, education level, and household structure. Gender has the value 1 for female respondents and 0 for male respondents. Levels of education has 0 and 1 representing respectively "less than 2-year college" and "2-year college or more." Finally, we measure an indicator showing whether respondents lived with adolescents or children aged below 19 in 2014. Note that all these variables were measured using 2014 information and the same respondents have the same value across years.

3. Statistical Method

A widely used difference-in-differences model can be written as follows (Angrist & Pischke; Wooldridge, 2002).

$$Y_{it} = T_{It} + \delta * DI_{it} + u_i + \varepsilon_{it} \qquad\qquad \text{(EQ 1)}$$

In the model, Y_{it} means the life satisfaction at time t of the respondent I. Note that actually time t consists of 0 and 1 which respectively represent the year 2013 and 2014. T_I denotes the aforementioned time variable. DI is the main causal variable carrying 0 if the i respondent answered to the life satisfaction question at the same day of the Sewol Ferry Disaster or later. In this framework, DI has the value 1 if observations wee collected after Sewol Ferry Disaster and 0 otherwise. Naturally all observations made in 2013 has the value 0. u shows individual-level heterogeneity or individual-level fixed effect and ε means idiosyncratic errors that our model can't explain. By applying the first-differencing estimator which gives the same results as the deviations-from-mean estimator because we have balanced data for two years, we get δ which retrieves the impact of Sewol Ferry Disaster on subjective well-being.

Another well-received model for the differences-in-differences framework is using an interaction term between time and the event variable as follows.

$$Yit = \beta 0 + \beta 1*TIit + \beta 2*DIit + \beta 3*DIit*TIit + \varepsilon it \qquad\qquad (EQ\ 2)$$

Notice that TI is the same as before but DI is quite different. As we discussed in the measurement section, DI has the value 0 if observations came before Sewol Ferry Disaster in 2014 and 1 if observations came after Sewol Ferry Disaster in 2014. However, the value of 2013 observations is the same as that of 2014 for the same respondent. All βs carry coefficients associated with respective variables. Our main interest is concentrated on the size and statistical inference of β3. Ordinary least squares would give point estimates and standard errors to make statistical inferences.

The coefficient δ from EQ1 and that of β3 from EQ 2 are exactly the same such that there is no difference of point estimate of our interest between two estimators. However, there are non-negligible differences in standard errors. After trying both estimators, we find EQ 2 give more conservative standard errors, namely smaller p-values than EQ 1 probably because we use cross-sectional weights, which impels us to report results from EQ 2.

III. Results

1. Descriptive Statistics

Table 1 shows descriptive statistics of our analytic dataset. There were 10,987 respondents who documented life satisfaction in 2013 and 2014, among whom 3,739 were interviewed before the Sewol Ferry Disaster and the remaining 7,248 were interviewed the same day or after the disaster. To provide more information, Table 1 also gives estimates from 2013 which are broken down by whether the respondents completed the interview in 2014 before or after the Sewol Ferry Disaster. Note that we do not fill 2013 cells of gender, education and coresidence variables because those are the same as 2014.

We find remarkably similar distributions in gender before and after the Sewol Ferry Disaster. However, education and co-residence with any adolescent or children aged under 19 are not equally distributed across the interview date. To convey a concrete example, 38.3% of respondents who were interviewed before the disaster had the education level of college or

more while 49.7% had the same education level for the respondents after the disaster. In addition, greater percentage of respondents lived with children after the disaster compared to that before the disaster. These figures suggest that the interview date should not be randomly distributed. In other words. there must have been non-random process in making and completing interviews with respondents.

<Table 1> Descriptive Statistics

| | 2013 Before | | 2013 After | | 2014 Before | | 2014 After | |
Unweighed N	3,739		7,248		3,739		7,248	
	Mean	SD1)	Mean	SD1)	P/M2)	SD1)	P/M2)	SD1)
Gender								
Male					50.4		50.8	
Female					49.6		49.2	
Education								
Less than College					61.7		50.3	
College or more					38.3		49.7	
Co-residence with children								
No					67.1		58.4	
Yes					32.9		41.6	
Satisfaction with								
Household income	1.898	(0.541)	2.063	(0.446)	1.914	(0.523)	2.056	(0.452)
Leisure life	2.111	(0.495)	2.247	(0.446)	2.117	(0.520)	2.253	(0.446)
Housing environment	2.385	(0.452)	2.493	(0.410)	2.438	(0.432)	2.522	(0.384)
Family relations	2.603	(0.384)	2.689	(0.320)	2.638	(0.377)	2.678	(0.310)
Relations with relatives	2.472	(0.370)	2.549	(0.325)	2.456	(0.361)	2.536	(0.318)
Social relations	2.470	(0.352)	2.559	(0.323)	2.472	(0.337)	2.541	(0.311)
Overall life	2.379	(0.364)	2.480	(0.324)	2.380	(0.348)	2.490	(0.312)

Note. All estimates except unweighted N are weighted using cross-sectional weights representing 2014 population (sw17p_c)

1) Standard deviations

2) Percentages for categorical variables or mean for quantitative variables

Taking a close look at means and standard deviations of 7 domains of life satisfaction reveals a couple of quite interesting patterns. For a given year, those who responded after the Sewol Ferry Disaster in 2014 had higher mean values but lower standard deviations for all 7

domains than those who answered the questions after the disaster. This observation implies that respondents who were interviewed in later days of the survey waves would be relatively more satisfied with their life and more homogeneous than those who were so in early days of the survey rounds.

However, we fail to detect any consistent changing patterns across two years by subgroups of the interview date. For instance, the early interview group in 2014 show elevated satisfaction in 2014 compared to in 2013 with all domains except relations with relative. Some domains such as leisure life, house environment and overall life feature an increase in 2014 but not for the other domains for the later interview group.

To summarize our findings from the descriptive statistics, the interview date is not a random process such that some observed and unobserved variables would influence the interview date and there was a consistent finding that those who responded later seems to be more satisfied with all domains of life satisfaction. To put this finding in this context, our main causal variable, namely the interview date before and after the Sewol Ferry Disaster would not be randomly assigned among respondents, which requires us to experiment with a statistical method such as EQ 1.

2. Statistical Models

The main advantage of EQ 1 with the first-differencing or deviations-from-the-mean estimator lies in the model power to control for time-constant observed as well as unobserved individual effects. Because the coefficient of the interaction term in EQ 2 has the same value as that of δ from EQ 1, we can safely say that β_3 estimate from EQ 2 inherits the same advantage as EQ 1. In the hope to control for individual-level time-constant variables, even though we do not believe this is the ideal situation as the random assignment of the interview date, we present β_3 results from EQ 2 in Table 2. In the table, coefficients nested in the highlighted cells are the main focus of this study.

Readers who are familiar with the differences-in-differences method would unmistakably catch that the coefficients in the first column using all observations can be recuperated by differencing means between two groups with a year and differencing again the differences across years. But we can not obtain standard errors to draw statistical inferences from Table 1, which is why we turn to EQ 1 and EQ 2.

<Table 2> Coefficients and p-values of difference-in-differences estimation

		All		Gender			Education (College or more)			Living with children aged below 19		
				Male		Female	No		Yes		No		Yes
Household income	Intercept	1.898	***	1.925 ***		1.870 ***	1.822 ***		2.028 ***		1.873 ***		1.948 ***
	Sewol	0.165	***	0.145 ***		0.186 ***	0.160 ***		0.122 ***		0.142 ***		0.182 ***
	Year	0.016		0.024		0.007	0.004		0.027		0.011		0.027
	Sewol*Year	-0.023		-0.050		0.004	-0.030		-0.020		-0.011		-0.044
Leisure life	Intercept	2.111	***	2.122 ***		2.100 ***	2.038 ***		2.236 ***		2.098 ***		2.138 ***
	Sewol	0.136	***	0.138 ***		0.134 ***	0.124 ***		0.103 ***		0.115 ***		0.157 ***
	Year	0.006		0.003		0.009	-0.005		0.017		0.018		-0.017
	Sewol*Year	-0.001		-0.023		0.022	-0.008		0.001		0.010		-0.008
Housing environment	Intercept	2.385	***	2.391 ***		2.379 ***	2.300 ***		2.530 ***		2.346 ***		2.464 ***
	Sewol	0.108	***	0.100 ***		0.115 ***	0.114 ***		0.046		0.113 ***		0.075 **
	Year	0.053	**	0.050		0.056 *	0.046		0.056		0.062		0.036
	Sewol*Year	-0.024		-0.030		-0.017	-0.020		-0.028		-0.023		-0.018
Family relations	Intercept	2.603	***	2.613 ***		2.593 ***	2.507 ***		2.767 ***		2.544 ***		2.722 ***
	Sewol	0.086	***	0.067 **		0.107 ***	0.088 ***		0.024		0.092 ***		0.041
	Year	0.035		0.030		0.041	0.035		0.025		0.024		0.058 *
	Sewol*Year	-0.047	*	-0.042		-0.052	-0.045		-0.045		-0.023		-0.087 **

<Table 2> Continued

| | | All | | Gender | | Education (College or more) | | Living with children aged below 19 | |
				Male	Female	No	Yes	No	Yes
Relations with relatives	Intercept	2.472	***	2.479 ***	2.466 ***	2.391 ***	2.611 ***	2.421 ***	2.577 ***
	Sewol	0.076	***	0.075 ***	0.077 ***	0.080 ***	0.021	0.082 ***	0.037
	Year	-0.017		-0.019	-0.014	-0.003	-0.047	-0.025	0.000
	Sewol*Year	0.004		0.001	0.007	-0.019	0.038	0.020	-0.024
Social relations	Intercept	2.470	***	2.489 ***	2.451 ***	2.390 ***	2.609 ***	2.429 ***	2.555 ***
	Sewol	0.088	***	0.074 ***	0.102 ***	0.082 ***	0.043	0.093 ***	0.055 *
	Year	0.002		0.012	-0.008	0.015	-0.027	0.011	-0.017
	Sewol*Year	-0.020		-0.027	-0.012	-0.033	0.005	-0.015	-0.019
Overall life	Intercept	2.379	***	2.402 ***	2.355 ***	2.292 ***	2.528 ***	2.339 ***	2.460 ***
	Sewol	0.102	***	0.081 ***	0.123 ***	0.094 ***	0.054 *	0.091 ***	0.092 ***
	Year	0.002		-0.005	0.008	0.007	-0.016	-0.005	0.015
	Sewol*Year	0.008		0.000	0.018	0.004	0.019	0.024	-0.017

Table 2 tells us that there was no statistically significant difference in the dominant part of life satisfaction domains between the groups divided by the interview date before and after the Sewol Ferry Disaster. There is only one domain of life satisfaction that shows statistically significant difference: family relations. We observe a negative coefficient in the model including all respondents, which enables us to state that satisfaction with family relations was decreased for those who responded after the disaster compared to those who did so before the disaster. As to the effect size, the absolute value of the coefficient ‐0.047 is approximately 12% to 15% of standard deviations of satisfaction with family relations depending on subgroups.

We also fail to detect any statistically significant estimate by subgroup such as gender, education, and co-residence with children aged under 19, except for only one domain and one group. A statistically significant negative coefficient was on the satisfaction with family relations for the respondents who lived with adolescents or children aged below 19. This observation can be translated into the interpretation that respondents who lived with children aged under 19 would have experienced decreased satisfaction with family relations if they were interviewed after the Sewol Ferry Disaster compared to before the disaster.

Notice that the absolute value of the coefficient get almost doubled from that of the all observation model. To put this in perspective, the absolute value of the coefficient ranges from 22.6% to 28.1% of the standard deviations of satisfaction with family relations, depending on subgroups in Table 1. This observation strongly informs us of the fact that satisfaction with family relations for respondents who lived with any adolescents or children aged below 19 dived after the Sewol Ferry Disaster.

In an effort to draw statistical inferences of the differences between subgroups, for instance between male and female, we also tried to harvest coefficients of three-way interaction terms with all two-way interactions included in the model EQ 2. No coefficient in the three-way interaction was statistically significant and even the difference in satisfaction with family relations by the co-residence status was not statistically significant (data available on request).

IV. Discussion

Our finding in this article can be summarized as follows. After assessing impacts of the Sewol Ferry Disaster on subjective well-being, we found statistically significant decreases in satisfaction with family relations after the disaster. More importantly, the impact was stronger

for those who lived with adolescents or children aged below 19. However, all the other domains examined in this article showed no statistically significant changes after the Sewol Ferry Disaster. Nor were there statistically significant impacts within subgroups and statistically significant differences by subgroups.

The findings of statistically insignificant impacts of the Sewol Ferry Disaster on several domains of subjective well-being except for satisfaction with family relations seem to support the hypothesis that life satisfaction measures consist not only of emotional and affective components but also of evaluative and purposive components (Diener, Lucas, & Oishi, 2018). We also suspect that overall life satisfaction would show insignificant differences because our current measure contained more of evaluative and purposive aspects of life satisfaction because data collectors threw it after several domain satisfactions such as household income, leisure and social relations.

Nevertheless statistically significant decreases of satisfaction with family relations are all the more remarkable since the finding demonstrates impacts of the Sewol Ferry Disaster on the emotional and affective features of subjective well-being. It seems that since a dominant portion of victims of the disaster was Danwon high school students, the disaster reminded people of their own children who could have been one of the victims by a streak of bad luck. We are pretty sure that this sympathy and compassion are well reflected in the statistically significant impact of the disaster on satisfaction with family relations for respondents who lived together with any adolescents or children aged under 19.

Despite these interesting and important findings, there are quite a few limitations that prevents readers from drawing any definitive conclusion from the current study. We are concerned about omitted variable bias due to plausible confounding variables that were not controlled in this article. Note that our statistical models were able to control for time-constant individual-level time-varying. However there might be some time-varying confounding variables that affected the interview date and subjective well-being even though controlling for time-varying variables could be more expensive than reasonable for two-year longitudinal data owing to measurement errors (Angrist & Pischke, 2009).

In this line of reasoning, our study presented in this article should be regarded as a starting point to the pursuit of understanding relationships between the national disaster and subjective well-being. We should devote our time and efforts to more studies from more diverse backgrounds to further deepen our understanding on subjective well-being.

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