Disasters as a Source of Personal Growth? Insights from Longitudinal Research

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From the Wikipedia Entry "Lists of Disasters"

Disasters with at least 1000 (estimated) deaths for the last ten years.

Sinking of MS al-Salam Boccaccio, Red Sea 2006 Cyclone Nargis, Myanmar Sri Lankan Civil War 2008 2009 Haiti earthquake 2010 Russian heat wave 2010 Tohoku earthquake and tsunami 2011 **ISIL** activities 2011 onward 2011 onward **Syrian Civil War** Collapse of the Rana Plaza, Bangladesh 2013 Typhoon Haiyan War in Donbass 2013 2014 onward Mina stampede, Mecca 2015 Nepal earthquake 2015



Earth	Air	Fire	Water					
Avalanches Dam failures Ecological irresponsibility Earthquakes Road and train accidents Erosions Landslides Eruptions Radioactive substances Toxic waste disposal	Blizzards Acid rain Aircraft accidents Cyclones Hijackings Dust storms Meteorite and planetary shifts Radioactive cloud and soot Thermal shifts Urban smog Tornadoes	Lightning Boiling liquid Expanding vapor accidents Fire-setting Electrical fires Spontaneous combustion	Drought Tsunamis Maritime accidents Floods Oil spills					
Animate Creatures								
	Endemic	: disease						
	Epide	emics						
	Fan	nine						
	Play							
	Pesti	lence						
	Desigr	n flaws						
	Equipment problems							
Illicit manufacture and use of explosives and poisons								
Plant accidents								
Criminal extortion by virus and poisons								
	Guerilla wartare							
	Sports crowd violence							
	Terro	prism						
	Warfare							



Core Question

How can we study long-term effects of disasters?

From the viewpoint of study design, disasters are natural experiments.

The simplest form of an experiment has the following form





What does this very simple experimental design mean for how one can study long-term effects of disasters?

Studies must enable two modes of comparison, namely to assess variables of interest before and after the disaster, and to assess treatment recipients and treatment non-recipients.

Given that disasters cannot be planned, random assignment of study participants to the treatment or the control group cannot be implemented. Thus natural experiments (disasters) can only be studied quasiexperimentally.



Moreover, natural experiments are by definition field experiments; they cannot be brought into laboratory setting (in any ethically viable way).

This means that, unlike in lab experiments, where the context is held constant, context also has to be assessed in studies of long-term effects of disasters. It matters whether an earthquake takes place in Haiti or in Italy.

However, contexts do not only differ at a given time, they also change over time, and might change differently for different contexts.

Context and context change have to be measured independently of study participants!



From a design perspective the demand that context has to be measured independently means that one has to de-confound context and treatment as far as possible:





One would, thus, want to have study participants from one and the same context who were stricken and not stricken by the disaster, and participants of both types from a different context.

Earthquake victims and non-victims from Japan and from Italy would be an example.

Obviously a study of long-term disaster effects cannot work with one measurement point before a disaster and one after a disaster. The study needs an extended longitudinal design.



It needs to be acknowledged that the implementation of a longitudinal design brings in 'time' as an additional context, in Bronfenbrenner's terms the 'chronosystem'.

People change and contexts change!



For an ideal-type study of long-term effects of disasters this means that there must be an assessment of change before and after the treatment. Consequentially such a study needs minimally two assessments before and two assessments after the disaster.

Bringing in time as a context has the consequence that not only calendric time is included but also individual time, i.e., age. People of different ages react differently to disasters as do people at different historic times.

This calls for the inclusion of people born at different times as a design element.



C _{1/Cohort1}	0	0	X	0	0	0	0
	0	0		0	0	0	0
C _{1/Cohort2}	0	0	X	0	0	0	0
	0	0		0	0	0	0
C _{1/Cohort3}	0	0	X	0	0	0	Ο
	0	0		0	0	0	0
C _{2/Cohort1}	0	0	X	0	0	0	0
	0	0		0	0	0	0
C _{2/Cohort2}	0	0	X	0	0	0	0
	0	0		0	0	0	0
C _{2/Cohort3}	0	0	X	0	0	0	Ο
	0	0		0	0	0	Ο



To take ideal-typing yet a step further, studies as described on the previous slide should be repeated at at least one other historic time.

The complexity of designing internally and externally valid studies of long-term effects of disasters, makes it obvious that such studies cannot easily be started anew and that it makes no real sense to start them as after-only studies when a disaster has happened.

What is utterly advisable is to utilize existing datasets to come close to studying long-term impact of disasters adequately.



One would try to identify ongoing or concluded longitudinal studies that assessed people of different ages several times before and after a disaster. Candidates could be

British Household Panel Survey (BHPS), UK Household, Income and Labour Dynamics in Australia Survey (HILDA), Australia Korea Labor Income Panel Study (KILPS), Korea Panel Study of Income Dynamics (PSID), USA Socio-Economic Panel (SOEP), Germany Survey of Labour and Income Dynamics (SLID), Canada Swiss Household Panel (SHP), Switzerland Russia Longitudinal Monitoring Survey (RLMS-HSE), Russia

All these studies are usable for academics without extensive costs. They are accessible either through the so-called Cross-National Equivalent File at Ohio State University.



However, these studies typically contain only few instruments that assess mental health (if at all). It may thus be more rewarding to look into other types of longitudinal studies that do, however, have the drawback that many of them do work with special populations, sometimes even with convenience samples. Also not all of them are equally easily accessible.

On the next slides you find a fairly random selection of longitudinal mental health studies from the US. In them one could—to offer a very practical example—search for data that studied people from Louisiana and from another state in the US before and since Hurricane Katrina



Antonucci: Social Relations and Mental Health Over the Life Course **Brown: Life-Span Development of Educated Women** Earls: Human Development in Chicago Neighborhoods Eccles: Ontogeny of Self and Task Concepts, Activity Choice, and School Behavior **Eccles: Maryland Adolescent Development in Context Study Eccles: Michigan Study of Life Transitions** Furstenberg: Philadelphia Family Management Study Hagen: Resiliency and Vulnerability Among Abused and Neglected Children in Foster Care Huesmann: Evaluating the Metropolitan Area Child Study of Aggression Huesmann: Cross-Generational Influences on the Development of Aggression Huston: New Hope Child and Family Study of Poverty and Employment Kaplan: Alameda County Study of Health and Aging Lozoff: Iron Deficiency Anemia and Infant Behavior McLoyd: Flint Study of Maternal Work and Family Processes Myers; Young Adults with Diabetes: A Follow-Up Study Pintrich: Competence and Commitment in Jr. High School Sameroff: Rochester Longitudinal Study of Multiple Social Risk **Stafford: Panel Study of Income Dynamics** Schulenberg: Stability and Change in Alcohol Use During the Transition to Young Adulthood Schulenberg: Countering Pressures Related to Adolescent Alcohol Misuse Stewart: Women's Life Paths Study Stewart: Radcliffe Longitudinal Study of Women Life Courses Thornton: Intergenerational Panel Study of Parents and Children Zimmerman: School Drop-out and Drug Use Zucker: Risk and Protective Factors for Substance Abuse



Such data sets would then hopefully be matchable in some way or another with data from another context, in which a similar (or even different) disaster took place.

Strong advice: If your primary focus is NOT on victim relief in your home country, but on a better understanding of what disasters 'do' to human beings in the long-run, DO NOT start a new study but delve into existing data. There are wonderful accessible long-term longitudinal data around that can be exploited for the generation of new knowledge! Even from 'way back when' so that they allow comparisons across different historic times.



Even if you primarily want to look at home country victims, do not start a new ex-post victim study if you are interested in long-term consequences. Try to contact all local colleagues who may have ongoing longitudinal studies. Ask them for permission to do secondary analyses of their data!



Own Study

- "Biography" of the Study
 - Conceptual Considerations
- Hypotheses
- Sample

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- Instruments
- Analytic Approach
 - Results
 - Descriptives
 - Validation of Dependent Variable
 - Hypothesis Testing
 - Attrition Analyses
 - **Discussion and Conclusions**



Own Study—Waves of Data Gathering

> 1985

- 1988/89
- 1992
 - 1995/96
 - 1999
 - 2002/03
 - 2006
 - [2009/10]
 - [2013]
 - [NOW]



Conceptual Considerations





Hypotheses

- Activists have lower (self-related) microworries at the onset of the study (H1)
 Activists have higher macroworries, concerned with larger entities, at the onset of the study (H2)
 - Activists who appraised the threat of nuclear war as high in 1985 will report better mental health 21 years later than nonactivists and activists who did not perceive a high threat (H3)
 - Activists will express relatively more macroworries than non-activists in mid-adulthood (H4).



Sample

Wave	Year of Data Gathering	Ν	Retention Rate in Percent	Age Range (Average Age)	Percent Female
1	Summer 1985	1492		8-20 (14.5/13.9) ^a	54
2	Winter 1988/89	837	56	11-23 (17.7/17.5)	56
3	Summer 1992	541	65	14-26 (21.3/21.1)	58
4	Winter 1995/96	367	68	18-30 (24.7/24.7)	57
5	Summer 1999	241	65	21-34 (28.5/28.2)	58
6	Winter 2002/03	201	83	24-36 (31.7/31.5)	61
7	Summer 2006	220	109 ^b	28-40 (35.0/35.0)	60

a The left figure indicates the average age for the particular wave, the right figure the average age in the longitudinal core sample.

b In addition to Wave 6 participants drop-outs after Wave 5 were re-contacted. Twenty-seven re-joined the study, eight Wave 6 participants dropped out. 22



Instruments

Worries

(Goldenring & Doctor, 1986; Boehnke, Schwartz, Stromberg, & Sagiv, 1998) Activism

- Appraisal of Threat of Nuclear War
 - Trier Mental Health Scale

(Becker, 1989)

Psychosomatic Symptoms

(Grob, 1993)

Revised Children's Manifest Anxiety Scale

(Boehnke, Silbereisen, Reynolds, & Richmond, 1987)

Happiness

(Fordyce, 1988)



Instruments—Worries

Macroworries

- How much do you worry about ...
 - environmental destruction
 - nuclear power plant accidents hunger in the world

 - overpopulation problems
 - nuclear war
- 4-point response scale (0-3) Wave 1 to 3 (scores multiplied by 4/3)
- 5-point response scale (0-4) Wave 4 to 7 Cronbach's α ranging from .65 to .78 across the seven waves (no time-related trend)



Instrument—Worries

Microworries

How much do you worry about ...

- work- or studies-related problems
- . being unattractive
- .. becoming the victim of a violent crime
- .. your parents' death
 - your own death
- 4-point response scale (0-3) Wave 1 to 3 (scores multiplied by 4/3)

5-point response scale (0-4) Wave 4 to 7 Cronbach's α ranging from .61 to .69 across the seven waves (no time-related trend)



Instruments—Worries

Scale Score Calculation

Scale scores were calculated by averaging across the five pertinent items.

Macroworries and Microworries are typically correlated substantially, reflecting personal tendencies to worry.

In order to have 'pure' measures of the two types of worries, both were regressed upon each other, and standardized residuals with a mean of 0 and a variance of 1 were generated both for macroworries and microworries.

Grand sample raw scale score means per wave were then added to the standardized residual scores, to retain the time-dependent mean structure.



Instruments—Activism

Life-Time Prevalence of Participation in Activities of the German Peace Movement at Wave 1

Have you ever participated in activities of the peace movement?
 Dichotomous response format (0 = 'no' / 1 = 'yes')



Instruments – Appraisal of Threat of Nuclear War

Likelihood of Nuclear War

A nuclear war will take place...

. next year

- .. within the next five years
- .. within the next 20 years
 - in my life-time.
- 4-point response scale, ranging from "surely not" (0) to "quite surely" (3)

Means of the four items are increasing in similarly-sized increments, .45, .85, 1.34, and 2.12

Guttman's λ = .74; Cronbach's α = .71



Instruments – Appraisal of Threat of Nuclear War

Calculation of Scale Score

[(Item 1 X 4) + (Item 2 X 3) + (Item 3 X 2) + (Item 4 X 1)] The mean of that variable was 8.96 with a median of 10, scores ranging from 0 to 24 This transformation allowed us to compare two equally-sized groups with a high and a low appraisal of the likelihood of a nuclear war in 1985



Instruments— Trier Mental Health Scale

Trier Mental Health Scale

20 items

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- Sample item, "It happens that I can't stand myself"
- 4-point response scale, ranging from 'never' (0) to 'always' (3)
 - ùséd Wave 3 tò 7
 - average Cronbach's α = .90



Instruments—Psychosomatics

Psychosomatic Symptoms Checklist

8 items
Sample item "Stomach ache"
4-point response scale, ranging from 'never'
(0) to 'frequently' (3)
used Wave 4 to 7
average Cronbach's α = .73



Instruments—Manifest Anxiety

Revised Children's Manifest Anxiety Scales RCMAS-G Shortened Scale



Sample item "I am frequently out of breath" 4-point response scale, ranging from 'completely false' (0) to 'completely true' (3) used Wave 2 to 4 average Cronbach's $\alpha = .77$



Instruments—Happiness

Fordyce's Happiness Indicator

Single item

- "How happy or unhappy do you feel in general"
- 11-point response scale, ranging from 'extremely unhappy' (0) to 'extremely happy' (10)
- ùséd Wave 4 to 7
- Means stayed almost constant over time and ranged from 6.98 to 7.12



Analytic Strategy

- Descriptive analyses for worry scales and their interrelation with other mental health and well-being indicators
 - Latent growth modeling (Preacher, Wichman, MacCallum, & Briggs, 2008)
 - Checks of possible consequences of selective attrition on findings



Type of Worry	Wave 1 (1985)	Wave 2 (1988/9)	Wave 3 (1992)	Wave 4 (1995/6)	Wave 5 (1999)	Wave 6 (2002/3)	Wave 7 (2006)
Microsocial Worries	1.97	1.86	1.89	1.52	1.48	1.43	1.36
Macrosocial Worries	2.95	3.05	2.87	2.25	2.09	2.02	1.92



<i>Mental Health/ Well-Being Indicator</i>	Same-Wave Microworries	Same-Wave Macroworries
Manifest Anxiety 1988/9	.36***	.12+
Manifest Anxiety 1992	.34***	.05
Manifest Anxiety 1995/6	.47***	.04
Mental Health 1992	35***	01
Mental Health 1995/6	48***	.04
Mental Health 1999	50***	.04
Mental Health 2002/3	34***	.05
Mental Health 2006	37***	.01



<i>Mental Health/ Well-Being Indicator</i>	Same-Wave Microworries	Same-Wave Macroworries
Psychosomatics 1995/6	.31***	.12+
Psychosomatics 1999	.36***	.18**
Psychosomatics 2002/3	.28***	.24***
Psychosomatics 2006	.27***	.12+
Happiness 1995/6	25***	.18**
Happiness 1999	- .16*	05
Happiness 2002	10	04
Happiness 2006	14+	.04











Indicator		Wave	1 to 3	Wave 1 to 4		Wave 1 to 5		Wave 1 to 7	
Percent- age of Activists	High Threat	45.0 %		40.0 %		35.2 %		42.2 %	
	Low Threat	33.5 %		34.1 %		31.1 %		26.4 %	
		Micro- worries	Macro- worries	Micro- worries	Macro- worries	Micro- worries	Macro- worries	Micro- worries	Macro- worries
I)	Level ntercept)	2.20	2.74	2.12	2.84	2.11	3.26	2.10	3.18
	Change (Slope)	25	.11	55	54	65	-1.14	68	-1.24
PMA+ → Level (L)	High Threat	24***	.42***	14*	.27***	22**	.33***	17*	.48***
	Low Threat	23***	.33***	13*	.18***	21**	.30***	15*	.12
PMA+ →	High Threat	.53***	62***	.08	17*	.14	40***	.27**	28**
Change (C)	Low Threat	.04	53***	.09	24*	.16	34***	08	21**
Correla- tion L ← → C	High Threat	20	05	51***	50***	41**	32	47***	06
	Low Threat	15	03	55***	53***	46**	59*	44***	55***



Discussion

All four hypotheses confirmed



Conclusions

Political activism in adolescence secures life-time happiness (????????)



Research Question

To assume that humanity would annihilate itself through a nuclear war was quite common during the 1980s in many parts of the world.

How does this juvenile 'life context' affect political involvement and happiness of people in the long-run, who were adolescents in the 1980s?



Table 1 Sample Characteristics (1985-2010)

Wave	Year of Data Gathering		Retention Rate in %	Average Age	Percentage of Women (%)
1	Summer 1985	3499 ª		14.2°	52
		1492 ^b		14.5	54
2	Winter 88/89	837	56	17.7	56
3	Summer 1992	541	65	21.3	58
4	Winter 95/96	367	68	24.7	57
5	Summer 1999	241	58	28.5	61
6	Winter 02/03	201	61	31.7	61
7	Summer 2006	220	109 ^d	35.2	60
8	Winter 09/10	203	92 ^e	28.6	60

^a Teilnehmer_innen der ersten Querschnittsuntersuchung; ^b Teilnehmer_innen, die Adressen angegeben hatten und so für eine mögliche längsschnittliche Untersuchungsteilnahme erreichbar waren; ^c Die Angabe bezieht sich auf das mittlere Alter in der gegebenen Erhebungswelle; ^d Zusätzlich zu den Teilnehmer_innen der Welle 6 wurden auch Teilnehmer_innen angeschrieben und um Wiederteilnahme gebeten, die ihre Teilnahme nach Welle 5 (vorübergehend) beendet hatten; ^e Erneut wurde alle 241 Teilnehmer_innen aus Welle 5 angeschrieben.



Instruments – Appraisal of Threat of Nuclear War

Likelihood of Nuclear War

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- .. within the next 20 years
 - in my life-time.
- 4-point response scale, ranging from "surely not" (0) to "quite surely" (3)

Means of the four items are increasing in similarly-sized increments, .45, .85, 1.34, and 2.12

Guttman's λ = .74; Cronbach's α = .71



Instruments – Political Involvement

One Item

- (3) I am interested in politics and actively engaged.
- (2) I am interested in politics but not active myself.
- (1) I am not particularly interested in politics; it is one thing among many.
- (0) I have no interest in politics whatsoever.



Instruments—Happiness

Fordyce's Happiness Indicator

Single item

- "How happy or unhappy do you feel in general"
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- ùséd Wave 4 to 7
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Figure 1 Probability of a nuclear war next year





Figure 2 Probability of a nuclear war during the next five years





Figure 3 Probability of a nuclear war during the next 20 years





Figure 4 Probability of a nuclear war later in the future





Figure 5 Political Involvement in 2010 (Wave 8)





Figure 6 Happiness in 2010 (Wave 8)





Abbildung 7 Latentes Wachstumsmodell mit latenten Variablen



The 1985 to 2010 average latent subjective probability of a nuclear war expressed by people who were adolescents in the 1980s increases their political involvement in mid adulthood:



The more the subjectively assessed probability of a nuclear war decreased between 1985 and 2010, the unhappier participants were in 2010:



Interpretation Offer

(A) The higher the subjectively assessed probability of an anticipated disaster caused by human decision-making, the higher people's mid adulthood political involvement.

(B)

The long-term avoidance of cognitions about possible politically caused disasters reduces people's satisfaction with their lives in mid adulthood.



Thank you very much for your attention!