Mental disorders and well-being in the context of climate change: Models, results and intervention approaches

Bernd Roehrle

roehrle@staff.uni-marburg.de www.gnmh.de

Outline of the presentation

- The heat takes his mind away: a short case history
- Reflection and aims of the lecture - Starting points
- Research activities
- Climate change and mental health: a model
- Climate change and mental health
- Results at a glance
- Findings on climate threats (heat, floods, droughts, etc.)
- Risk groups
- Intervention approaches at individual and collective level
- Summary and conclusion

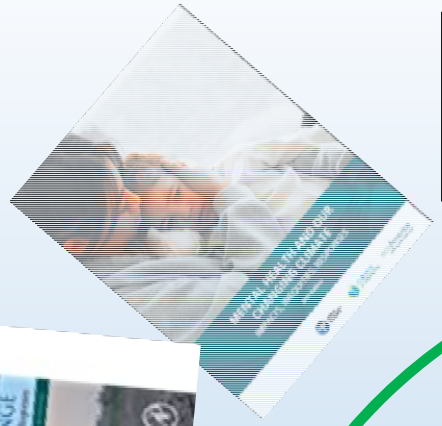
A short case study

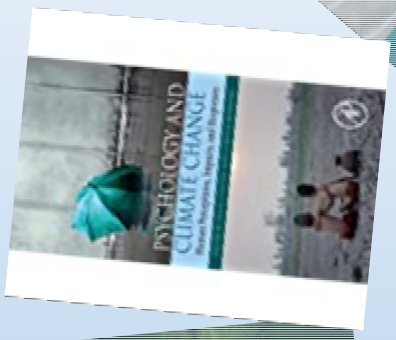
A short reflection: What should I tell about climate change?

- Loss of livelihoods, injuries, heart attacks, cancer, respiratory problems, infections, allergies, now also psychosocial problems.
- Direct connection via temperature fluctuations, natural consequential problems (flood, fire, storm, drought, air pollution)indirectly via tertiary problems: economic, social, cultural foundations (unemployment, material, cultural, social losses, disintegration of communities, migration, care obligations, etc.).
- Grave correlation: a new motivator for new environmental, health and social policies.
- Knowledge about the nature of the linkages is poor
- Research is quantitatively and qualitatively deficient.
- Interrelationships often marginal
- Knowledge on the effectiveness of prevention and treatment is deficient

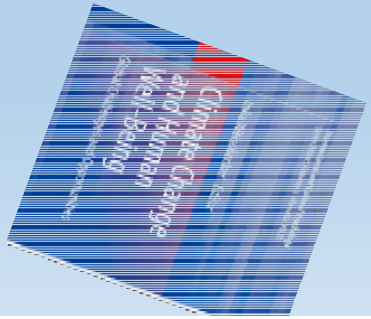
or

Target of the presentation





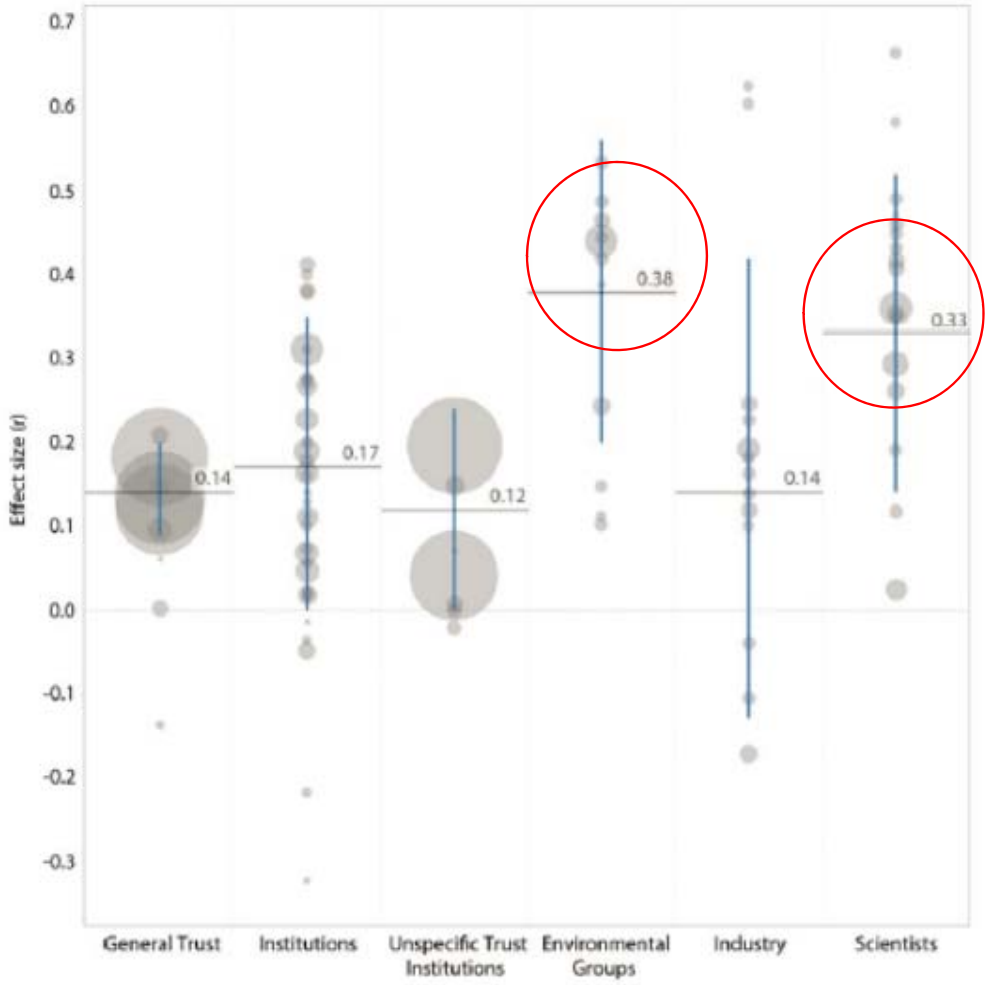
- Information, preparation and motivation
- Humility and trust
- Climate change as an opportunity for a different approach to mental illness and its causes



Modesty is an adornment…

- Credibility of environmental initiatives and scientists particularly (medium) high on climate-friendly behavior

  Meta-analysis (141 correlations. 51 studies) Cologna & Siegrist (2020; J. Env. Psychology, 69, 101428)
- Information with questions is more convincing therefore modesty is the order of the day

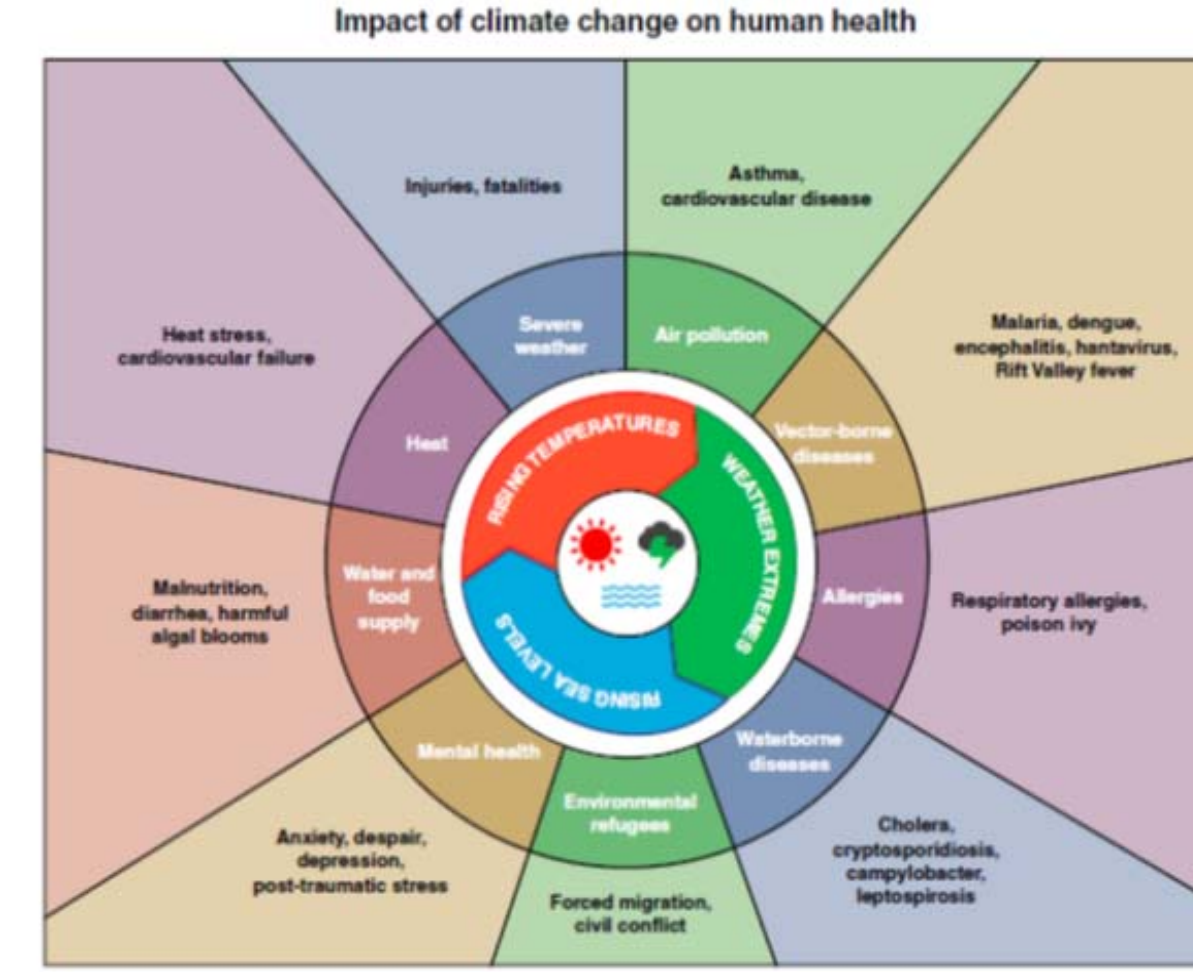


To the starting point

- Physical and mental health-illness interact.
- Meta-analyses on cardiovascular and generalised anxiety

  z= .30; k= 11 (≈ 60% affected)
  (Tully et al. 2013; J-Health Ps. 18,12)

Figure 1.1: The ways climate change can affect health; all are preventable.

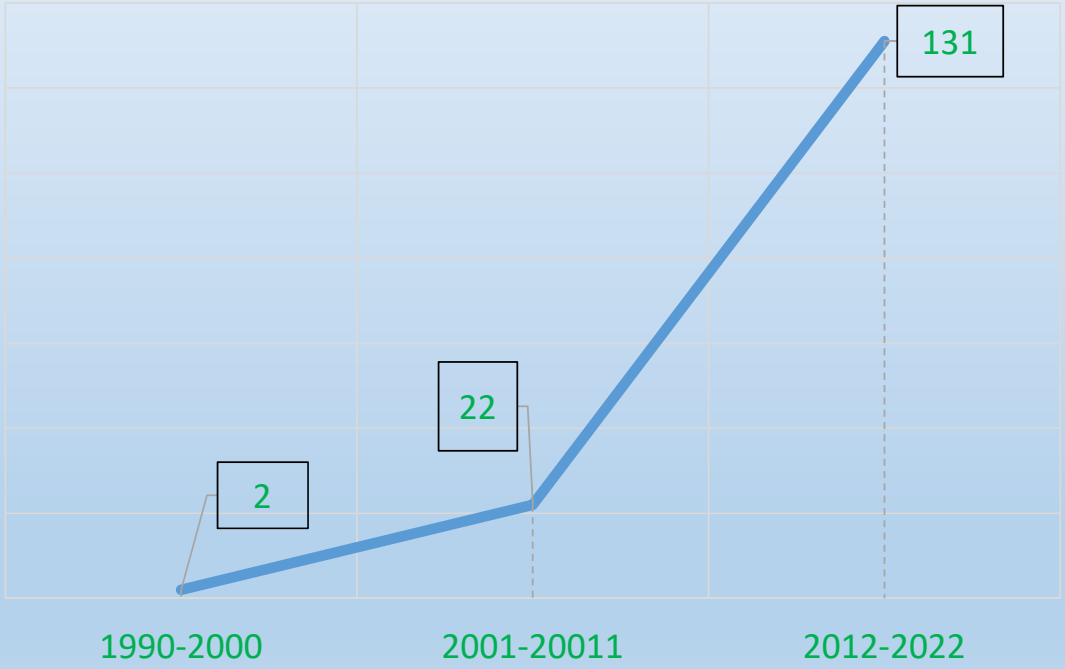


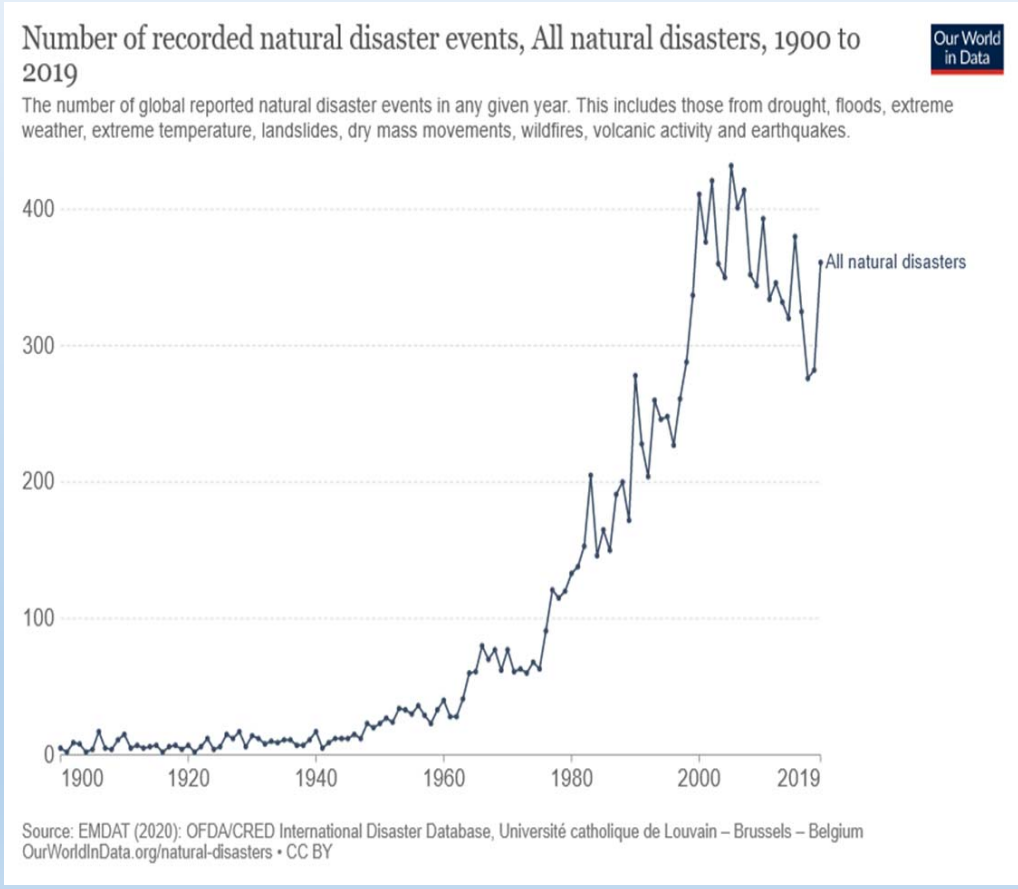
Source: Adapted from J. Patz, National Oceanic and Atmospheric Administration (https://toolkit.climate.gov/image/505).

Research activities in PSYCINFO

Keywords: ***mental health/-illness/-disorder/psychiatric illness & climate change/global warming/ climate crisis***

Number of publications





(Russel et al. 2019)

Charlson et al. (2020; I. J. Env.Res. P. H.) Forschungsaktivität (120 Studien) mit Studienart

- Data base
  - 1.1. 2001 – 31.12. 2020
  - PubMed, PsycINFO, EMBASE, CINAHL, Web of Science, Scopus

Search ((((((((((“Climate Change”[Mesh]) OR “Global Warming”[Mesh]) OR “Global Warming”[tiab]) OR “climate change”[tiab]) OR “Greenhouse Effect”[Mesh]) OR “Greenhouse Effect”[tiab]) OR “Climatic Processes”[Mesh]) OR “Hot Temperature”[Mesh]) OR “Climate”[Mesh]) OR “Weather”[Mesh]) OR “Weather”[tiab])) AND ((((((“Mental Disorders”[Mesh]) OR “Mental Disorders”[tiab]) OR “Mental Disorder”[tiab]) OR “Mental illness”[tiab]) OR “Mental illnesses”[tiab]) OR “Mental Health”[Mesh]) OR “mental health”[tiab])

- 50% are qualitative oriented

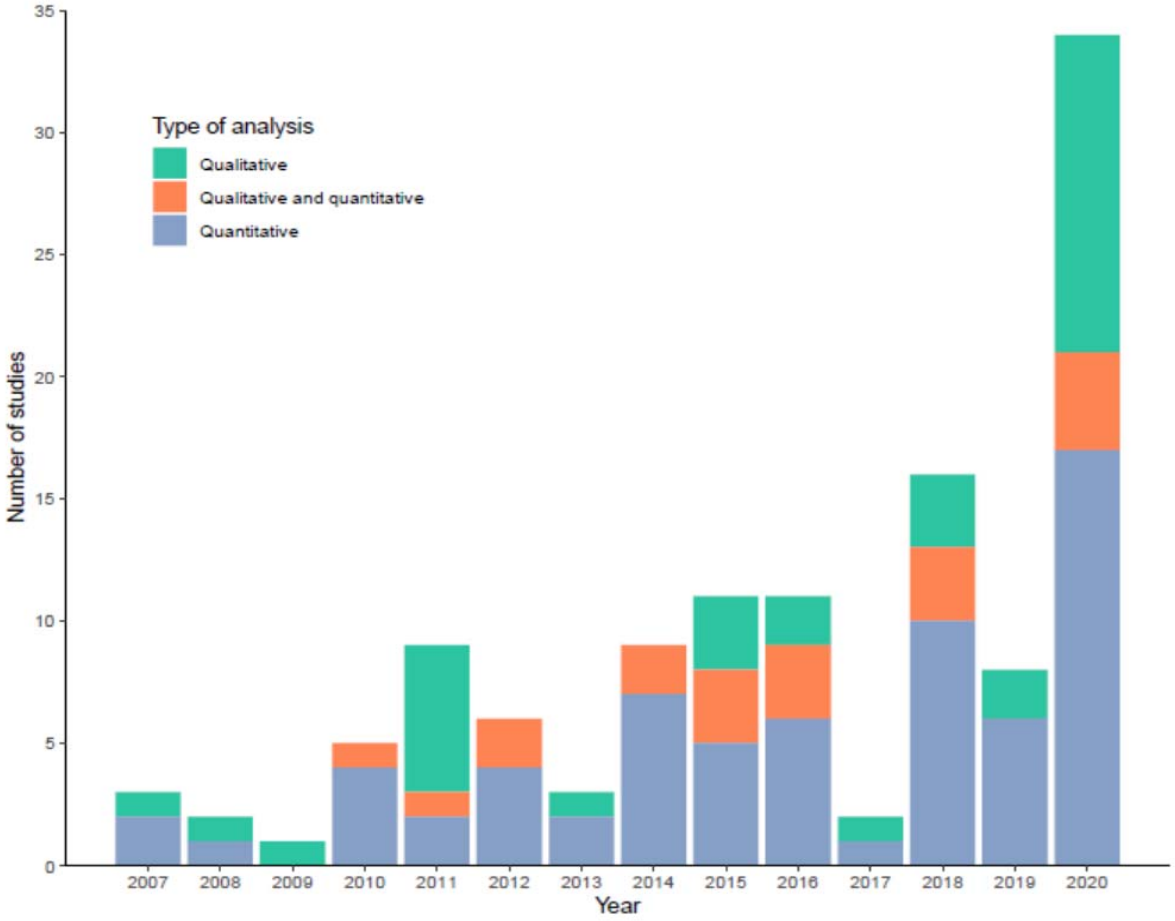
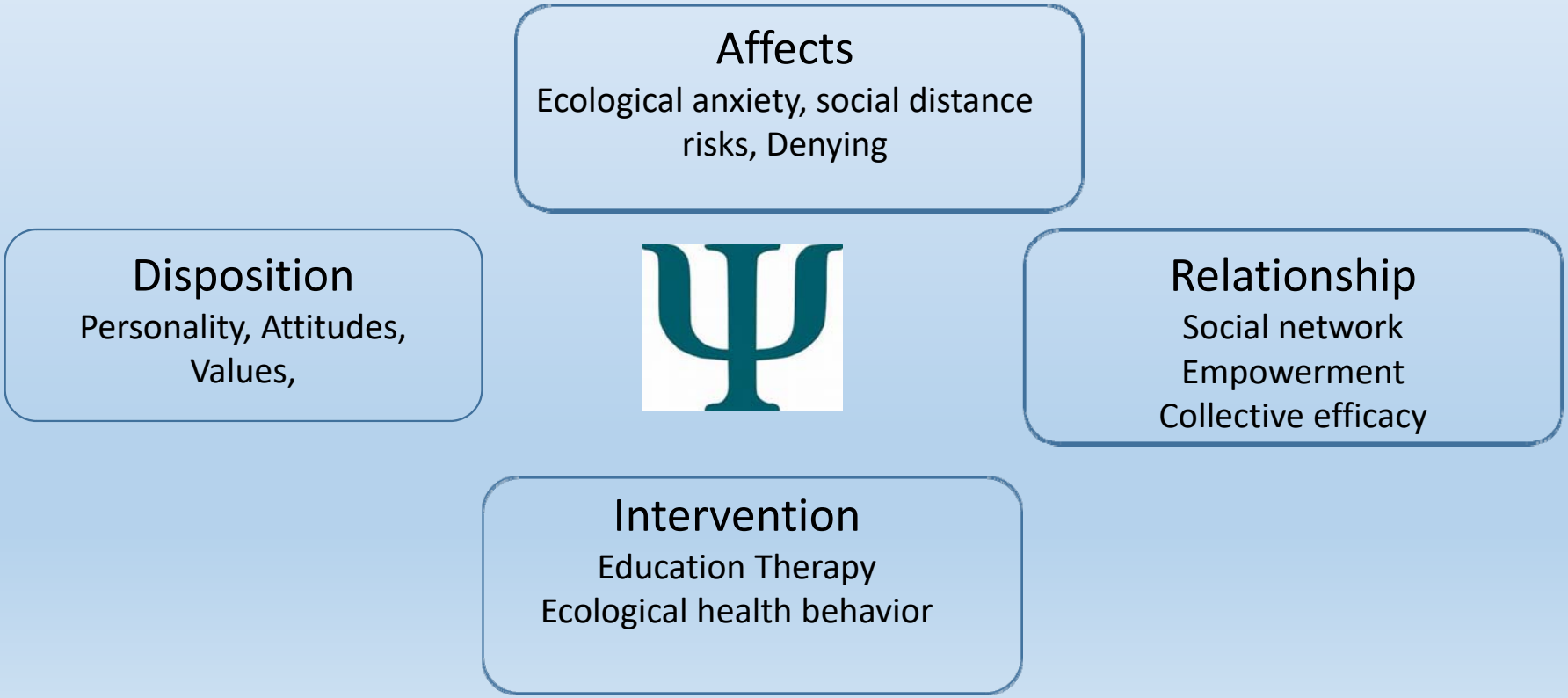


Figure 3. Number of studies published over time, by analysis type.

Climate-related research interests in psychology (PSYCINFO) Examples (number of contributions)

Psychology of

Environment (154) **Social (115)** **Education (92)** **Development (15)**
Community (15) **Organization (11)** **Health (34)** **Clinical (34)**



On the quality of research based on reviews

Own literature search via:

- **Climate change or climate crisis and mental health**
- **Pubmed, Psychinfo, Cochrane, own search:**

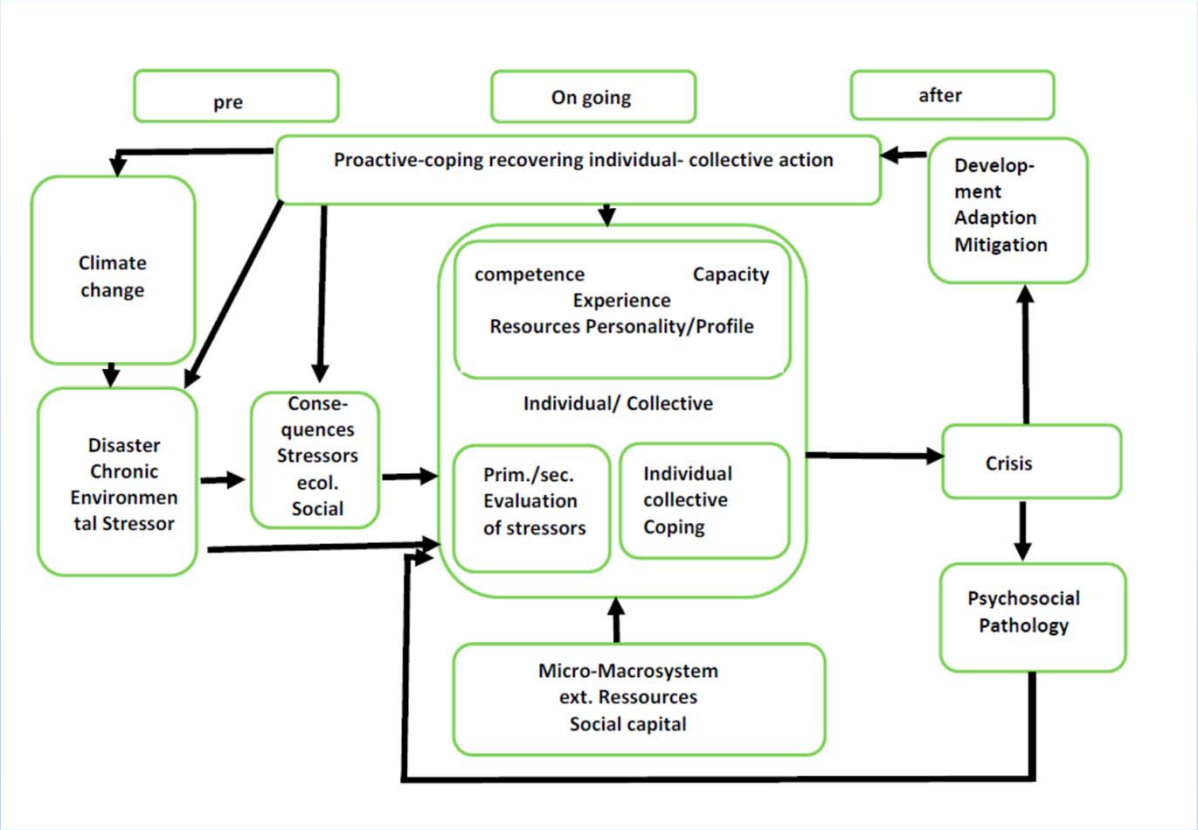
→ **40 reviews**

→ **Useful: 3 studies with syst. search and method quality of studies (very good 0.3-75%)**
8 meta-analyses (4 self-found)

Hwong et al., Lancet Planet Health 2022; 6: e281–91; Charlson et al., Int. J. Environ. Res. Public Health 2021, 18, 4486, Thompson et al. Public Health, 2018, 161, 171
Beaglehole et al., Br.J. Pstry, 2018, 213(6); *Cruz et al. Int J Environ Res Public Health. 2020, 17(22):8581*, *Furr et al., J Consult Clin Psychol. 2010* Dec;78(6):765-80; Liu et al., Env. Bev. 153, 2021, 106533, *Parker et al. 2016; Int. Psychogeriatrics (2016), 28:1, 11–20, Rubonis & Bickman 1991, Psych. Bull, 109, 3. 384*; Schmitt et al. Sci Total Environ. 2021, 772: 145025, Tang et al. BMC Pub Health 2014, 14:623, *Kursiv*: selbst gefunden

Vulnerability model: mental disorders come in a roundabout way (see APA, 2009; Norris et al. 2008)

- Individual and collective processing of climate impacts
- Characteristics of the impact
- Primary and secondary processing
- Moderated by person and context



Descriptive results of systematic reviews

- **Hwong et al. (Lancet Planet Health 2022; 6: e281–91)**
  Climate Change **k= 56 Studies**
  - Distress, Anxiety disorder, Depression, PTSD
  - Violence, Psychosis, Bipolar disorder, Dementia

- **Charlson et al. (Int. J. Env. Res. Publ. H. 2021, 18, 4486.)**
  Climate Change **k= 120 Studies**
  - Suicide, Distress, Anxiety disorder, Depression,

- **Thompson et al. (Public Health, 2018, 161, 171-191**
  Hitze **k= 35 Studies**
  - Suicide, Alcohol abuse, bipolar disorder, Psychosis, Dementia

Question:
How strong are the effects of climate-related events to get a diagnosis of a mental disorder ?

Results of 8 meta-analysis

- **Topic:** Natural disasters, Temperature, Environmental Poissoning
- **Mean Effect(8 Meta-analysis) Meta-Meta-Analysis:** r= .16 (-0.061 – 0.360; fixed) (Z= 1.41; p< .16; I^2= .00)
- **Mainly:** Disorders, PTSD, Anxiety disorder, Depression, Psychosis, Drug dependency
- **No Meta-Regression** Difference between adults and child
- **No Qualitäty control:** yes but not evaluated

Beaglehole et al., Br.J. Pstry, 2018, 213(6); *Cruz et al. Int J Environ Res Public Health. 2020, 17(22):8581, .Furr et al., J Consult Clin Psychol. 2010* Dec;78(6):765-80; Liu et al., Env. Bev. 153, 2021, 106533; *Parker, Psychogeriatr. 2016,28(1):11-20, Rubonis & Bickman 1991, Psych. Bull, 109, 3. 384;* Schmitt et al. Sci Total Environ. 2021, 772: 145025, Tang et al. BMC Pub Health 2014, 14:623,

Out of 51 studies on the psychological consequences of climate-related disasters *(see Hwong et al. 2022;)*

- **59%:** Changes in ambient temperature.
- **30 %** cyclones, floods, typhoons, dust storms, temperature fluctuation.
- **14 %** drought
- **7 %** long-term changes in humidity, rainfall, sunshine hours, wind, air pollution, noise pollution.

Temperature fluctuations: Suicide risk, etc. (Charlson et al. 2022)

- **RR = 1.04 (≈.02) to 1 degree Celsius (15 studies, Thompson et al. 2018) r= .10-.64 (bipolar .27 (3), Schiz: .95 (5))**

- **1 degree is low, but weightyu. with low base rate**

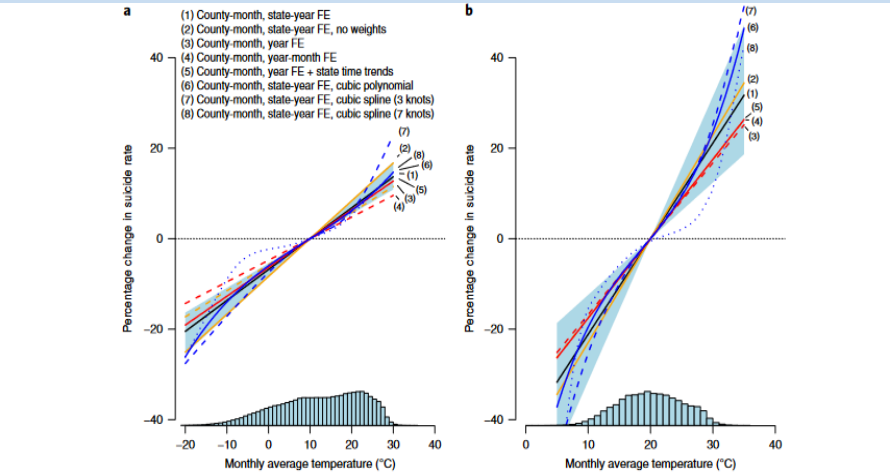


Fig. 1 | Effects of temperature on suicide rate. a,b, The lines show the estimated relationship between monthly temperature and monthly suicide rate in the United States (**a**; 1968–2004) or Mexico (**b**; 1990–2010), under different specifications of the fixed effects (FE) and increasingly flexible polynomials or splines as described in the legend. The blue shaded areas are the bootstrapped 95% CI on Model 1 for each country. The histograms at the bottom display the distribution of monthly temperatures in each sample. Fixed effects in Mexico are as in the United States, except with municipality and state-month fixed effects in place of county-month fixed effects.

Temperature fluctuations: : Violence/Deviance

- Poverty more significant than heat for homicide (World Bank; Kuznar et al. 2021)
  - r= .26 Temperature r= .70 Gini (World Bank data; Kuznar et al. 2021)

Flood

- Increased association in 60 studies of PTSD, acute stress syndrome (ASD), anxiety disorder, depression, substance abuse, suicide, others (Sharpe & Davison, 2021)
  E.g. South Asia (k=23)
  PTSD: 0.2-100%
  Depress.: 0.7-61.5%
  Anxiety Disorder: 0.1-44%.

- Moderated by threat, support, psychological premorbidity, gender (women↓; men alcohol), coping (Fernandez et al. 2015).

Storm Hurrycane Taiphon
(Cianconi et al., 2020; Palinkas & Wong 2020)

- **Kessler et al. (2008)**
  Incicence

N= 815 (> 8 month) Hurrican Katarina
PTSD: 14,8→ 20,9%
Severe disorders 10,9% → 14,0%
Suicide ideas 2,8% → 6,4%

- **Scaramutti et al. 2018**
  N 218 Hurricane Maria
  Prevalence

Percentages of Participants with Clinically Significant Symptom Criteria

Variable	Site			Urbanicity		
	Florida, %	Puerto Rico, %	OR (95% CI)	Urban, %	Rural/Suburban, %	OR (95% CI)
Depressive symptoms	46.5	32.7	1.67 (0.97-2.86)	34.1	50.0	1.97[a] (0.98-3.95)
Anxiety symptoms	25.0	27.0	1.17 (0.65-2.11)	23.5	41.4	**2.25 (1.21-4.16)**
PTSD	65.7	43.6	**2.94 (1.67-5.26)**	48.8	66.7	**2.35 (1.29-4.28)**

Odds ratios adjusted for respondent age and gender. Odds ratios and 95% confidence intervals in bold are statistically significant at $P < .05$.
[a] P value greater than .05 but less than .10.

Drought (Stanke et al. 2013; Vins et al., 2015)

- Cianconi et al. 2020 (in 6 Studies more suicides)
- E.g.Guerney (2012)

TABLE 1: *Number of farming suicide deaths as a proportion of all Victorian suicides 2001–2007*

Year	Total number of Victorian suicides	Number of Victorian farming suicides	Farming suicides as a percentage of all Victorian suicides (%)
2001	541	18	3.3
2002	528	13	2.5
2003	540	19	3.5
2004	521	18	3.5
2005	506	11	2.2
2006	444	18	4.1
2007	443	13	2.9
Total	3523	110	3.1

Forrest-Bush fires

- **Significant correlations (To, 2021) 54 Studies**
- **E.g. (Mc Farlane et al, 1997 Austarlia bush fire: (N= 1526):**
  33% Depression
  24% PTSD
- ♀ > ♂
- **43% psychiatric cases**

PTSD: → 60%; child 92%

Depression: → 24,8 %

Anxiety disorder: → 19,8 %

Table 1 GHQ data for the Ash Wednesday bushfire victims

GHQ	Males (n = 744)		Females (n = 704)		Comparison of male and female scores Mann-Whitney U test
	Mean	SD	Mean	SD	
Somatic	1.4	(1.9)	1.8	(2.2)	247,828*
Anxiety	1.8	(2.4)	2.4	(2.6)	241,953*
Social dysfunction	1.3	(2.0)	1.5	(2.2)	261,501
Depression	0.4	(1.2)	0.7	(1.5)	247,354*
Total score	4.9	(6.3)	6.4	(7.1)	233,045*

*$P \leq 0.001$

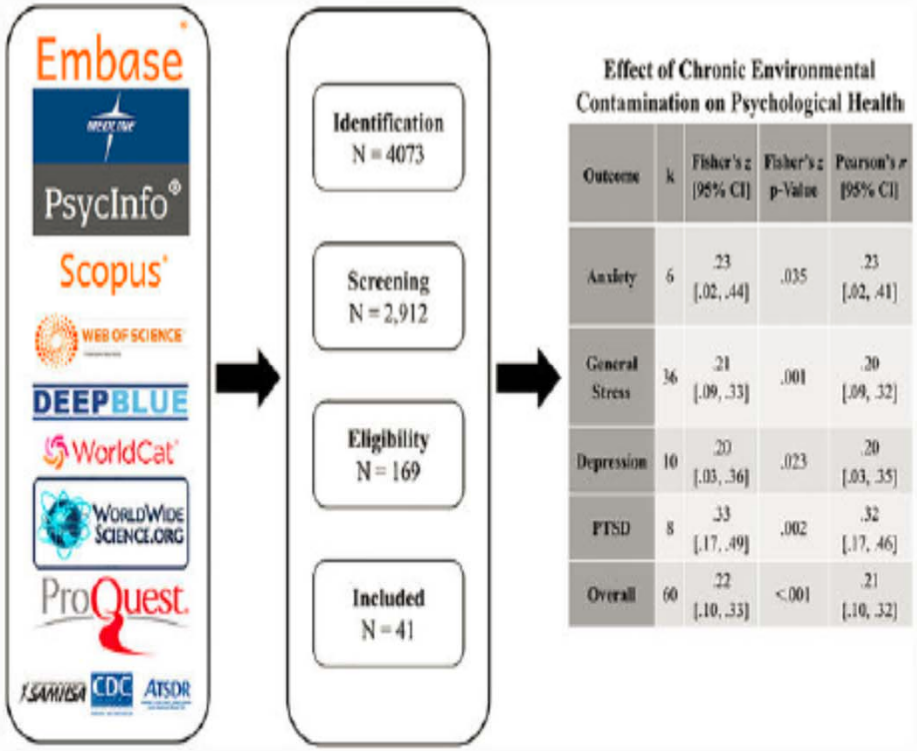
Chronic environmerntal poisonning and mental health

(Schmitt et val. 2021) Sci Total Environ. 2021 June 10; 772: 145025.

- K= 41 Studies
- Men made poissoning of air, water, ground,
- r= .21 -> Anxiety disorder, Depression, PTSD
- Covid 19 ???

  (Röhrle, in preparation/ SMD= .26 k= 6 Longitudinal studies)

Schmitt et al.



Effect of Chronic Environmental Contamination on Psychological Health

Outcome	k	Fisher's z [95% CI]	Fisher's z p-Value	Pearson's r [95% CI]
Anxiety	6	.23 [.02, .44]	.035	.23 [.02, .41]
General Stress	36	.21 [.09, .33]	.001	.20 [.09, .32]
Depression	10	.20 [.03, .36]	.023	.20 [.03, .35]
PTSD	8	.33 [.17, .49]	.002	.32 [.17, .46]
Overall	60	.22 [.10, .33]	<.001	.21 [.10, .32]

Interim evaluation of the consequences of the various disasters

- Small to medium effects, but with small effects weighty effects with existing base rate problems
- Studies predominantly simple, complex correlations rarely discernible
  - Influence of other stressors but also protective factors (resilience, support) little known, not included (indirect correlations, multi-level analyses; influence of moderators e.g. also group-specific effects)

Vulnerable Groups

(APA 2017; https://www.apa.org/news/press/releases/2017/03/mental-health-climate.pdf)

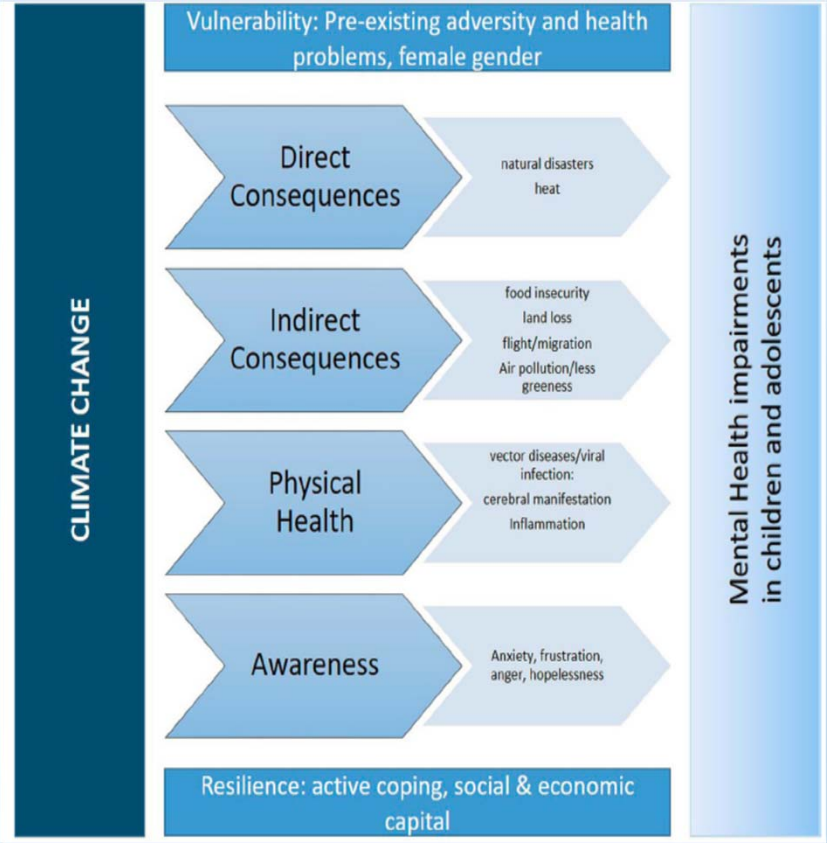
Child
Elderly
immoble people
mentally disordered
Poor people
Pregnant / postpartum women
chronic insane

Heat and Mental disorder

- Death rate 3 times higher with pre-existing mental illness (k= 6 ; RR= 3.61 (≈d=.60) Bouchama et al. 2007).
- Increased admission rates for heat (Hansen et al. 2008)especially retarded, Alzheimer's, elderly, schizophrenia (RR= 1.28)
- Death rate in psychoses, dementia and alcoholism (9 areas; RR= 1.01)Effect in medication use (esp. anxiolytics) proven (RR= 1.11)(Page et al. 2012)

Psychological consequences in children
(Clemens et al. 2022; Eur Child Adolesc Pstr;31(5):701

- Wang et al., 2013 (85 Studies)
  Tang et al., 2014 (31 Studies)
  reporting
  - PTSD-Rates 1.0 – 60%
  - Depression 1.6 – 44,8%
    (Child and death relatives) OR 2.85 (.60)



Elderly and Disasters

- Parker et al. 2016 (k= 6)
  Effects→ (d)
  - PTSD: OR: 2.11 (.41)
  - Depression: OR: 0.71 (.19)
  - Anxiety disorder: OR: 0.78 (.14)
  - Adjustment disorder OR: 1.73 (.29)
  - Distress OR: 1.41 (.19)

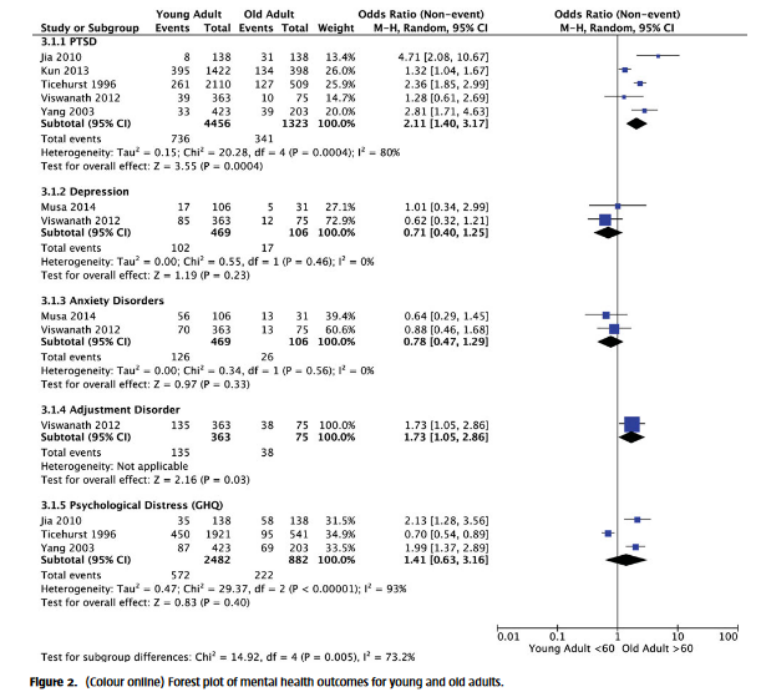
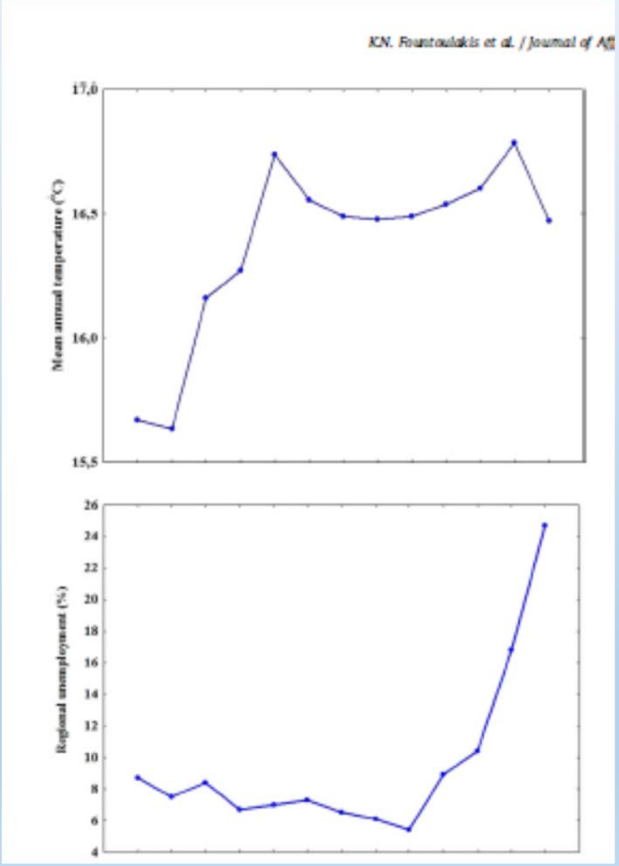


Figure 2. (Colour online) Forest plot of mental health outcomes for young and old adults.

Something about the social situation: Social losses and inequality

- Suicide rates as a function of climate and economic variablesFountoulakis et al. Ann Gen Psychiatry. 2016 Aug 9;15:19
- 29 European countries (2000-2012; World Bank).
- (low temperatures) ♂ : r= .64
  (unemployment rate) : r= .02
- Psychological harm depends on education
  At least 4 studies (Chen et al. 2020; PTSD)



And who can stand all that?

(Ojala et al. 2021, An. Rev. Env. Res., 46, 35-58)

- **Prerequisite: Well-being, coping and the right feelings are a protection against mental disorders on an individual and community level.**

- **Feelings:** **Is eco-distress good?**

- **Coping & well-being:** **Fear alone is no good, you have to understand and be able to change and not be alone**

Necessary feelings

- Neccessary feelings (Stanley et al. J. Climate Change& Health 2021 [online])

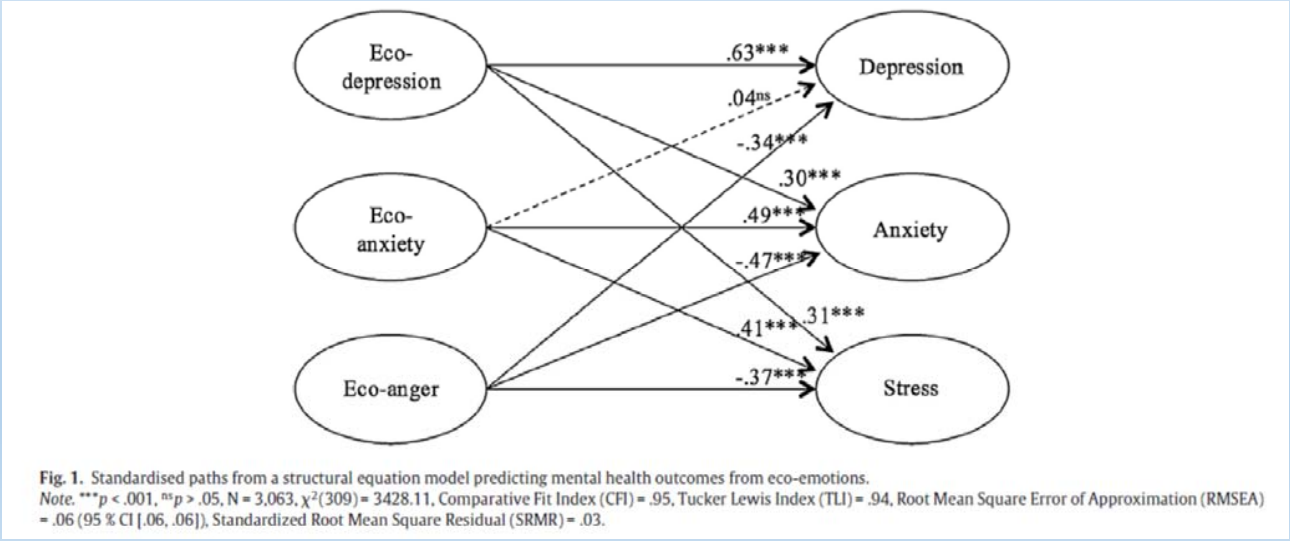


Fig. 1. Standardised paths from a structural equation model predicting mental health outcomes from eco-emotions.
Note. ***$p < .001$, $^{ns}p > .05$, N = 3,063, $\chi^2(309) = 3428.11$, Comparative Fit Index (CFI) = .95, Tucker Lewis Index (TLI) = .94, Root Mean Square Error of Approximation (RMSEA) = .06 (95 % CI [.06, .06]), Standardized Root Mean Square Residual (SRMR) = .03.

- N=9705 adults

  Negative Emotion
  &
  mental health (simple Rating)

  r= -.24

- (Ogunbode et.al. 2021)

Coping (Ojala, 2012) and perceived climate change

- 293 children (12 J.)
- Problem oriented coping strenghtens negative affects (confrontation)
- Meanin oriented coping diminishes negative affects, strenghtens positive affects; satisfaction of life, Optimism

Table 3
Pearson correlations between the three coping strategies and measures of environmental engagement and well-being.

	Meaning-focused coping	De-emphasizing/ don't care	Problem-focused coping
Optimism concerning climate change	.61*** ($n = 287$)	−.04 ($n = 282$)	.18** ($n = 290$)
Environmental efficacy	.43*** ($n = 287$)	−.39*** ($n = 282$)	.51*** ($n = 290$)
Pro-environmental behavior	.29*** ($n = 288$)	−.38*** ($n = 283$)	.70*** ($n = 289$)
General negative affect	−.12*($n = 288$)	−.16** ($n = 283$)	.19*** ($n = 291$)
General positive affect	.13* ($n = 288$)	.06 ($n = 283$)	.03 ($n = 291$)
Life satisfaction	.22*** ($n = 288$)	.10 ($n = 283$)	−.01($n = 291$)
Purpose in life	.13* ($n = 286$)	−.05 ($n = 281$)	.31*** ($n = 289$)

Note. *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

Collective power: Community resilience:
A first systematic review on correlates and outcomes of a collective power
Roehrle (2022) Presentation -17 European Congress of Psychology Lublijana 5.-8.7.22

17th European Congress of Psychology
Psychology as the Hub Science: Opportunities & Responsibility
5-8 July 2022, Ljubljana, Slovenia

- What is Community Resilience?
  - Connectedness and caring
  - Place attachment
  - Resources of social trust
  - transformative potential
  - Disaster management
  - Information and communication
  - leadership
  - collective efficacy
  - preparedness (see Leykin et al. 2013; Pfefferbaum et al., 2013).

  - Meta-Analysis Roehrle (2022) (k=35; 2 pathogen + 8 resource oriented)

Resource oriented consequences

- Across eight studies a medium high effect size was achieved

Model	k	Point estimate	Lower limit	Upper limit	Z	p	I^2
fixed	8	0.439	0.424	0.454	49.746	.000	97.874
random	8	0.388	0.269	0.495	5.991	.000	

The avoidance of negative consequences

- Only 2 studies examined influences on the avoidance of negative states (anxiety and depression). As a result, they show a medium-high correlation on a reliable basis.

Model	k	Point estimate	Lower limit	Upper limit	Z	p	I^2
fixed	2	-0.399	-0.481	-0.310	-8.082	0.085	0.000
random	2	-0.399	-0.481	-0.310	-8.082		

And if this is not enough….
Intervention approaches

- Individual strategies
  - Prevention
    (direct and mediated)
  - Treatment

- Collective Strategies: Strengthening of „Community Resilience“

Preventive approaches

- **Dealing with climate change anxiety (directly) (Bingley et al. 2022)**
  - **Climate anxiety as existential and stressor**
  - **Strengthen needs/hedonic well-being**
  - **Strengthen social relationships (also in initiatives, cf. Schwartz et al. 2022)**
  - **Strengthening environmental coping (e.g. meaning-oriented, collective coping [Dohm])**
  - **Strengthening emotion regulation (e.g. expression)**
  - **Classical therapy such as cognitive behavioural therapy or interpersonal therapy etc. not yet evaluated, the rest is not evaluated either.**

Preventive approaches

- To deal with consequential problems of climate impact and disasters (indirect).
  - General skills (problem solving, stress management, social skills, well-being therapy)
  - Related to life events (e.g. unemployment, losses, loneliness, etc.)
  - Indicated: disorders not yet pronounced (e.g. violence, depression, anxiety, etc., trauma-first aid, debriefing)

Therapetic approaches in the case of disasters

Pfefferbaum et al. 2019; https://doi.org/10.1007/s10566-019-09494-9

- 29 Studies, Meta-Analysis
- Procedure: Behavior therapy, meditation, body oriented therapy, education, confrontation, EMDR, Play therapy. etc.

		Effect size
• Depression	21 Studies	.14
• Angst	9 Studies	.39

- Natural disasters

• Depression	6 Studies	.40
• Anxiety disorders	2 Studies	.43

Community Resilience: Intervention (Abrash-Walton et al. 2021).

- Preparations
  - Risk-resource analysis
  - Bonding-Bridging
  - Social capital: access, trust, security
  - Training: inside-outside
- Recovery
  - Citizen-centred, participatory
  - On-site assistance
  - Recovery needs
  - Disaster preparedness

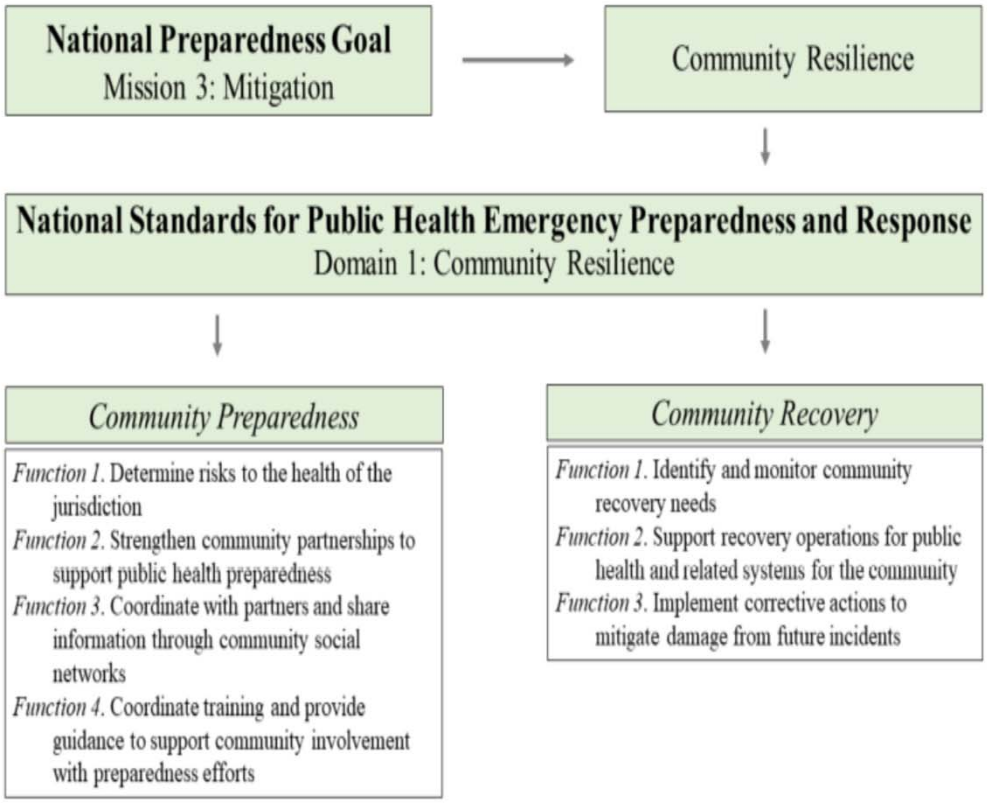


Figure 1. Community resilience, although affected by all five missions, is named explicitly within Mission 3 of the National Preparedness Goal [14], and Domain 1 of the National Standards for Public Health Emergency Preparedness and Response [19].

Advice for the services: Make preparations - First aid

- Preparing services with first aid, emergency plans
- Outreach in the outpatient sector
- Capacity flexibility in facilities (hopefully climate neutral)
- Bonding-bridging (inside; outside; as a resilience system)
- Education of staff, helpers, key figures etc.Self-protection of helpers, supervision, group activity
- General: services need to be not only climate-centred but also capacity- and quality-centred
- Stepped care from prevention (universal, selective, indicated) to rehabilitation

- (Palinkas et al., 2020; Röhrle 2021: http://www.gnmh.de/daten/20200709-Roehrle-psychosoziale-Folgen-von-Disaster.pdf)

Summary and conclusions

- **Climate change and its natural, economic, social, cultural, structural and political consequences are also a serious problem for mental health and social security, despite small effects.**
- **For certain stresses and for certain risk groups, the burdens are considerable. Overall, however, it is also evident that methodologically high-level statements are difficult to make.**
  - **The number of studies is still comparatively small and not of high methodological quality.**
  - **Reviews without a comprehensible system and without meta-analytical support allow accusations of biased selection and quantitatively inaccurate evaluation. This can be used against the environmental initiatives**

Conclusions for research

- **Existing framework models need to analyse the relationship between climate change and mental disorders, other diseases and social situations more precisely. To this end, the lack of structural and multi-level models must be compensated for (more complex analysis of the many contextual and individual factors and processes involved).**
- **Research on the climate-related emergence of mental disorders is in need of development (e.g. lack of transdisciplinarity, stronger integration of individual and collective models, integration of the phases of dealing with disasters).**
- **Intervention approaches (prevention, therapy, rehabilitation) need to reformulate their notions of an existential threat and adapt their approaches (also think growth processes). There is an urgent need for more evaluations, especially at the collective level.**

Following the results

- The struggle for better care for the mentally ill (approx. 3
  and for their prevention is a contribution to the attenuati
  preparation of the consequences of climate effects.

  Social and health policy is a central part of environmental policy (perhaps even a prerequisite) and vice versa.

- The fight against environmental problems is also a contribution to the prevention of mental disorders. It is the reconquest of a sustainable, modest world of well-being for all creatures (with less inequality and other social noxae).

Thank you

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