

# Assessing and Quantifying Stressors

*Workshop on resilience quantification in humans,  
10th Resilience Symposium, Mainz*

## Why quantify stressors?

Resilience = maintenance or quick recovery of mental health  
during or after adversity

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during or after adversity

→ No resilience quantification without assessment of adversity  
= stressor exposure

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  - *...not be confounded with mental health symptoms (e.g. „being stressed by ruminative thoughts“)*
  - *...ideally not involve appraisals (e.g. „having not enough social contacts“, or severity ratings)*
  - *...minimize retrospective reporting bias*

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- ...ideally not involve appraisals (e.g. „having not enough social contacts“, or severity ratings)

- ...minimize retrospective reporting bias

- + ...focus on observable stressors

- + ...use stressor counts (instead of severity ratings)

- + ...include clear instructions and examples for broader stressor categories

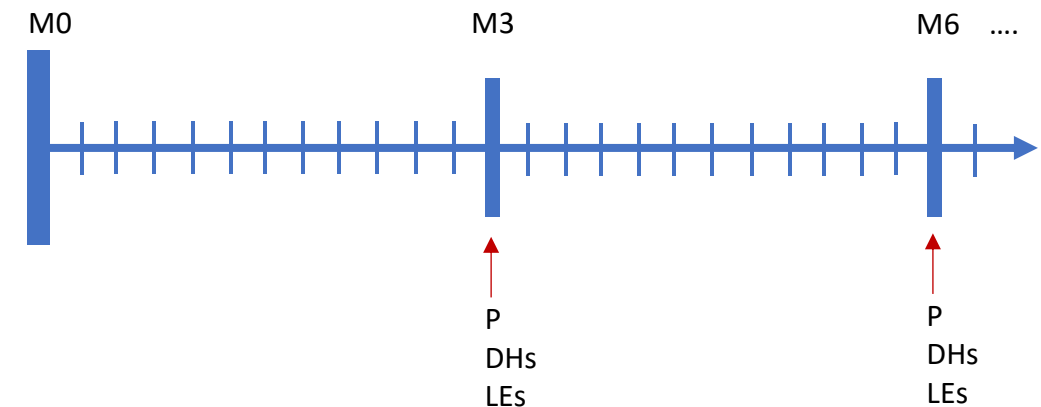
- + ...cover an appropriate reporting time window

## How to assess stressors?

- Granularity: How fine-grained stressors are assessed depends on...
  - *...time scale:*
    - **Micro stressors:** Daily hassles (DHs) -> everyday quality (7-14 days)
    - **Macro stressors:** Life events (LEs) -> more severe, less frequent (3 months)

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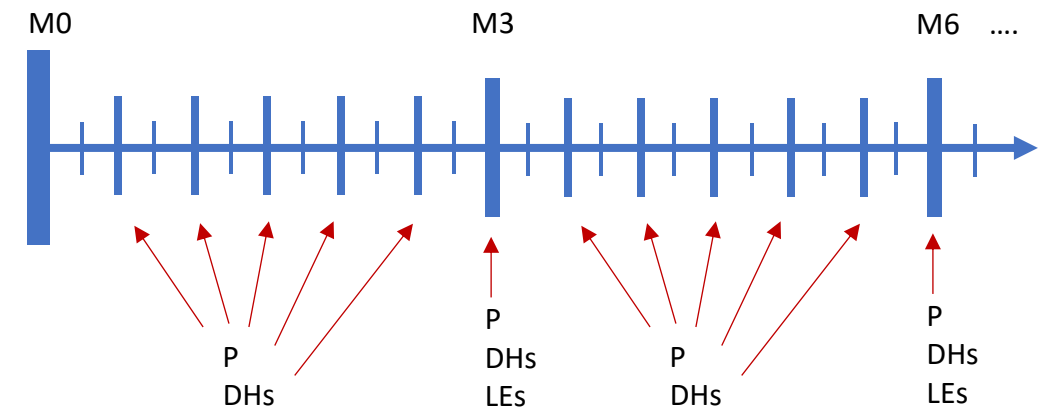


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## How to assess stressors?

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  - *...time scale:*
    - **Micro stressors:** Daily hassles (DHs) -> everyday quality (7-14 days)
    - **Macro stressors:** Life events (LEs) -> more severe, less frequent (3 months)
  - *...economical constraints:*
    - Stressors within one list should ideally have similar granularity
    - Less items → less granularity
  - *... your sample!*
    - Are there sample-specific stressor domains
    - Are certain stressors unlikely to occur?

Micro stressors:

Mainz Inventory of Microstressors  
(MIMIS)

## Micro stressors: Mainz Inventory of Microstressors (MIMIS)

- Chmitorz et al., 2020
- 58 daily hassles
- Count and severity rating
- Focus on “observable” stressors from daily life in modern society
- Validated in western population of younger to middle-aged adults

Please think about the last 7 days including today.

	On approximately how many days did the situation occur?							To what extent did you find the situation mentally straining, on average?		Did not occur
	1	2	3	4	5	6	7	Not at all	Very	
1. Losing or displacing objects	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
2. Negative event in the media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
3. Negative political event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
4. Social obligation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
5. Interruption during an activity (eg, at work or during leisure activities)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
6. Waiting time or delay (eg, waiting for a person; bus or train delay)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
7. Careless mistakes or slips due to a lack of attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
8. Gossip (including social media)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
9. Discrimination or mobbing by another person (including social media)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
10. Nightmares	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
11. Journey/commute to work/university/school	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
12. Minor offence (eg, fine)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
13. Trouble with authorities, state office or other institutions (eg, tax office, bank, company)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
14. Conflict or disagreement at work (eg, with colleagues or boss)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
15. Conflict or disagreement with close persons (eg, parents, siblings, partner)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
16. Conflict or disagreement between close persons (between parents, siblings, friends)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
17. Conflict or disagreement with other non-related persons (eg, bus driver, neighbor)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>
18. Conflict or disagreement with own child/children	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>

## Micro stressors: Mainz Inventory of Microstressors (MIMIS)

### ■ Instructions:

We would like to ask you about annoyances and hassles as may occur in daily life.

The list below contains possible situations. Please only consider **the last 7 days including today**. Please read each item on the list and rate:

- On **approximately how many days** the mentioned situation occurred (please choose ‘did not occur’ if you did not experience the situation)
- To **what extent** the situation caused you mental **strain** (from ‘not at all’ to ‘very straining’)

Please think about the last 7 days including today.

	On approximately how many days did the situation occur?							To what extent did you find the situation mentally straining, on average?		Did not occur
	1	2	3	4	5	6	7	Not at all	Very	
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## Macro stressors:

### Life Events

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### Life Events

- Canli et al., 2006; derived from LHC (Caspi et al., 1996)
- 27 life events
- Positive and negative events (only negative ones used as stressors)
- Count and valence/severity ratings

Please refer to the **last three months** when answering the questions!

	very positive	rather positive	neutral	rather burdensome	very burdensome	not applicable	prefer not to say
1. Lost job							
2. Traumatic incident at work							
3. Planned a wedding							
4. Bought or sold a house, moved							
5. Major house renovation							
6. Had something stolen or vanished							
7. Legal problems							
8. Serious financial problems							
9. Serious illness, accident or diagnosis of a close family member (child, parent, sibling, grandparent)							
10. Serious illness, accident or diagnosis of a close friend or partner							
11. Death of a family member							
12. Death of a friend (other than boyfriend/girlfriend)							
13. Death of a beloved pet							
14. Parents separated							
15. Constant arguments between family members							
16. Broke up with boyfriend/girlfriend or spouse							
17. Serious arguments with boyfriend/girlfriend or spouse							
18. Serious problems in relationships with friends							



## Macro stressors:

### Life Events

#### ■ Instructions:

In the following, various life events that you may have experienced are listed one after the other. Please read the list from top to bottom. If one of these ever happened to you **during the last three months**, please indicate your age at the time (if it happened more than once, you can of course indicate several ages). It may well be that you have not experienced many of the listed life events so far. Please read them all carefully anyway. If you haven't experienced an event, just leave the field blank.

Finally, we ask you whether you have experienced the life events as positive, neutral or stressful on average. If you experienced the event multiple times, please rate the burden for every event separately.

Please refer to the **last three months** when answering the questions!

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## An example of adaptation: DynaCORE

- Cross-sectional and longitudinal survey in beginning of COVID-19 pandemic
  - Special situation
  - Economic constraints

Veer et al. *Translational Psychiatry* (2021) 11:67  
<https://doi.org/10.1038/s41398-020-01150-4>

Translational Psychiatry

ARTICLE

Open Access

## Psycho-social factors associated with mental resilience in the Corona lockdown

Ilya M. Veer<sup>1</sup>, Antje Riepenhaus<sup>4,6</sup>, Haakon Engen<sup>3,6</sup>, Göran Köber<sup>7,8</sup>, Marta A. Marciniak<sup>9,10</sup>, Adria Vaida Bartkute-Norkuniene<sup>18</sup>, Silja Kaja Damjanovic<sup>25</sup>, Joana De Kinga Farkas<sup>28,29</sup>, Clémence Anu P. Hiekkaranta<sup>10</sup>, Live S. Dionne B. Lenferink<sup>9</sup>, Thomas Sofia Muzychka<sup>20</sup>, Maria Ntafoi Anna M. Rosická<sup>49</sup>, Espen Røys Ana Teixeira<sup>10</sup>, Ana Todorovic<sup>5</sup>, Dorota Kobylńska<sup>11</sup>, Talma He Oliver Tüscher<sup>4,32</sup>, Kenneth S.

JMIR MENTAL HEALTH

Original Paper

## Psychological Resilience Factors and Their Association with Weekly Stressor Reactivity During the COVID-19 Lockdown in Europe: Prospective Longitudinal Study

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### Abstract

The SARS-CoV-2 pandemic is not only a health crisis but also a stress-related symptomatology described, hardly anything is known about the mechanisms of adversity. To gain mechanistic insight into the current crisis, we assessed psychological resilience in a cross-sectional on (22 March to 19 April) in a convalescent health despite stressor exposure and tested two hypotheses (osfio/16btrn) were tested that positive appraisal style (PAS) predicts a positive association between perceived stress and the ability to easily recover from stress. The analyses (osfio/thka9) showed that PAS identifies modifiable protective factors.

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## An example of adaptation: DynaCORE

- 2 types of stressors:

## An example of adaptation: DynaCORE

- 2 types of stressors:
  - 11 ,general stressors‘, derived from MIMIS and life events

General stressors (for calculation of $E_G$ )
Negative political events.
Conflicts or disagreements in family, social, or professional settings.
Financial problems.
Myself or a close person experienced physical health problems.
Myself or a close person experienced mental health problems.
Burdensome experiences at home or with your family (e.g., caring for/looking after relatives).
Burdensome experiences at work, school, university, or another occupation.
Burdensome environmental experiences (e.g., pollution, noise, unsafe neighborhood, ...).
Conflicts with strangers (e.g., authorities, criminals).
Separation from a loved one.
Death of a loved one.
other

## An example of adaptation: DynaCORE

- 2 types of stressors:
  - 11 ,general stressors‘, derived from MIMIS and life events
  - 29 COVID-related stressors

Corona crisis-specific stressors (for calculation of $E_s$ )
Having COVID-19 symptoms, or symptoms that could be related to COVID-19.
COVID-19 symptoms, or symptoms that could be related to COVID-19 in family members, friends, loved ones, or colleagues.
Being at increased risk for an infection (e.g., at work).
Being at increased risk for a serious course of the disease in case of an infection (belonging to a so-called 'risk group').
Family, friends, or loved ones being at increased risk for a serious course of the disease in case of an infection (they belong to a so-called 'risk group').
Problems with access to healthcare, medication, or sanitation.
You cannot return to the country you live in.
(Feeling) restricted to leave your home.
Loss of social contact.
Unable to attend an important social event.
Family, friends, or loved ones are at the hospital and you are restricted in visiting them.
Unable to attend a funeral of a family member, friend, or loved one.
Family, friends, or loved ones serving in the army or as first responder (paramedic/firefighter/police).
Family, friends, or loved ones working as health care professional.
Not being able to perform leisure activities.
Less physical activity than usual.
Problems arranging childcare.

# Measuring stressors in your studies

Adapting existing measures, creating new items, recoding old variables

## Identifying new stressor items

- In several studies we adapted measures to suit the population
  - *DynaMORE*
    - *Pandemic-specific stressors*
    - *Terrorism or war related items*
  - *RESPOND*
    - *Migrant workers*
    - *Health care workers*

## Steps to identify relevant stressor items

- In RESPOND new items were identified through qualitative interviews
  - *Iterative process with researchers to narrow down most important items*
  - *Motivation to reduce items to decrease burden on participant*
- In DynaMORE and other studies items were identified by researchers
  - *Through discussion and subject knowledge*
  - *Literature on target population*
- Also consider existing measures (such as Life event list and MIMIS)

## RESPOND population specific stressors

We would like to ask you about annoyances and hassles as may occur in daily life. The list below contains possible situations. Please only consider the last 14 days including today. Please read each item on the list and consider if it happened to you: ([0-3] 'did not happen/almost never' 'sometimes' 'often' to '(nearly) every day')

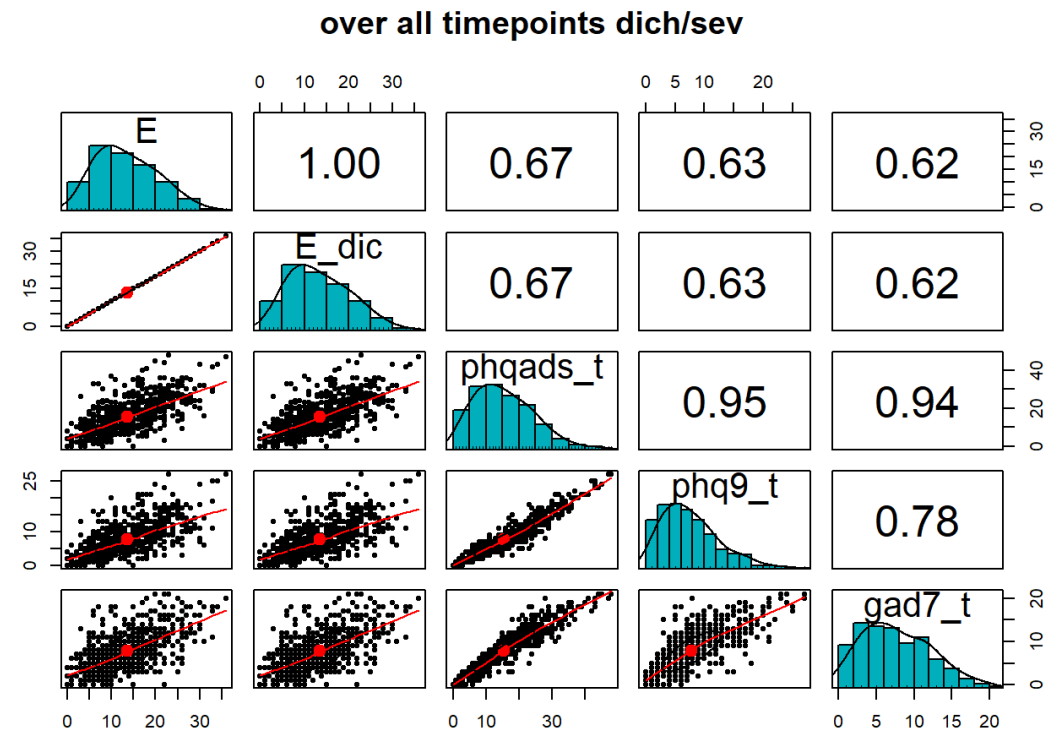
Item	Question
EH_1	Patients under your care have died due to COVID-19
EH_2	People you know have been hospitalized due to COVID-19
EH_3	Change in duties or unclear duties and protocols
EH_4	Difficulty combining social life with work

Item	Question
EV_1	Problems related to housing
EV_2	Problems related to legal issues, for example related to tax, immigration or residence permits
EV_3	Lack of access to services (for example: health services, etc.)
EV_4	Discrimination or racism
EV_5	Problems relating to language
EV_6	Inability to see family or close ones
EV_7	Inability to travel abroad
EV_8	Being at increased risk of passing on a COVID-19 infection



## Quality checks

- Design of the study
  - *time between assessments and collection time period*
  - *Burden on participants*
- Correlations
  - *Do stressors explain an adequate amount of variance in mental health?*



### When should stressors be assessed?

- Stressors should be included at all time points at which mental health problems are assessed. Ideally covering the same time period
  - *In the last week...*
- Ask over short time periods (to avoid recall bias)
  - *Past 7 days or two weeks*

### What if you already have collected data?

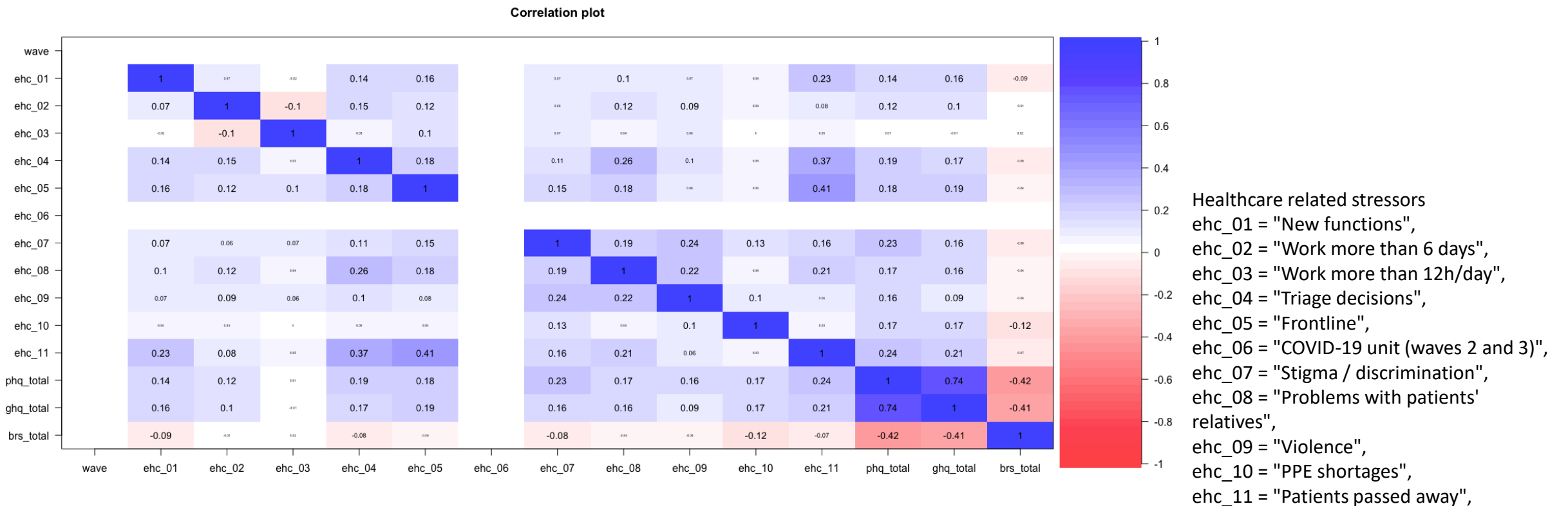
- It is also possible to recode relevant items in existing datasets
- Steps
  - *Review codebooks carefully*
  - *Compare items to existing measures and subject literature*
  - *Check if recoding is feasible (occurrence or appraisal?)*
  - *Build scores*
  - *Quality checks*

- **Design:** Prospective cohort study. Three waves: 2020, 2021, and 2022.
- **Participants:** HCWs aged 18 years or more working in Spain.
  - *Wave 1 = 2,300 people; Wave 2 = 1,800 people; Wave 3 = 600 people.*
  - Participants with all assessment waves = 330.*
- **Categorisation of stressors**
  - *193 survey items*
    - *Qualitative evaluation*
    - *Comparison with existing stressor lists*
      - *MIMIS*
      - *Dynacore studies (covid stressors)*
  - *17 dichotomous stress (yes/no)*
    - *Summarised in sum score*

#	Item (original wording)	Supporting sources
1	Have you been deployed.	Associated with poor mental health outcomes in Mediavilla et al. (2021), Moro et al. (2022)
2	Working 6 or more days a week.	Similarity to item in stressor list in Veer et al., (2021) “Increased workload”
3	Working an average of more than 12 hours per day.	Similarity to item in stressor list in Veer et al. (2021) “Increased workload” See also Moro et al. (2022)
4	Having to take triage decisions.	Associated with poor mental health outcomes in Amador-Perilla et al. (2023), Chou et al. (2022), Mediavilla et al. (2021)
5	Contact with COVID-19 patients (suspected or confirmed)	Similarity to item in stressor list in Veer et al. (2021) “Being at an increased risk for infection (e.g., at work).”
6	Working in a COVID-19 unit.	Associated with poor mental health outcomes in Czepiel et al. (2024), Lai et al. (2020), Moro et al. (2022), Paniagua-Avila et al. (2022)
7	Stigma or discrimination based on profession.	Associated with poor mental health outcomes in Kogan et al. (2023), Mediavilla et al. (2023), Moro et al. (2022), Zhang et al. (2023)
8	Experience of conflict or aggression with family members of patients.	Similarity to item in stressor list in Veer et al. (2021) “Conflicts with strangers”
9	Experience of violence due to being a HCW.	Similarity to item in stressor list in Veer et al. (2021) “Conflicts with strangers”

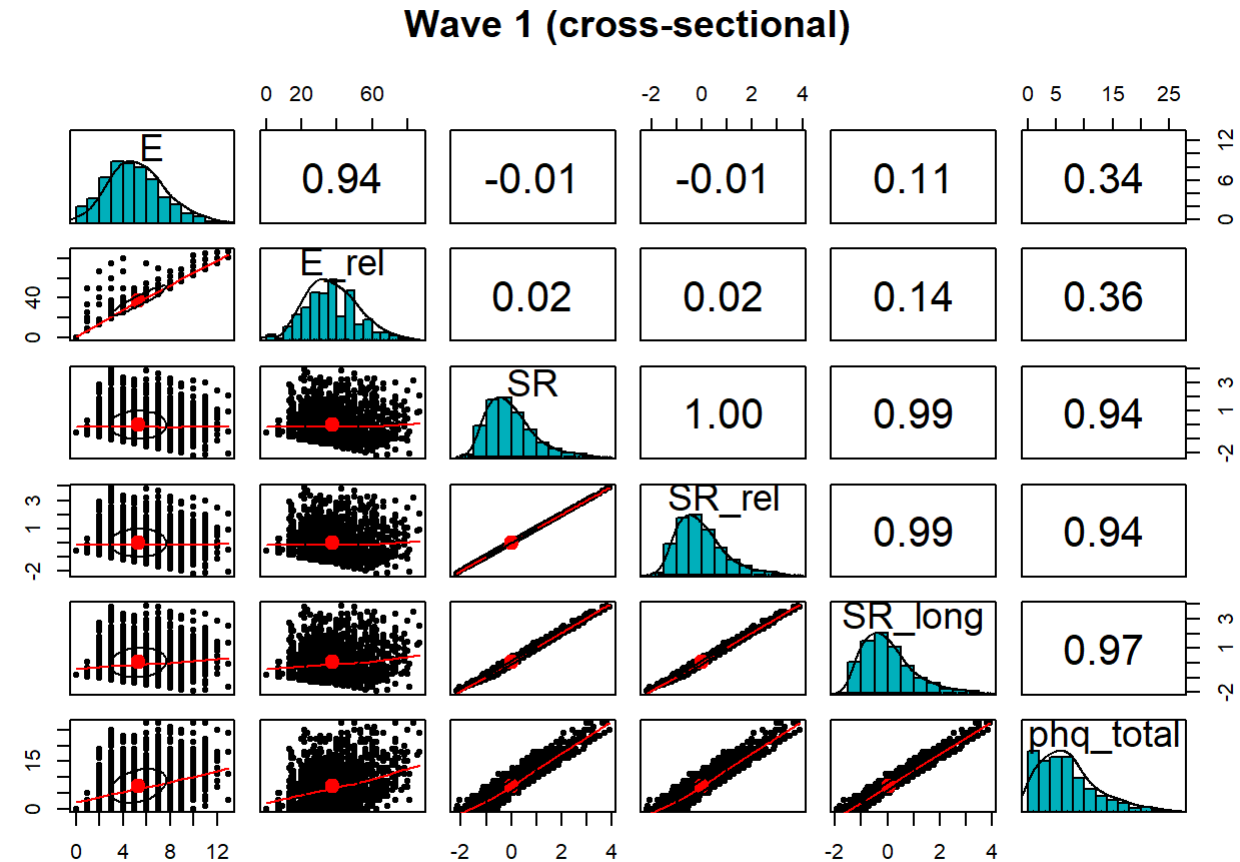
#	Item (original wording)	Supporting sources
10	Lack of access to protective equipment.	Associated with poor mental health outcomes in Correia da Silva et al. (2022), Czepiel et al., (2022, 2024), Mediavilla et al. (2021), Paniagua-Avila et al. (2022), Umbetkulova et al. (2024).
11	Death of close contact at work due to COVID-19.	Similarity to life events list used in previous studies (Chmitorz et al., 2020) “Death of a close person”
12	Being worried about being infect with COVID-10.	Similarity to item in stressor list in Veer et al. (2021) “Being at an increased risk for infection (e.g., at work).” See also Czepiel et al. (2024), Moro et al. (2022), Paniagua-Avila et al. (2022)
13	Being worried about infecting loved ones with COVID-10.	Similarity to item in stressor list in Veer et al. (2021) “A family member, friend, or loved one is at an increased risk of a serious course of the disease in case of an infection (they belong to the so-called 'at-risk group').”
14	Testing positive for COVID-19.	Similarity to item in stressor list in Veer et al. (2021) “Having COVID-19 symptoms, or symptoms that could be related to COVID-19.”
15	Loved one diagnosed with COVID-19.	Similarity to item in Mainz Inventory of Microstressors (Chmitorz et al., 2020).
16	Death of loved one due to COVID-19.	Similarity to life events list used in previous studies (Chmitorz et al., 2020) “Death of a close person”
17	Death of patient due to COVID-19.	Similarity to life events list used in previous studies (Chmitorz et al., 2020) “Death of a close person”

## Item correlation with mental health



## Case study 2: HEROES

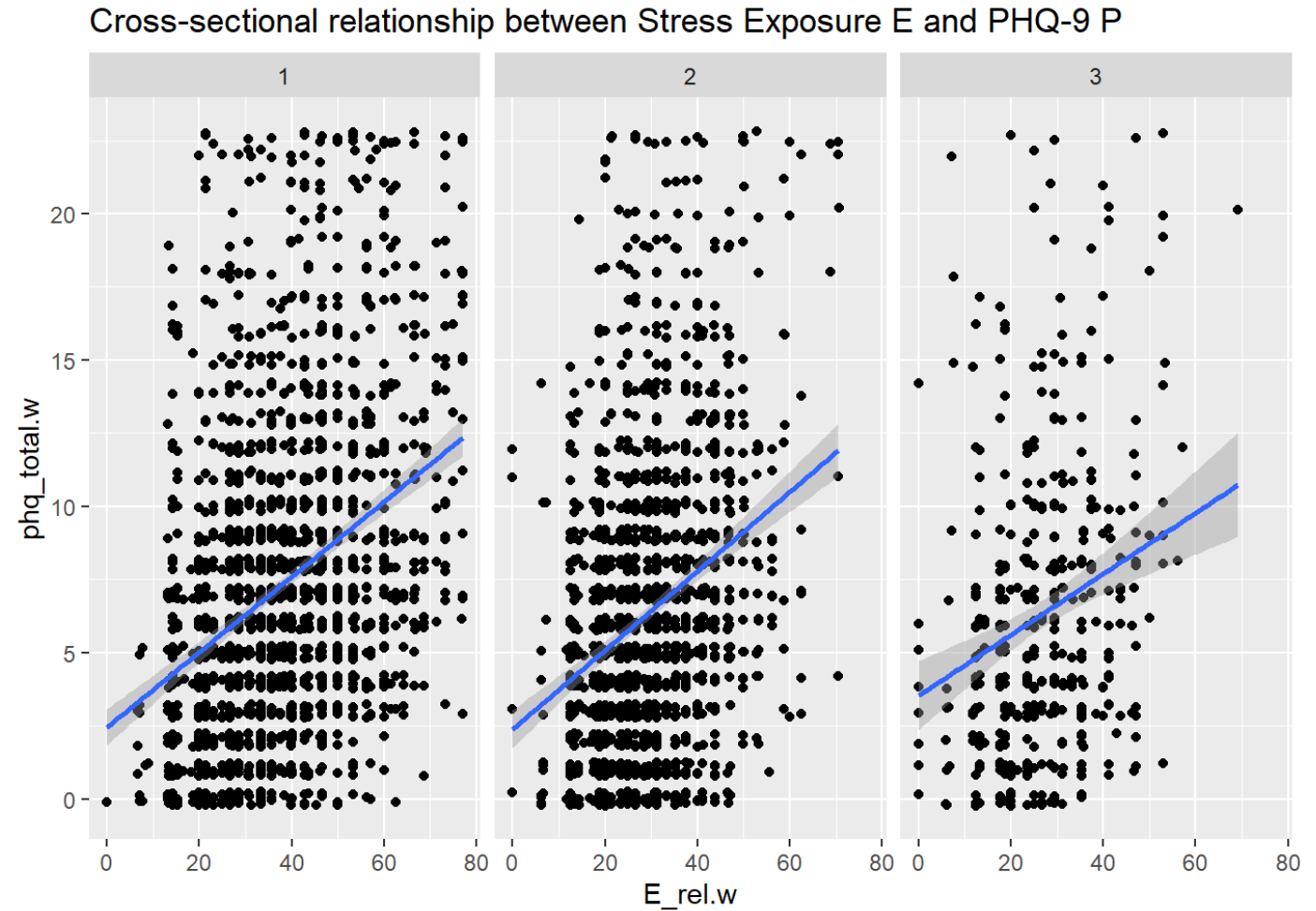
- Consider different sum scores
  - Combined into a relative E score
    - *E at this time point/Possible E at this time point*
    - *Overcoming different questionnaires at different time points*
- Quality checks
  - *Item and sum score correlation with you mental health measure*





## Case study 2: HEROES

- *You can then use the stressor exposure to build SR scores*



# Stress and mental health across phases: HEROES

## Mental health problems (P)

