

Merel van Herpen

# Context Matters

Understanding and Providing Psychosocial Support  
after Potentially Traumatic Events



Nationaal  
Psychotrauma  
Centrum



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Merel Marjolein van Herpen



Dit boek is een uitgave van ARQ Nationaal Psychotrauma Centrum en maakt deel uit van de ARQ boekenreeks.

Cover: hollandse meesters, Utrecht

Cover image: Kunstschilder Peter Johannes Antonius Cox (1912 – 1985)

Lay-out: Ilse Modder | [www.ilsemodder.nl](http://www.ilsemodder.nl)

Printing / binding: Gildeprint, Enschede

ISBN 978-94-6419-575-0

Printing of this thesis was financially supported by ARQ National Psychotrauma Centre.

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Context Matters  
Understanding and Providing Psychosocial Support after Potentially Traumatic Events

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor  
aan de Universiteit van Amsterdam  
op gezag van de Rector Magnificus  
prof. dr. ir. P.P.C.C. Verbeek  
ten overstaan van een door het College voor Promoties ingestelde commissie,  
in het openbaar te verdedigen in de Aula der Universiteit  
op vrijdag 25 november 2022, te 11.00 uur

door Merel Marjolein van Herpen  
geboren te Leiden

**Promotiecommissie**

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## PREFACE

Bringing academic research, policy and practice together creates a synergy that may benefit the trauma survivor. This is once more demonstrated by the PhD thesis before you, which is the result of a scientific collaboration between Amsterdam UMC and ARQ National Psychotrauma Centre. The author, Merel van Herpen, works as a researcher and policy adviser at ARQ Centre of Expertise for the Impact of Disasters and Crises.

Central to Van Herpen's research are people who have been, or are at risk of being exposed to a so-called potentially traumatic event (PTE). Examples of PTEs are severe injuries, the death of a patient, and losing a loved one unexpectedly. Both the general population as well as professionals in high-risk organizations can experience PTEs. This wide variety of contexts is reflected in the thesis' different research populations: professionals from a Helicopter Emergency Medical Services team and railway emergency services, clients of Victim Support Netherlands, chronically ill patients and people exposed to the aftermath of the MH17 plane crash disaster. The author's first aim was to identify what factors contribute to a person's resilient response after experiencing a PTE: after all, it is only a small, yet significant, group of people who develop mental health problems in its wake. She then examined how optimal psychosocial support is delineated in diverse contexts following PTEs. In doing so, Van Herpen sheds light on how psychosocial support is to be implemented in practice and how recipients experience the support that is offered, a research area that receives limited attention. The findings identify central themes, but also underline the importance of context-specific psychosocial support following a PTE.

The second part of Van Herpen's thesis is devoted to an examination of three practical instruments designed to support people who have experienced a PTE. While the MIRROR self-help test addresses psychological complaints measuring a PTE's impact on one's mental health, BASE pertains to the occupational setting where professionals are exposed to PTEs. Besides these individual means of psychosocial support, support provided on the group level was also studied with the evaluation of the Information and Referral Centre (IRC) set up in the wake of the MH17 disaster. Van Herpen's analysis of the experiences of such organisations as Victim Support Netherlands that work in the actual practice of care provision and of the feedback of support recipients is a prime example of how research and practice may connect fruitfully. Further, as the author deploys a variety of research methods in her study, including quantitative and qualitative methods, she is able to investigate psychosocial support.

The diversity in target groups and methods of the present thesis underscores the need for collaboration between research, policy and practice. Only when stakeholders in each of these fields engage in joint dialogue, can psychosocial support be understood and improved, Van Herpen argues.

It is with great pleasure that we present this thesis. We feel it constitutes an important contribution to how we understand and provide psychosocial support in the wake of PTEs, and how we might finetune our psychosocial support to benefit those concerned.

drs. J-W (Jan-Wilke) Reerds MBA,  
Chair Board of Directors ARQ National Psychotrauma Centre



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1.

GENERAL INTRODUCTION

# GENERAL INTRODUCTION

With this dissertation, we aim to contribute to the understanding of and provision of psychosocial support to people who have been exposed to a potentially traumatic event (PTE) in different contexts. It contains several studies in a variety of contexts and samples, including the general population and high-risk professionals. This chapter provides a general introduction to the research topics in this dissertation.

## EXPOSURE TO POTENTIALLY TRAUMATIC EVENTS

Experiencing a potentially traumatic event (PTE) will happen to most people (Benjet et al., 2016; Bonanno et al., 2011; de Vries & Olf, 2009; Kessler et al., 2017; Knipscheer et al., 2020). Studies investigating lifetime trauma exposure worldwide showed that 70% of respondents experienced at least one PTE during their life (Benjet et al., 2016; Kessler et al., 2017). Studies conducted in The Netherlands revealed that 71.1% to 80.7% of inhabitants are exposed to a PTE in their lifetime (de Vries & Olf, 2009; Knipscheer et al., 2020). The most common PTE experienced worldwide are accidents/injuries or the unexpected death of a loved one ((Benjet et al., 2016; Kessler et al., 2017). A distinction can be made between PTEs that are common but have a relatively low mental health impact and PTEs that are more uncommon but have a high negative impact on one's mental health. For example, the unexpected death of a loved one belongs to the first category, while intimate partner sexual violence is part of the latter category (Kessler et al., 2017).

The Life Events Checklist for DSM-5 (LEC-5) was developed to screen for PTEs that are known to result in distress. The checklist includes the following types of PTEs: 1) natural disaster, 2) fire or explosion, 3) transportation accident, 4) serious accident at work, home, or during recreational activity, 5) exposure to a toxic substance, 6) physical assault, 7) assault with a weapon, 8) sexual assault, 9) other unwanted or uncomfortable sexual experience, 10) combat or exposure to a war-zone, 11) captivity, 12) life-threatening illness or injury, 13) severe human suffering, 14) sudden violent death, 15) sudden accidental death, 16) serious injury, harm, or death you caused to someone else, and 17) any other very stressful event or experience (Weathers et al., 2013). This extensive list shows that people can be exposed to a wide variety of PTEs that can be potentially harmful to their mental health and overall wellbeing. The impact of such events is not the same for every individual (Iacoviello & Charney, 2014). The risk of developing psychological complaints following a PTE is always dependent on multiple factors, such as gender, age, genetics, and social support (Kessler et al., 2017; Knipscheer et al., 2020; Olf, 2012). The variety of PTEs, risk factors and differences in responses are complicating factors in determining how to best respond to or take care of individuals and communities that have been exposed to a PTE.

## MENTAL HEALTH CONSEQUENCES OF PTEs AND RESILIENCE

Experiencing some psychological complaints, such as having trouble sleeping or feeling jumpy or down, a few days to weeks after a PTE is considered normal (Bryant, 2003a; Bryant et al., 2003b; Hobfoll et al., 2007). Only a minority of people exposed to a PTE will develop persisting psychological complaints and require professional care. Most people can maintain a healthy level of functioning and are considered resilient (Bonanno, 2005; Bonanno et al., 2011; Galatzer-Levy et al., 2018). Resilience is a complex concept and no clear consensus exists in the literature on its exact definition (Bonanno, 2021; Denckla et al., 2020; Southwick et al., 2014). The different scales that have been developed to measure resilience are a tribute to this (Connor, 2006; Windle et al., 2011). People who are considered resilient show a healthy level of functioning after a PTE and may experience some acute psychological complaints, but these will diminish over time without the help of a professional (Bonanno, 2005; Bonanno et al., 2011; Denckla et al., 2020; Forbes et al., 2007; Galatzer-Levy et al., 2018; Olff et al., 2019; Silver et al., 2002; Southwick et al., 2014). Studies have identified four different response trajectories following a PTE: resilience, recovery, chronic stress and delayed onset (Bonanno, 2004; Bonanno et al., 2012; Galatzer-Levy et al., 2018; Smid et al., 2009; Van Zuiden et al., 2022). Resilience was found as the most common response trajectory across studies (Galatzer-Levy et al., 2018).

According to the Conservation of Resources Theory, having resources is crucial to building resilience (Hobfoll et al., 2015). Resources can enable people to cope with the effects of PTEs or other stressful life events. Examples of resources are autonomy, job security, self-esteem, self-efficacy, and emotional intelligence (Halbesleben et al., 2014). The theory states that people aim to protect the resources they currently have and also want to obtain new resources. Resources are defined as objects, states, or conditions that are of value to people. The value one attributes to resources differs among people and is dependent on one's situation and experiences. People have to invest in resources to be able to protect themselves from losing resources (Halbesleben et al., 2014). An extensively studied resource is social support, which has been linked to resilience (Iacoviello & Charney, 2014; Windle et al., 2011). Not receiving social support and recognition from the people around you has been found as one of the most consistent risk factors for developing post-traumatic stress disorder (PTSD) following a PTE (Olff, 2012; Olff et al., 2019).

# PROFESSIONALS WITHIN HIGH-RISK ORGANIZATIONS

A context in which individuals are more frequently exposed to PTEs is in high-risk organizations, such as prehospital care services, the police force, or the military. Professionals in these organizations are exposed to PTEs during their work on a frequent basis. PTEs in this context are also referred to as work-related critical incidents (Alexander & Klein, 2001). Due to the regular exposure to work-related critical incidents, these professionals are at a higher risk of developing mental health problems, such as PTSD, depression, and burn-out, compared to the general population (Berger et al., 2012; Harenberg et al., 2018). Mental health problems are associated with work performance and life satisfaction (Alexander & Klein, 2001; Levy-Gigi et al., 2016). Furthermore, organizational stress should not be disregarded in providing support to professionals in high-risk organizations because in addition to work-related critical incidents, these professionals also have to deal with organizational stressors, such as high workload or difficulties with supervisors (Van der Meer et al., 2017; Van der Velden et al., 2010). Organizational stressors have been found to be important predictors of mental health problems, in addition to the impact of work-related critical incidents (Hart & Cotton, 2003; Gouweloos-Trines, 2018; Van der Velden et al., 2010).

Despite the frequent exposure to work-related critical incidents, high-risk professionals show high levels of work engagement, job satisfaction and resilience (Alexander & Klein, 2001; Gayton & Lovell, 2012; Isaacs et al., 2017; Streb et al., 2014). Similar to the general population, social support plays an important role in dealing with work-related critical incidents and job stress. In the work context, this translates to receiving support and recognition from one's supervisors and direct colleagues after a work-related critical incident. This has been found to be crucial to wellbeing (Gouweloos-Trines et al., 2017). In addition, having sufficient time to recover, organizational support, and humor are also known protective factors (Avraham et al., 2014; Gouweloos-Trines et al., 2017).

A widely used theoretical model that fits well in the high-risk work context because it takes into account both positive and negative aspects of the job and employee wellbeing is the Job Demands-Resources model (Bakker & Demerouti, 2017). Job demands require sustained physical and/or mental effort, may lead to energy depletion, and are the main predictors of health problems such as burnout symptoms. Job resources motivate employees, can buffer against the negative effects of job demands and are the most important predictors of work engagement. Personal resources are related to resilience and the perception of control and impact on one's environment (Bakker & Demerouti, 2017; Barbier et al., 2013). A reciprocal association has been found between personal resources, job resources, and work engagement (Bakker & Demerouti, 2017; Barbier et al., 2013; Xanthopoulou et al., 2007). Insight into both positive and negative work characteristics that influence employee wellbeing can help organizations to determine, improve, and implement strategies to support employees.

## WATCHFUL WAITING AND PSYCHOSOCIAL SUPPORT

The National Institute for Health and Care Excellence (NICE) advises considering active monitoring after a PTE. This is also known as watchful waiting; the regular monitoring of people with some PTSD symptoms after a PTE (National Institute of Health and Care Excellence, 2018). Watchful waiting is based on the notion that most individuals can maintain a healthy level of functioning and are considered resilient after a PTE. Watchful waiting allows for some time to pass to avoid overtreatment. It aims to balance an active (outreaching) and a passive (doing nothing) approach (Bisson et al., 2010). This dilemma of active versus passive has been modeled as a parabola, taking into account two dimensions: quality of support and the attitude towards affected ones (Dückers & Thormar, 2015). The parabola shows that providing psychosocial support is complex; being too passive can overlook people and being too active can disregard people's self-reliance and waste resources. It is difficult to provide psychosocial support on time but also avoid overtreatment or unnecessarily burdening healthy individuals. Psychosocial support instruments should take this complexity into account and empower individual autonomy and self-reliance, while at the same time identifying those who are at risk of developing persisting psychological complaints. Studies have shown that it is important to support self-reliance and resilience of those affected by a PTE (Bonanno et al., 2011; Hobfoll et al., 2007; National Institute of Health and Care Excellence, 2018).

The European Network for Traumatic Stress (TENTS) guidelines for post-disaster psychosocial support advises against formal screening of everyone after a PTE but stresses the importance of identifying individuals in need of support (Bisson et al., 2010). To determine groups at risk of developing persisting trauma-related complaints, timely and accurate identification could help. Screening instruments that are quick and easy to use could enable those at risk to monitor their symptoms and identify whether or not they need help. Online or mobile screening instruments could potentially lower the threshold for individuals to assess their symptoms because they are easily accessible. At the same time, these instruments can offer more information about normal emotional responses and encourage individuals to seek help when they need it (Olf, 2015; Price et al., 2014). Another psychosocial support instrument that is in line with watchful waiting and should be easily accessible is a central coordination point or one-stop shop (Bisson et al., 2010; Dückers et al., 2018; Hobfoll et al., 2007; Inter-Agency Standing Committee, 2006; Reifels et al., 2013; Suzuki et al., 2012; Te Brake & Dückers, 2013). A one-stop shop can be provided to affected individuals in case of larger scale events. It integrates a variety of information and services in an accessible way. Affected ones can go there to ask questions, for help with practical, legal and health-related problems, and referral to professional care if needed (Jacobs et al., 2019).

Following a disaster or crisis, five main aspects of psychosocial support have been identified to support affected ones: promoting a sense of safety, calming, a sense of self

and collective efficacy, connectedness, and hope (Hobfoll et al., 2007). Experts agree that adequate psychosocial support should be provided following disasters and crises (Bisson et al., 2010; Juen et al., 2016; Suzuki et al., 2012; Te Brake & Dückers, 2013). International evidence-based guidelines are available to enhance psychosocial support service delivery in different contexts, such as following disasters and crises, in high-risk organizations, and in general healthcare (Bisson et al., 2010; Colvin et al., 2018; Creamer et al., 2012; Inter-Agency Standing Committee, 2006; Jacobsen & Wagner, 2012; Roberts et al., 2019; Suzuki et al., 2012; Te Brake & Dückers, 2013; Te Brake et al., 2022). Psychosocial support entails practical, legal, and psychosocial services to those affected. The guidelines contain expert advice regarding psychosocial support principles and interventions. It is recommended to provide psychosocial support, i.e. all the support and care directed at the psychological wellbeing and health of people affected during or after a PTE, to individuals as well as to groups.

## THE IMPORTANCE OF EVALUATION STUDIES

The evaluation of psychosocial support services is important because potential lessons can be identified to improve the provision of psychosocial support during future events (Reifels et al., 2013). Through evaluation studies, it can be assessed whether the psychosocial support services reach the intended results. This is important information to improve psychosocial support services, given the chaotic circumstances in which they are provided. The importance of evaluating psychosocial support that is provided after PTEs has been widely acknowledged in the literature (Dücker & Thormar, 2015; Dücker et al., 2018; McFarlane & Williams, 2012; Reifels et al., 2013; Roberts et al., 2019; Te Brake & Dücker, 2013; Tol et al., 2011). Nevertheless, evaluation studies are scarce (Dücker & Thormar, 2015; Dücker et al., 2018; Reifels et al., 2013). In order to conduct a high-quality evaluation study, it is recommended to collect data on multiple domains. Usually, outcomes receive the most attention in an evaluation, while other aspects such as process, conditions or context, and also transactions between the provider and recipient are considered equally important (Donabedian, 1988; Stake, 2004; Stake, 1967).

## AIMS AND OUTLINE OF THIS DISSERTATION

With this dissertation, we aim to contribute to the understanding of and provision of psychosocial support to people who have been exposed to a potentially traumatic event (PTE) in different contexts. Finding a balance in providing psychosocial support in time but at the same time avoiding overtreatment is difficult due to chaotic



circumstances, different response trajectories, differences in needs, and contextual factors. More knowledge is needed on what factors contribute to a resilient response and what elements of psychosocial support are experienced as helpful by recipients. In addition, there is a lack of knowledge regarding how to implement psychosocial support instruments in practice, that address the complexity of combining positive and negative outcomes of PTEs, a balance between an active versus passive approach and take into account individual autonomy and monitoring.

Part one of the dissertation focuses on understanding which factors contribute to a resilient response after experiencing a PTE and how psychosocial support is defined and perceived in different contexts. The second part of this dissertation will provide and evaluate three different psychosocial support instruments in practice. These instruments aim to be in line with the watchful waiting approach, and take into account both positive and negative aspects, individual responsibility and that of organizations or governments.

### **Part one: Understanding the resilient response to PTEs and psychosocial support needs in challenging contexts**

The following research questions will be addressed in part I (chapters 2 and 3):

1. Which factors contribute to the wellbeing of professionals in high-risk organizations and their resilient response to PTEs?
2. Which psychosocial support aspects are considered important by recipients and how can these be measured in order to evaluate the quality of psychosocial support in practice?

In **chapter 2**, we aim to further our understanding of the factors underlying Helicopter Emergency Services (HEMS) personnel wellbeing within their challenging work context. Based on semi-structured interviews we will demonstrate how HEMS personnel maintain their wellbeing, and cope with PTEs, and their view on psychosocial support. Within two contexts in **chapter 3** – people who have experienced a PTE and people with Spinal Muscular Atrophy (SMA) – we will derive key themes of psychosocial support using the concept mapping method. First, we aim to understand which psychosocial support aspects are considered important by recipients and relevant stakeholders. Second, we will develop instruments to test and integrate those aspects in practice while determining the importance and need for improvement of current psychosocial support.

### **Part two: Providing and evaluating psychosocial support instruments in practice**

In part two we will address the following research questions (chapters 3 – 6):

3. What are the psychometric and classification properties of a web-based screening instrument that can be provided to individuals that are exposed to a PTE?
4. What work-related and personal characteristics are associated with employee

wellbeing and how can these be monitored?

5. What are the experiences of users and providers in regard to an online one-stop shop and which facilitating conditions and barriers to the implementation can be identified?

In **chapter 4**, we will conduct a psychometric evaluation of a web-based self-help test called MIRROR; Mobile Insight in Risk, Resilience and Online Referral (MIRROR) in the general population. MIRROR aims to identify individuals who develop psychological complaints after a PTE, encourage them to seek help, and support self-reliance. MIRROR integrates both negative and positive outcomes of PTEs and takes into account time since the event. It provides users with personal advice and relevant follow-up support options. In **chapter 5**, we will evaluate an online self-monitoring tool Brief Assessment of Stress and Energy (BASE) among railway emergency services personnel. Employees can use BASE as a tool to frequently self-monitor levels of stressors and resources. BASE focuses on daily occupational factors, provides direct feedback, and encourages self-monitoring, reflection, and seeking support. In **chapter 6**, we will conduct a systematic evaluation of the online one-stop shop that was implemented after the MH17 airplane disaster. The aims of the one-stop shop were to provide current, appropriate, and reliable information and referral, foster contact between affected ones, and acquire information on needs, problems, and risk groups. Based on existing evaluation and quality frameworks, we will evaluate the experiences of users and providers using both qualitative and quantitative data and identify potentially relevant implications for future events. Lastly, **chapter 7** will provide a summary and general discussion of the findings of this dissertation.

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## PART ONE:

Understanding the resilient response to PTEs and psychosocial support needs in challenging contexts

PART TWO:

Providing and evaluating psychosocial support  
instruments in practice





# 4.

## MOBILE INSIGHT IN RISK, RESILIENCE, AND ONLINE REFERRAL (MIRROR): PSYCHOMETRIC EVALUATION OF AN ONLINE SELF-HELP TEST

Published as: Van Herpen, M. M., Boeschoten, M. A., Te Brake, H., van der Aa, N., & Olf, M. (2020). Mobile Insight in Risk, Resilience, and Online Referral (MIRROR): psychometric evaluation of an online self-help test. *Journal of medical internet research*, 22(9), e19716.

## ABSTRACT

### Background

Most people who experience a potentially traumatic event (PTE) recover on their own. A small group of individuals develops psychological complaints, but this is often not detected in time or guidance to care is suboptimal. To identify these individuals and encourage them to seek help, a web-based self-help test called Mobile Insight in Risk, Resilience, and Online Referral (MIRROR) was developed. MIRROR takes an innovative approach since it integrates both negative and positive outcomes of PTEs and time since the event and provides direct feedback to the user.

### Objective

The goal of this study was to assess MIRROR's use, examine its psychometric properties (factor structure, internal consistency, and convergent and divergent validity), and evaluate how well it classifies respondents into different outcome categories compared with reference measures.

### Methods

MIRROR was embedded in the website of Victim Support Netherlands so visitors could use it. We compared MIRROR's outcomes to reference measures of PTSD symptoms (PTSD Checklist for DSM-5), depression, anxiety, stress (Depression Anxiety Stress Scale–21), psychological resilience (Resilience Evaluation Scale), and positive mental health (Mental Health Continuum Short Form).

### Results

In 6 months, 1112 respondents completed MIRROR, of whom 663 also completed the reference measures. Results showed good internal consistency (inter-item correlations range .24 to .55, corrected item-total correlations range .30 to .54, and Cronbach alpha coefficient range .62 to .68), and convergent and divergent validity (Pearson correlations range  $-.259$  to  $.665$ ). Exploratory and confirmatory factor analyses (EFA+CFA) yielded a 2-factor model with good model fit (CFA model fit indices:  $\chi^2_{19}=107.8$ ,  $P<.001$ , CFI=.965, TLI=.948, RMSEA=.065), conceptual meaning, and parsimony. MIRROR correctly classified respondents into different outcome categories compared with the reference measures.

### Conclusions

MIRROR is a valid and reliable self-help test to identify negative (PTSD complaints) and positive outcomes (psychosocial functioning and resilience) of PTEs. MIRROR is an easily accessible online tool that can help people who have experienced a PTE to timely identify psychological complaints and find appropriate support, a tool that might be highly needed in times like the coronavirus pandemic.

**Keywords**

potentially traumatic events; mobile mental health; self-help; online; resilience; posttraumatic stress disorder

**Acknowledgment of author contributions:**

*Research design and data collection:* van Herpen, M. M., Boeschoten, M. A., Te Brake, H., van der Aa, N., & Olff, M.

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**INTRODUCTION**

Most people will experience at least one potentially traumatic event (PTE) in their lives (Benjet et al., 2016; Bonanno et al., 2011; de Vries & Olff, 2009; Kessler et al., 2017; Knipscheer et al., 2020). The impact of PTEs is not the same for every individual. Research shows that most individuals are able to maintain a healthy level of functioning or resilience after experiencing a PTE and psychological complaints usually diminish over time without professional support (Bonanno, 2005; Bonanno et al., 2011; Forbes et al., 2007; Galatzer-Levy et al., 2018; Olff et al., 2019; Silver et al., 2002). However, a small but significant group of individuals develops psychological complaints such as posttraumatic stress disorder (PTSD) that require care (de Vries & Olff, 2009).

Experiencing psychological complaints a few days to weeks after a PTE is often considered normal (Bryant, 2003; Bryant et al., 2003; Hobfoll et al., 2007). The National Institute for Health and Care Excellence (NICE) advises to consider active monitoring—also known as watchful waiting—following a PTE (i.e., regular monitoring of people with some PTSD symptoms within 1 month of the event) (National Institute for Health and Care Excellence, 2018). The European Network for Traumatic Stress (TENTS) guideline for post-disaster psychosocial care advises against formal screening of everyone affected by a PTE but stresses the importance of identifying individuals in need of support. Once PTSD has been diagnosed, early treatment is advised (Bisson, Tavakoly, et al., 2010; Boelen et al., 2019; National Institute for Health and Care Excellence, 2018; Oosterbaan et al., 2019; Roberts et al., 2019). It could be concluded, then, that support for people who have experienced a PTE is necessary, preferably early, and easily accessible.

Unfortunately, the small but significant group that develops persisting psychological complaints is often not detected in time or guidance to care is suboptimal (Jeavons, 2001; Stene et al., 2016). Guidance to care can be hindered due to people not recognizing their symptoms or having self-stigma, which prevents them from seeking help (Cheng et al., 2018; Corrigan, 2004; Shalev et al., 2011; Stuber et al., 2006). In addition, health care

facilities may lack the resources to be able to reach people who have experienced a PTE and identify the ones who need support (Brewin et al., 2010; Shalev et al., 2011). Also, general practitioners may not recognize PTSD symptoms (Rosenbaum, 2004) or other psychological complaints (Verhaak et al., 2006).

In order to prevent the development and persistence of trauma-related complaints, timely and accurate identification is needed (Dekkers et al., 2010; Shalev et al., 2011). Short and easy-to-use screening instruments could enable individuals at risk of developing psychological complaints to self-identify and monitor possible symptoms after PTEs. Moreover, providing online or mobile self-help tests can aid in timely identification of symptoms in people who have experienced a PTE, providing more information regarding normal psychological responses and encouraging help seeking (Olf, 2015; Price et al., 2014).

Multiple studies show that when one chooses to assist people who have experienced a PTE, it is important to support self-reliance and resilience (Bonanno et al., 2011; Hobfoll et al., 2007; National Institute for Health and Care Excellence, 2018). Normalizing and validating emotional responses can promote the capacity to deal with these emotions (Hobfoll et al., 2007). Also, the extent to which individuals identify themselves as being resilient is considered to positively influence post-trauma outcomes (Connor, 2006; Windle et al., 2011). Several self-report screening instruments are available to predict PTSD, such as the Trauma Screening Questionnaire, Impact of Event Scale–Revised or PTSD Checklist for the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (PCL-5) (Brewin, 2005; Mouthaan et al., 2014). However, most instruments only screen for complaints and do not inquire about protective factors such as psychological resilience and psychosocial functioning (Brewin, 2005; Mouthaan et al., 2014). In addition, most screening instruments do not consider the time period that has passed since the event. Such information is necessary to determine whether reported complaints can be appraised as normal given the stressful event just happened or whether referral to care is needed (National Institute for Health and Care Excellence, 2018). By not including time in classifying responses, screening can overlook or misappraise the different response trajectories that have been found after PTEs (Galatzer-Levy et al., 2018).

To incorporate above guideline advice and address the aforementioned concerns in the early support of people who have experienced a PTE, Mobile Insight in Risk, Resilience, and Online Referral (MIRROR) was developed. MIRROR is a web-based self-help test with the potential to reach large groups of people who are seeking reassurance on how they are coping. MIRROR takes an innovative approach since it integrates both negative and positive outcomes of PTEs and time since the event. This was realized by creating a new questionnaire based on existing measures on resilience, functioning, and PTSD, and by developing a new algorithm that takes into account multiple factors. In compliance with NICE, TENTS, and DSM-5 guidelines (American Psychiatric Association, 2013; Bisson, Tavakoly, et al., 2010; National Institute for Health and Care Excellence,

2018), MIRROR's algorithm includes the following as main weight factors: severity of complaints, time passed since the event, and level of psychosocial functioning. MIRROR provides users with personal advice based on respondent answers with relevant follow-up support options such as a reminder for self-monitoring and contact information for consultation. Giving personal feedback to users is recommended to augment the use of mobile self-tests after PTEs (Price et al., 2016). Also, arranging active monitoring with follow-up within one month is advised (National Institute for Health and Care Excellence, 2018). Of relevance, no difference has been found between responses on a PTSD self-report administered via a mobile device versus paper administration (Price et al., 2015). MIRROR aims to contribute to the early identification of those likely to develop psychological complaints and encourage them to seek help. At the same time, MIRROR aims to support self-reliance by facilitating self-monitoring and self-recovery through follow-up support options.

While it is recognized that mobile apps have the potential to improve timely identification of complaints and delivery of mental health support after PTEs, there is very little research on their validity, reliability, and effectiveness (Donker et al., 2013; Olf, 2015; Price et al., 2014; Rodriguez-Paras et al., 2017). Therefore, the aims of this study were to assess MIRROR's use, examine MIRROR's psychometric properties (factor structure, internal consistency, and convergent and divergent validity) and evaluate how well MIRROR classifies respondents into different outcome categories compared with reference measures.

## METHODS

### **Mobile Insight in Risk, Resilience, and Online Referral (MIRROR)**

A multidisciplinary team of professionals in the fields of psychotrauma (clinicians, researchers, and policy officers) and victim and crisis support developed MIRROR. The items and algorithm were based on existing protocols - DSM-5 and the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD-10) (American Psychiatric Association, 2013; World Health Organization, 2004) best practices and recommendations of the Dutch National Multidisciplinary Guideline on Psychosocial Support in Disasters and Crises (Impact, 2014) and international guidelines for PTSD and postdisaster psychosocial care (Bisson, Tavakoly, et al., 2010; National Institute for Health and Care Excellence, 2018).

MIRROR consists of 2 parts. Part 1 includes items regarding event-related characteristics: type of event, measured with all events of the Dutch version of the Life Events Checklist for the DSM-5 (LEC-5) (Boeschoten et al., 2014), time passed since the event (measured in weeks), and relation to the event (happened to me, learned about it, witnessed it, part of my job). Part 2 consists of 8 items divided in 3 sections. The first

concerns PTSD core symptoms (4 items in total; 1 about intrusion, 2 about avoidance, and 1 about arousal). The items are developed based on the clusters in the DSM-IV, DSM-5, ICD-10, and ICD-11. Higher scores reflect more PTSD symptoms. The second concerns the item “how would you rate your present functioning (at work/home),” based on the widely used Global Assessment of Functioning (GAF) score for which higher scores reflect a higher level of functioning. The third concerns resilience (3 items in total; about social support, self-reliance, and problem solving), based on the resilience concept as introduced by Van der Meer et al. (2018). Higher scores reflect more resilience. PTSD and resilience items are answered on a 5-point response scale, ranging from 1 (never) to 5 (all the time). Functioning is rated on a scale from 1 to 10.

MIRROR’s algorithm aims to identify PTSD symptoms, psychosocial functioning, and resilience; normalize complaints (i.e., reassuring users that it is normal to experience distress shortly after a PTE); and stimulate seeking support in users with persisting complaints. See Appendix 1 for an overview of the possible outcomes of the algorithm. In the algorithm, MIRROR’s PTSD scale and functioning item are classified in 3 levels: low, moderate, and high. Resilience is categorized as either low or high. The categorizations are based on the aforementioned existing protocols and best practices. MIRROR’s algorithm differentiates 3 phases of time passed since the event: (1) less than 1 week ago, (2) between 1 and 4 weeks, and (3) more than 4 weeks or reoccurring. These were based on the assumption that complaints after PTEs may occur but will generally diminish over time, as most people recover on their own (Bonanno, 2005). Therefore, the occurrence of PTSD core complaints with moderate to low functioning shortly after an adverse event can be seen as normal (Bryant, 2003; Bryant et al., 2003; Hobfoll et al., 2007), but if complaints and moderate to low functioning are present after 1 month, guidance to care is needed (Bisson, Tavakoly, et al., 2010; Boelen et al., 2019; National Institute for Health and Care Excellence, 2018; Oosterbaan et al., 2019; Roberts et al., 2019).

MIRROR summarizes the outcome of its algorithm to respondents as either green, orange, or red. Together with this color outcome, respondents receive personal advice. The color outcome is based on the level of complaints, functioning, and time passed since the event. MIRROR’s resilience scale is not included in the color outcome because based on current research it is unclear precisely how resilience interacts with the development of PTSD complaints and functioning after PTEs. Nonetheless, resilience is integrated in the personal advice to stimulate the use of social support. If respondents score low on resilience they are encouraged to seek support from those close to them and individuals who have experienced similar events.

A green outcome indicates few complaints and/or sufficient functioning, and the accompanying advice states no further action is needed. An orange outcome indicates complaints and moderate functioning in combination with a PTE that happened only recently (ie, less than 1 month). The accompanying advice is directed at normalizing complaints combined with promoting watchful waiting and encouraging setting a

reminder to use MIRROR again in 2 weeks to assess if complaints have diminished. The red outcome indicates significant complaints (ie, low functioning or complaints with moderate to low functioning for a longer period or due to a reoccurring event) which have persisted for more than 1 month. Therefore, the advice aims to encourage the user to seek consultation with a general practitioner or to contact Victim Support Netherlands. MIRROR provides follow-up support options with its advice, such as the opportunity to get in touch with people who have had similar experiences, reading information about dealing with stress reactions, or setting a reminder to use MIRROR again in 2 weeks.

### **Participants and Procedure**

MIRROR was available in the Dutch language and open for each visitor on the website of Victim Support Netherlands (Slachtofferhulp Nederland). The specifically targeted sample consisted of website visitors who were automatically led to MIRROR when searching for information regarding stress reactions following a PTE. MIRROR is a responsive website; respondents did not have to download it. MIRROR can be used on mobile and nonmobile devices. To evaluate the psychometric properties of MIRROR, we added a research survey with reference measures (see details in Measures) after the MIRROR questions. Data collection took place during a period of 6 months. We tested the usability and technical functionality of MIRROR and the research survey before making it available. Each item was presented on a new webpage.

Before starting MIRROR, respondents were invited to participate in the research survey. Participants were informed regarding the purpose of the study, duration time of the survey, and data storage. Participation was voluntary and completely anonymous. Respondents received no incentive for completing MIRROR or the research survey. They were asked for informed consent to use their data for research purposes, in accordance with the European General Data Protection Regulation. The Medical Ethical Committee of Amsterdam University Medical Center exempted this study from formal review (W18\_364 #18.435).

Data collection took place between February and August 2019. Only original answers were saved in the database. That is, if respondents went back to change their answers once they already received their advice, changes were not saved. We followed data cleaning recommendations by Birnbaum (2004) and Wood et al. (2004). Data were discarded when respondents did not complete all survey items. In case of identical answers on all items of the different reference measures, other systematic answering patterns, or obvious unusual missing answers on certain measures, we reviewed individual results thoroughly and discarded the data in case of doubt.



## Measures

### ***Posttraumatic Stress Disorder Symptoms***

To measure PTSD symptoms, we used the Dutch version of the PCL-5 (Eidhof et al., 2019; Weathers et al., 2013). The PCL-5 consists of 20 items and measures symptoms of intrusion (cluster B, 5 items), avoidance (cluster C, 2 items), negative alterations in cognitions and mood (cluster D, 7 items), and alterations in arousal and reactivity (cluster E, 6 items) in the past month. All items are answered on a 5-point scale, ranging from 0 (not at all) to 4 (extremely). The PCL-5 showed good psychometric properties in different languages (Bovin et al., 2016; Kruger-Gottschalk et al., 2017; van der Meer et al., 2017). The total score was calculated by adding all item scores. Scale scores per cluster were calculated by adding the scores of the corresponding items. Higher scores reflect more severe symptoms. Cronbach alphas in our sample ranged between .77 and .86 for the B, C, D, and E clusters. The DSM-5 rule to determine a provisional PTSD diagnosis was followed. This entails treating each item with a minimum score of 2 as a symptom endorsed and requiring at least one B symptom, one C symptom, two D symptoms, and two E symptoms (Weathers et al., 2013).

### ***Depression, Anxiety, and Stress***

To assess other common psychological complaints after PTEs, we used the Dutch short version of the Depression Anxiety Stress Scale (DASS-21) measuring depression (7 items), anxiety (7 items), and stress (7 items) (de Beurs et al., 2001; Lovibond & Lovibond, 1995). The DASS-21 is a valid and reliable measure (Henry & Crawford, 2005; Lee, 2019). Item scores were summed to calculate scale scores and the total score. Higher scores reflect more severe symptoms. In our sample, Cronbach alphas were .92, .86, and .86 for depression, anxiety, and stress scales, respectively. A 4-point response scale measures the extent to which each state has been experienced over the past week ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). To determine cutoff values, DASS-21 scale scores were multiplied by two, in accordance with the scale's manual (de Beurs et al., 2001). The manual provides cutoff scores for a Dutch clinical sample. These discriminate the following categories: normal (depression <9, anxiety <7, stress <14), mild (depression 10-13, anxiety 8-9, stress 15-18), moderate (depression 14-20, anxiety 10-14, stress 19-25), severe (depression 21-27, anxiety 15-19, stress 26-33) and extremely severe (depression >28, anxiety >20, stress >34).

### ***Psychological Resilience***

We used the Resilience Evaluation Scale (RES) to assess psychological resilience (van der Meer et al., 2018). The 9 items are rated on a 5-point scale ranging from 0 (strongly disagree) to 4 (strongly agree). We calculated the total score by adding all items. Higher scores reflect more psychological resilience. The RES is a valid and reliable measure (van der Meer et al., 2018). In this sample, Cronbach alpha of the total scale was .88.

### ***Positive Mental Health***

We assessed positive mental health with the Dutch version of the Mental Health Continuum Short Form (MHC-SF) (Keyes, 2006; Lamers et al., 2011). The MHC-SF measures emotional well-being (3 items), social well-being (5 items), and psychological well-being (6 items). Items were rated on a 6-point scale ranging from 0 (never) to 5 (every day). The MHC-SF is a valid and reliable instrument (Keyes et al., 2008; Lamers et al., 2011). We calculated the total score by summing all item scores. Higher scores reflect more positive mental health. In this sample, Cronbach alpha of the total scale was .93.

### ***Google Analytics***

Google Analytics data were collected between March and August 2019 to examine MIRROR's use. Due to technical problems, data from February 2019 were missing. The data provide information on the number of unique visits per page, type of device used, and number of visitors who have started MIRROR (defined as a unique page visit on MIRROR's start page) and who have finished MIRROR (defined as unique page visit on MIRROR's outcome and advice page). Google Analytics cannot determine to what extent the follow-up options were used, but it can detect how many respondents have visited the follow-up support option pages.

## **Statistical Analyses**

### ***Sample and Use***

Since participation in the research survey was optional, this resulted in two 2 samples. The MIRROR-only sample consists of respondents who only completed MIRROR. The validation sample includes respondents who completed MIRROR and the accompanying survey with reference measures before receiving their advice. The total sample combines these two samples, consisting of all respondents. To examine if the validation sample was representative of the MIRROR user, we used independent-samples t-tests in SPSS Statistics version 23 (IBM Corporation) to compare the MIRROR-only sample with the validation sample based on their MIRROR scores and event-related characteristics.

We used the total sample to evaluate MIRROR's use and examine MIRROR's factor structure and internal consistency because for these analyses only data from MIRROR were needed. We used the validation sample to examine MIRROR's convergent and divergent validity and evaluate how well MIRROR classifies respondents into different outcome categories because for these analyses data from MIRROR as well as reference measures from the accompanied survey were needed.

### ***Factor Structure***

We used Mplus version 8 (Muthén & Muthén, 2017) to conduct exploratory factor analysis (EFA) using geomin rotation and confirmatory analysis (CFA). EFA assumes that any item may be associated with any factor. CFA specifies expected relationships

between items and their underlying latent factors. Because items of MIRROR's PTSD and resilience section were categorical, they were treated as ordinal and therefore the means and variance adjusted weighted least square (WLSMV) estimator was used. An underlying normal distribution was assumed for each ordinal item, where the 5 response categories were divided by 4 thresholds estimated from the data. MIRROR's functioning item has 10 response categories and was treated as continuous. Because MIRROR's factor structure was not tested before, several models with different numbers of latent factors were examined using EFA. To assess the model with the optimal number of latent factors needed to adequately account for the correlations among item scores, we used Kaiser criterion (i.e., eigenvalues of the latent factors  $>1$ ) and model fit statistics. The model with the best balance between model fit, parsimony, and conceptual interpretability was selected as the most optimal model. Subsequently, CFA was used to test the optimal model based on EFA. The difference in goodness-of-fit between nested models was evaluated with the difftest option in Mplus for appropriate chi-square difference testing with the WLSMV estimator (Muthén & Muthén, 2017). The chi-square difference test is highly sensitive to sample size such that even trivial differences between two nested models may be significant (Cheung & Rensvold, 2002). Therefore, we also assessed the difference in comparative fit index (CFI). A difference in CFI  $<0.01$  indicates a better fit of the nested model compared with the more complex model (Cheung & Rensvold, 2002). For EFA and CFA, the model fit indices CFI, Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) were used to evaluate model fit. Model fit can be considered good when CFI and TLI are close to .95, and RMSEA  $<.06$  (Hu & Bentler, 1991). If RMSEA  $<.08$ , model fit can be considered adequate (Hu & Bentler, 1991).

### ***Internal Consistency***

We evaluated internal consistency of MIRROR's PTSD and resilience section with inter-item correlations, corrected item-total correlations, and Cronbach alpha in SPSS Statistics version 23. Internal consistency of MIRROR's functioning section could not be evaluated since it is represented by only one item. When most inter-item correlations are in the recommended range of .15 to .50 (moderate magnitude) and Cronbach alpha for the scale is  $>.80$ , internal consistency can be considered good (Clark & Watson, 1995). Cronbach alpha is a function of scale length and therefore is likely to be lower for MIRROR's scales since they consist of 3 or 4 items (Clark & Watson, 1995). Corrected item-total correlations were computed to assess whether item scores regarding PTSD and resilience are associated with overall PTSD and resilience scores.

### ***Convergent and Divergent Validity***

To evaluate MIRROR's convergent and divergent validity, we calculated Pearson correlations between the MIRROR scales and reference measures. Convergent and divergent validity can be considered good when the correlations between a scale and

equivalent measure (eg, MIRROR's PTSD scale and the PTSD scale of the PCL-5) are significant and high while correlations between this scale and other related measures (eg, MIRROR's PTSD scale and depression scale of the DASS-21) are lower and moderate or modest in magnitude.

### **Classification Quality**

To evaluate how well MIRROR classifies respondents into a red, orange, or green outcome, we tested whether respondents in these three outcome categories differed on related reference measures by using cross-tabs and analysis of variance (ANOVA). If the assumption of equal variances was violated, we used the Welch F-test and Games-Howell post hoc test. MIRROR's PTSD scale score was calculated by summing the 4 PTSD items. Higher scores reflect more severe symptoms. MIRROR's resilience scale score was calculated by a summing the 3 items. Higher scores reflect more resilience. Provisional PTSD diagnosis based on PCL-5 were used to classify respondents. To examine the distribution on depression, anxiety and stress symptoms, respondents were classified by comparing their scores to a Dutch clinical reference group. Respondents with normal and mild complaints compared with the reference group were classified into one group representing subclinical complaints. Respondents with average, severe, and very severe complaints compared with the reference group were classified into another group, representing clinical complaints. Since no reference groups were available with regard to the RES and MHC-SF, the sample was divided into tertiles (ie, 3 groups of equal size divided by the 33rd and 66th percentile) based on the total scores of the RES and MHC-SF. With regard to the RES, the first tertile (scores  $\leq 17$ ) was assumed to represent relatively low psychological resilience, the second tertile (scores from 18 to 24) relatively moderate psychological resilience, and the third tertile (scores  $\geq 25$ ) relatively high psychological resilience. With regard to the MHC-SF, the first (scores  $\leq 23$ ), second (scores from 24 to 47), and third tertile (scores  $\geq 48$ ) were assumed to represent relatively low, moderate, and high positive mental health, respectively.

## RESULTS

### **Sample and Use**

MIRROR was completed 1314 times in the study period of 6 months. In total, 51.90% (682/1314) of respondents started the research survey. We deleted 51 respondents who indicated they used MIRROR on behalf of a family member, partner, friend, or colleague who experienced a PTE. We deleted 37 repeated measurements, completed by respondents who set a reminder. We excluded 95 respondents because they did not complete all research survey items. After thorough investigation of the answering patterns, we deleted 19 respondents because of unusual answering patterns. A total of

84.63% (1112/1314) of respondents were retained in the total sample, of whom 59.62% (validation sample, 663/1112) also completed all questionnaires of the accompanying research survey.

Table 1 presents the MIRROR scores, outcomes and event-related characteristics for the MIRROR-only and the validation sample. We found no significant difference between the samples on MIRROR's PTSD scale:  $t_{1110} = -.401$ ,  $P = .69$ ; resilience scale:  $t_{1110} = .752$ ,  $P = .45$ ; or level of functioning  $t_{1110} = 1.547$ ,  $P = .12$ . We found a significant association between sample and MIRROR outcome:  $\chi^2(2, N = 1112) = 18.99$ ,  $P < .001$ ; the validation sample consisted of more respondents with the red MIRROR outcome than the MIRROR-only sample. The event-related characteristics for both samples were similar, see Table 1. Overall, the validation sample can be considered representative of all MIRROR users in this study period. In the validation sample, 74.2% (492/663) of respondents were female. Almost half (300/663, 45.3%) of respondents were aged between 21 and 40 years. Table 2 and 3 present the frequency distribution for MIRROR's response categories.

**Table 1.** Mobile Insight in Risk, Resilience and Online Referral (MIRROR) scores, outcomes, and event-related characteristics for the validation sample and MIRROR-only sample.

	Validation <sup>a</sup> (N=663)	MIRROR <sup>b</sup> -only (N=449)
<b>MIRROR<sup>a</sup> scores</b>	<i>M (SD)</i>	<i>M (SD)</i>
MIRROR PTSD scale	14.88 (3.39)	14.80 (3.28)
MIRROR functioning	4.92 (1.96)	5.11 (1.94)
MIRROR resilience scale	10.08 (2.36)	10.91 (2.37)
<b>MIRROR<sup>a</sup> outcome<sup>b</sup></b>	%	%
Red	61.7	49.9
Orange	34.7	47.7
Green	3.6	2.4
<b>Type of event (LEC-5<sup>d</sup>)</b>	%	%
Another very stressful event or experience	32.6	33.4
Transportation accident	17.4	23.8
Physical assault	16.5	11.1
Sudden accidental death	5.7	4.5
Serious accident at work, home, or during recreation	5.0	6.2
Sexual assault	5.0	4.0
Assault with a weapon	4.5	5.6
Other unwanted or uncomfortable sexual experience	4.5	3.1
Sudden violent death	3.6	3.6
Severe human suffering	2.1	1.1
Life-threatening illness or injury	1.5	1.1
Fire or explosion	1.4	0.9
Combat or exposure to a war-zone	0.2	0.0
Captivity	0.0	0.9
Serious injury, harm or death caused by you to someone else	0.0	0.7
Natural disaster	0.0	0.0

**Table 1.** CONTINUED.

	Validation <sup>b</sup> (N=663)	MIRROR <sup>b</sup> -only (N=449)
<b>Relation to the event</b>	%	%
The event happened to me	72.5	69.3
I have witnessed the event	19.5	20.9
I learnt about the event	6.3	7.8
Other <sup>c</sup>	1.7	2.0
<b>Work-related</b>	%	%
No	88.4	84.4
Yes	11.6	15.6
<b>Time since the event</b>	%	%
Less than one week	36.3	48.6
Over four weeks	32.3	25.2
Between one and four weeks	21.7	20.0
It happens repeatedly	9.7	6.2

<sup>a</sup>MIRROR: Mobile Insight in Risk, Resilience, and Online Referral.

<sup>b</sup>Significant association between sample and MIRROR outcome,  $P < .001$ .

<sup>c</sup>PTSD: posttraumatic stress disorder.

<sup>d</sup>LEC-5: Life Events Checklist for DSM-5.

<sup>e</sup>If respondents could not select one of the event relations (happened to me, witnessed it, learned about it, work-related), they are asked to specify their relation to the event.

**Table 2.** Frequency distribution in percentages of Mobile Insight in Risk, Resilience and Online Referral (MIRROR) item response categories, items 1-4 and 6-8 ( $n=1112$ ).

Scale item and number	Never	Rarely	Sometimes	Often	All the time
<b>PTSD<sup>a</sup></b>					
1	2.7	5.7	16.6	38.5	36.5
2	5.1	8.5	19.3	27.4	39.6
3	9.3	13.8	26.9	22.9	27.1
4	8.5	11.4	26.7	26.8	26.6
<b>Resilience</b>					
6	5.3	8.5	21.7	35.3	29.3
7	7.3	15.6	35.2	30.5	11.5
8	5.2	15.1	45.6	28.1	5.9

<sup>a</sup>PTSD: posttraumatic stress disorder.

**Table 3.** Frequency distribution in percentages of Mobile Insight in Risk, Resilience and Online Referral (MIRROR) item response categories, item 5 ( $n=1112$ ).

Scale and item number	1	2	3	4	5	6	7	8	9	10
<b>Functioning</b>										
<b>5</b>	4.9	6.9	10.4	15.8	19.8	20.9	12.1	6.3	1.6	1.3

A detailed overview of the scores of the validation sample on the reference measures can be found in Appendix 2. Overall, these show a high level of complaints in our sample and rather low levels of psychological resilience and positive mental health (also see Table 7 and Figure 1 for reference measures of each MIRROR outcome category).

Google Analytics data provided insight into MIRROR's use. The number of visitors who started MIRROR was 2555, of whom 2247 (87.95%) finished it. The original database contained 1314 entries. This discrepancy can be explained by users having the opportunity to refuse to have their data saved before starting. Of all users, 47.59% (1216/2555) chose this option. Furthermore, of the follow-up support options, the "seek contact with Victim Support Netherlands" page had most views (411 unique views), followed by "more information" (293 unique views), "send your advice to yourself or someone else" (235 unique views), "seek contact with people who have had similar experiences" (209 unique views), and "set a reminder" (161 unique views). A total of 28.7% (113/394) of respondents who received the orange outcome and were advised to complete MIRROR again in 2 weeks immediately set a reminder to complete MIRROR again in 2 weeks. A total of 22.1% (25/113) did so at the time of data analyses. The most often used device was the smartphone (1566/2555, 61.29%), followed by desktop (794/2555, 31.08%), and tablet (195/2555, 7.63%).

### Factor Structure

Table 4 presents the factor loadings for the 2-factor and 3-factor solution model of MIRROR as estimated by EFA. EFA yielded a 3-factor solution with good model fit based on all fit indices. The Kaiser criterion was met for the first 2 factors, eigenvalues of the third through eighth factor were <1. The 3-factor solution separated MIRROR's PTSD items into 2 factors: 1 with the intrusion item and 1 with the avoidance and arousal/reactivity items. However, item 2 ("have you become jumpy and/or vigilant since the event?") cross-loaded significantly on 2 factors within the model, with only a small difference between the 2 factor loadings ( $\lambda = 0.030$ ). This indicates that item 2 did not sufficiently distinguish between both factors. The 3-factor solution clustered the functioning item with the resilience items into a third factor.

EFA yielded a 2-factor solution with adequate model fit. The RMSEA and TLI indicated adequate model fit and CFI indicated good model fit (Table 4). The Kaiser criterion was met for the first 2 factors; eigenvalues of the third through eighth factor were <1. The first factor of the 2-factor solution consisted of the PTSD items and the second factor consisted of the functioning and resilience items. No cross-loadings were observed in this model.

Next, we conducted CFA to further compare the 2- and 3-factor model that resulted from EFA. Table 5 presents the model fit indices based on CFA of both aforementioned models. The model fit indices were similar for both models; the CFI and TLI indicated good model fit, the RMSEA acceptable model fit. As indicated by the significant  $\chi^2$  difference test, the 2-factor model has worse model fit compared with the 3-factor model ( $\chi^2_{2,n=1112}=13.63, P=.001$ ). However, the difference in CFI is <0.01, indicating the 2-factor model does not have worse model fit. We selected the 2-factor model as the best-fitting model to our data, given the  $\chi^2$  difference test is sensitive to sample size,

the CFI difference is  $<.001$ , and it is more parsimonious and better interpretable at a conceptual level compared with the 3-factor model. The 2-factor model represents a clear distinction between negatively formulated outcomes (PTSD complaints) and positively formulated outcomes (psychosocial functioning and resilience) of PTEs. The positively formulated outcomes combine psychosocial functioning, social support, self-reliance and problem solving. We therefore propose to rename this factor psychosocial resources.

**Table 4.** Geomin rotated factor loadings for the 2-factor and 3-factor solution model of Mobile Insight in Risk, Resilience and Online Referral (MIRROR) as estimated by exploratory factor analysis ( $n=1112$ ).

MIRROR <sup>a</sup> items	2-factor solution <sup>b</sup>		3-factor solution <sup>c</sup>		
	F1	F2	F1	F2	F3
1. Are you troubled by images of or thoughts about the event? <sup>d</sup>	0.525*	-0.004	0.813*	0.015	0.018
2. Have you become jumpy and/or vigilant since the event? <sup>e</sup>	0.585*	-0.009	0.308*	0.338*	-0.012
3. Do you try to avoid things that are related to the event? <sup>f</sup>	0.789*	0.071	-0.000	1.078*	0.245*
4. Do you try to avoid thinking about the event? <sup>g</sup>	0.648*	-0.016	0.208*	0.459*	-0.019
5. How would you rate your present functioning (at work/home)? <sup>h</sup>	-0.153*	0.354*	-0.213*	0.004	0.360*
6. Do you experience support from those close to you? <sup>i</sup>	0.081*	0.388*	0.160*	-0.064	0.374*
7. Are you confident in yourself? <sup>j</sup>	0.006	0.827*	0.010	-0.021	0.827*
8. Are you able to deal with any problems you encounter? <sup>k</sup>	-0.015	0.730*	-0.074	0.018	0.718*

<sup>a</sup>Mobile Insight in Risk, Resilience and Online Referral.

<sup>b</sup>Model fit indices for the two-factor solution:  $\chi^2 = 88.728$ ,  $P < .001$ ,  $df = 13$ ,  $CFI = .969$ ,  $TLI = .933$ ,  $RMSEA = .072$ .

<sup>c</sup>Model fit indices for the three-factor solution:  $\chi^2 = 12.565$ ,  $P = .084$ ,  $df = 7$ ,  $CFI = .998$ ,  $TLI = .991$ ,  $RMSEA = .027$ .

\*  $P < .05$ .

<sup>d</sup>Eigenvalue 2.777

<sup>e</sup>Eigenvalue 1.466

<sup>f</sup>Eigenvalue .927

<sup>g</sup>Eigenvalue .715

<sup>h</sup>Eigenvalue .668

<sup>i</sup>Eigenvalue .640

<sup>j</sup>Eigenvalue .437

<sup>k</sup>Eigenvalue .369

**Table 5.** Confirmatory factor analyses model fit indices ( $N = 1112$ )

Model	$\chi^2$	$P$	$df^a$	CFI <sup>b</sup>	TLI <sup>c</sup>	RMSEA <sup>d</sup>
Two-factor solution	107.780	$<.001$	19	.965	.948	.065
Three-factor solution	95.868	$<.001$	17	.969	.949	.064

<sup>a</sup> $df$ : degree of freedom.

<sup>b</sup>CFI: comparative fit index.

<sup>c</sup>TLI: Tucker-Lewis index.

<sup>d</sup>RMSEA: root mean square error of approximation.

## Internal Consistency

Inter-item correlations of MIRROR's PTSD complaints scale ranged between .28 and .48 with a mean of .34. All of the inter-item correlations of the PTSD scale were in the



recommended range of moderate magnitude of .15 to .50, indicating that this scale has high internal consistency in combination with a differentiated item set. Corrected item-total correlations for this scale ranged between .39 and .54 with a mean of .46, indicating that high scores on the PTSD items are associated with high scores on the overall PTSD scale of MIRROR. Cronbach alpha coefficient for MIRROR's PTSD scale was .68.

Inter-item correlations of MIRROR's resilience scale ranged between .24 and .55, with a mean of .36. In addition, 1 out of 3 inter-item correlations was higher than the recommended range of moderate magnitude of .15 to .50 (between "are you confident in yourself" and "are you able to deal with any problems you encounter"), indicating that this scale has high internal consistency in combination with a differentiated item set. Corrected item-total correlations ranged between .30 and .52 with a mean of .44, indicating that high scores on the resilience items are associated with high scores on the overall resilience scale of MIRROR. Cronbach alpha coefficient for MIRROR's resilience scale was .62.

### Convergent and Divergent Validity

Pearson correlations between MIRROR and reference measures are presented in Table 6. MIRROR's PTSD scale showed strongest correlations with PTSD as measured with the PCL-5, followed by a lower but still substantial correlation with psychological complaints as assessed with the DASS-21. The weakest correlations were observed between PTSD symptom severity as assessed with MIRROR and psychological resilience and positive mental health. MIRROR's resilience scale showed strongest correlation with psychological resilience (RES), followed by a slightly lower correlation with positive mental health, psychological complaints (DASS-21), and PTSD (PCL-5). MIRROR's functioning item showed strongest correlations with psychological complaints (DASS-21) followed by PTSD (PCL-5) with lower correlations with positive mental health (MHC-SF) and psychological resilience (RES). In conclusion, the correlational structure indicates good convergent and divergent validity of MIRROR's PTSD subscale. The correlational structure with regard to MIRROR's resilience scale and functioning item indicates adequate convergent and divergent validity.

**Table 6.** Correlations between Mobile Insight in Risk, Resilience and Online Referral (MIRROR) subscales and reference measures ( $n=663$ ).

MIRROR	PTSD <sup>a</sup>	<i>P</i>	Resilience	<i>P</i>	Functioning	<i>P</i>
PCL-5 <sup>b</sup>	.665	<.001	-.507	<.001	-.442	<.001
DASS-21 <sup>c</sup>	.486	<.001	-.539	<.001	-.449	<.001
RES <sup>d</sup>	-.265	<.001	.612	<.001	.279	<.001
MHC-SF <sup>e</sup>	-.259	<.001	.603	<.001	.319	<.001

<sup>a</sup>PTSD: posttraumatic stress disorder.

<sup>b</sup>PCL-5: PTSD Checklist for DSM-5.

<sup>c</sup>DASS-21: Depression Anxiety Stress scale.

<sup>d</sup>RES: Resilience Evaluation Scale.

<sup>e</sup>MHC-SF: Mental Health Continuum Short Form.

## Classification Quality

We expected respondents with the red MIRROR outcome to report more PTSD symptoms and depression, anxiety, and stress complaints; lower psychological resilience; and positive mental health compared with respondents with the green and orange MIRROR outcome. Table 7 presents the means and standard deviations on the reference measures for each MIRROR outcome category. Figure 1 shows the classification percentages on reference measures for each MIRROR outcome category. Both Table 7 and Figure 1 show that respondents with the red MIRROR outcome category report higher complaints and lower psychological resilience and positive mental health compared with the orange and green MIRROR outcome category.

**Table 7.** Means and standard deviations of reference measures for each Mobile Insight in Risk, Resilience and Online Referral (MIRROR) outcome category (n=663).

MIRROR <sup>a</sup> outcome category (N)	Green (N= 24) M (SD)	Orange (N=200) M (SD)	Red (N=439) M (SD)
PTSD <sup>b</sup> (PCL-5 <sup>c</sup> )	18.04 (12.49)	36.09 (15.77)	46.13 (14.04)
Depression (DASS-21 <sup>d</sup> )	4.08 (8.10)	11.73 (11.54)	19.66 (11.54)
Anxiety (DASS-21 <sup>d</sup> )	5.25 (6.72)	14.03 (10.27)	18.04 (10.30)
Stress (DASS-21 <sup>d</sup> )	10.42 (7.32)	17.60 (9.20)	22.49 (9.37)
Psychological resilience (RES <sup>e</sup> )	25.58 (5.11)	22.04 (6.02)	18.82 (7.15)
Positive mental health (MHC-SF <sup>f</sup> )	50.0 (12.05)	43.11 (14.89)	31.42 (14.28)

<sup>a</sup>MIRROR: Mobile Insight in Risk, Resilience and Online Referral.

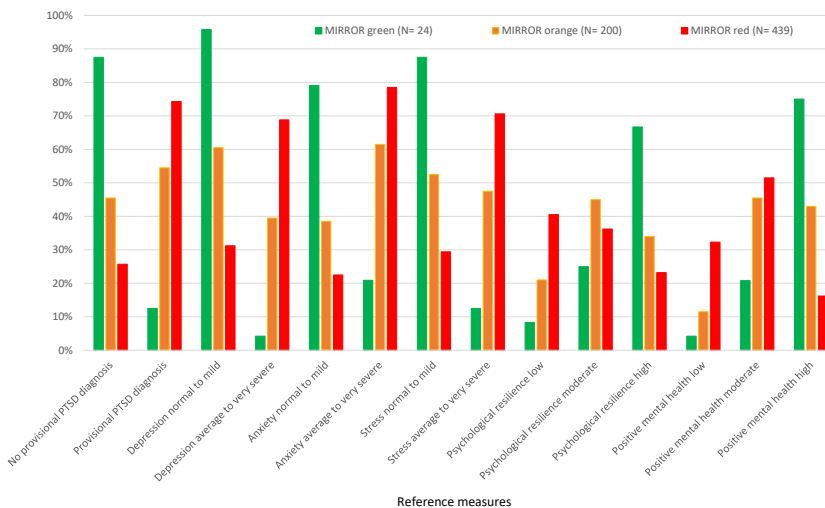
<sup>b</sup>PTSD: posttraumatic stress disorder.

<sup>c</sup>PCL-5: PTSD Checklist for DSM-5.

<sup>d</sup>DASS-21: Depression Anxiety Stress Scale.

<sup>e</sup>RES: Resilience Evaluation Scale.

<sup>f</sup>MHC-SF: Mental Health Continuum Short Form.



**Figure 1.** Classification percentages on reference measures of each Mobile Insight in Risk, Resilience, and Online Referral (MIRROR) outcome category.

We conducted several 1-way between-groups ANOVAs to investigate the difference in mean scores on the reference measures between MIRROR outcome categories. As can be seen, negative outcomes were highest for the red MIRROR outcome category and positive outcomes highest for the green outcome category. The ANOVA results are shown in Table 8. We found significant differences in PTSD symptoms; depression anxiety, and stress; psychological resilience; and positive mental health between groups. Post hoc tests revealed that PTSD symptoms and depression, anxiety, and stress complaints were significantly different between all groups ( $P < .001$ ). Psychological resilience was significantly higher for the green and orange MIRROR outcome category compared with the red category ( $P < .001$ ). It was also significantly higher for the green category compared with the orange category ( $P = .01$ ). Positive mental health was significantly higher for the green and orange category compared with the red category ( $P < .001$ ). There was no significant difference between the green and orange category ( $P = .07$ ).

**Table 8.** One-way between-groups analyses of variance with Mobile Insight in Risk, Resilience and Online Referral (MIRROR) outcome categories and reference measures.

	<i>F</i>	<i>Cohen's d</i>	<i>df</i> <sup>a</sup> between groups	<i>df</i> <sup>a</sup> within groups	<i>P</i>
PTSD <sup>b</sup> symptoms <sup>c</sup>	73.32	.168	2	62.90	<.001
Depression <sup>c</sup>	65.21	.136	2	65.81	<.001
Anxiety <sup>c</sup>	42.48	.072	2	67.37	<.001
Stress	34.15	.094	2	660.0	<.001
Psychological resilience <sup>c</sup>	30.13	.068	2	65.44	<.001
Positive mental health	57.79	.069	2	660.0	<.001

<sup>a</sup>df: degree of freedom.

<sup>b</sup>PTSD: posttraumatic stress disorder.

<sup>c</sup>The assumption of equal variances was violated. Therefore, the Welch F-test and Games-Howell post hoc test were used.

## DISCUSSION

### Principal Results and Comparison With Prior Work

The purpose of this study was to evaluate the use and psychometric and classification properties of MIRROR. MIRROR is an innovative web-based self-help test to identify individuals who develop psychological complaints after a PTE, encourage them to seek help, and support self-reliance. Our results indicated that MIRROR is a valid and reliable self-help test to identify negative outcomes (PTSD core symptoms) and positive outcomes (psychosocial functioning and resilience). MIRROR is able to correctly classify respondents according to their PTSD complaints and scores on reference measures. During the study period, 87.95% (2247/2555) of respondents who started MIRROR completed it.

We found that MIRROR's presupposed model of 3 factors (PTSD symptoms,

psychosocial functioning, and resilience) did not fit our data best. Instead, a 2-factor solution showed good model fit, conceptual meaning, and maximum parsimony. This model separates MIRROR's PTSD items from the functioning and resilience items (social support, self-reliance, and problem solving). In retrospect, the grouping of the functioning and resilience items is not entirely surprising. If we assume stress to be the result of an imbalance between perceived external and internal demands and perceived personal and social resources (Folkman & Lazarus, 1984), it is likely that this distinction between demands and resources is reflected in the way people cope with PTEs. We propose to call the factor psychosocial resources. In accordance with this distinction, the 2-factor model clearly separates negative (PTSD complaints) and positive (psychosocial resources) outcomes of PTEs. This is in line with the general notion that PTSD and psychosocial resources are separate constructs (Kuhn et al., 2003; Olf, 2012; Ozer et al., 2003).

The convergent and divergent validity of MIRROR is supported by the correlations that were found between MIRROR and the reference measures. The results indicate good convergent and divergent validity for MIRROR's PTSD items. As expected, MIRROR's PTSD showed strongest correlations with PTSD (assessed with the PCL-5), followed by a lower but substantial correlation with psychological complaints (measured with the DASS-21). MIRROR's PTSD items showed low correlations with positive reference measures (assessed with the RES and MHC-SF). The results indicate adequate convergent and divergent validity for MIRROR's resilience items but less distinct than MIRROR's PTSD. MIRROR's resilience items showed strongest correlations with psychological resilience, followed by slightly lower but substantial correlations with the other reference measures. The results in this study correspond with the finding of Van der Meer et al. (2018) who found the RES total scale to be positively associated with established measures for resilience, self-esteem, self-efficacy, and global functioning and negatively associated with PTSD symptoms. Furthermore, the different patterns of correlations for MIRROR's PTSD and resilience scales agrees with the notion that PTSD and resilience are two separate constructs (Kuhn et al., 2003; Olf, 2012; Ozer et al., 2003). MIRROR's functioning item showed the strongest correlation with psychological complaints and PTSD and lower correlations with the positive reference measures. This indicates adequate convergent and divergent validity. The factor analyses revealed that functioning belongs to the resilience items of MIRROR. However, the correlation between MIRROR's functioning item and psychological complaints and PTSD is in line with studies that show that psychosocial functioning can be impaired by psychological complaints (Fried & Nesse, 2014; Kuhn et al., 2003; Palyo & Beck, 2005).

We found that both MIRROR's PTSD and resilience scales show good internal consistency. The Cronbach alpha coefficients for these scales are relatively low (.68 and .62, respectively), but this is not unusual given the (intentionally) short scales of MIRROR and given that Cronbach alpha is a function of scale length (Clark & Watson,

1995). Because MIRROR contains only few items, we calculated interitem and item-total correlations. The results indicate that both scales have high internal consistency and that high scores on the items are associated with high scores on the overall scales.

MIRROR was able to correctly classify respondents into green (no further action needed), orange (encourage self-monitoring), or red (encourage seeking consultation) outcome categories and advice compared with the other measures. Results showed that respondents with a red outcome reported having more severe PTSD symptoms; more severe depression, anxiety, and stress complaints; and lower psychological resilience and positive mental health compared with respondents with a green or orange outcome. The occurrence of PTSD and other stress-related complaints like depression following traumatic exposure is in line with former results (O'Donnell et al., 2004). It is important to recognize that MIRROR is specifically evaluating the risk of developing PTSD instead of other mental health outcomes of PTEs such as depression, anxiety, and substance abuse. If a respondent experiences low functioning, they will receive advice to seek consultation with their general practitioner despite the level of their PTSD complaints. This is based on the assumption that low functioning but no PTSD complaints may indicate that other problems could be at hand such as depression, anxiety, or substance abuse. Importantly, MIRROR appears to adequately identify users with more severe complaints and validly advises them to seek help. Our results seem to underline the relevance of including the factor “time since the event” in MIRROR’s algorithm. According to the PCL-5, 54.5% (109/200) of the respondents with the orange outcome had a provisional PTSD diagnosis. However, their complaints could still diminish, considering the event happened only recently for these respondents and research has shown that in most individuals complaints usually diminish over time (Bonanno et al., 2011; de Vries & Olf, 2009; Hobfoll et al., 2007). Therefore, in accordance with international guidelines (National Institute for Health and Care Excellence, 2018), respondents with the orange outcome are advised to monitor how their complaints develop (by setting a reminder to use MIRROR again in 2 weeks).

The evaluation of MIRROR’s use with Google Analytics showed that the number of users of MIRROR was substantial ( $n=2555$ ), and the completion rate was high (2247/2555, 87.95%). These results are in line with former studies on apps assessing and monitoring mental health after PTEs indicating high use (Olf, 2015; Price et al., 2016; Price et al., 2014) and high completion rate (van der Meer et al., 2017). In general, the follow-up options were visited less frequently (161 to 411 unique visits) than the outcome and advice page (2247 unique visits). A reason for this could be that receiving MIRROR’s outcome and advice is sufficient initial support for people who have experienced a PTE, providing insight into how they are coping. A total of 28.7% (113/194) of respondents who were advised to complete MIRROR again in 2 weeks immediately set a reminder, suggesting MIRROR is able to support self-monitoring. Unfortunately, this study’s design and considerations of ethical nature did not enable us to assess use in more depth.

### Future Research and Limitations

Although guidelines on screening for PTSD complaints and postdisaster psychosocial care are widely available (Bisson, Tavakoly, et al., 2010; Jacobs et al., 2019; Silver et al., 2002; Te Brake & Dückers, 2013; Te Brake et al., 2009) the challenge remains how to reach and identify people at risk of developing psychological complaints after a PTE on a large scale. Future research could focus on investigating the implementation of MIRROR on a larger scale—for example, after terrorist attacks or natural disasters. Literature is inconclusive about the benefits versus disadvantages of formal screening of an entire population after a disaster or crisis (Australian Centre for Posttraumatic Mental Health (ACPMH), 2013; Bisson, Tavakoly, et al., 2010; National Institute for Health and Care Excellence, 2018; Te Brake & Dückers, 2013). Because of limited evidence of effectivity and sensitivity of screening, organizational efforts related to screening, and the often scarce resources available (Bisson, Weltch, et al., 2010; Brewin et al., 2010), it is generally not recommended to perform formal screening of complaints among all involved people following incidents. At the same time, we know that early recognition and timely referral to help are essential for preventing and treating traumatic stress symptoms. This is supported by evidence of the effectiveness of early psychological interventions for individuals prescreened with traumatic stress symptoms shortly following trauma and no benefits in those not prescreened for these symptoms (Roberts et al., 2019). Mobile apps such as MIRROR can make a contribution to solving the screening dilemma by supporting low key, accessible, and easy-to-use self-assessment and -monitoring. In this view, MIRROR could be implemented as a first step in the support for people who have experienced a PTE, before having to consult professional care (Olf, 2015; Price et al., 2016). MIRROR might lower the barrier to seek help given its open accessibility and anonymity. Future research could focus on acquiring longitudinal data of MIRROR to assess the development of complaints, functioning, and resilience over time and establish MIRROR's ability to correctly classify users accordingly. Also, qualitative research might clarify what actions users take as a result of MIRROR's personal advice.

Our study has some limitations. In our validation sample, 74.2% (492/663) of respondents were female, and 45.3% (300/663) of respondents were aged between 21 and 40 years. This could lead to selection bias and limited generalizability of the results, which is common with open internet surveys (Eysenbach & Wyatt, 2002). However, our sample is a specifically targeted sample because it consisted of visitors of the website of Victim Support Netherlands. Considering website visitors were automatically led to MIRROR when searching for information regarding stress reactions following a PTE, a high prevalence of psychological complaints after traumatic exposure in our sample could be expected. Moreover, research has shown that women have a higher risk of developing PTSD compared with men (Olf, 2017), they are more likely to seek medical or health-related information online (Smail-Crevier et al., 2019), and young people use the internet as their main source of information, and this is also true for mental health

concerns (Pretorius, Chambers, Cowan, et al., 2019; Pretorius, Chambers, & Coyle, 2019). This demonstrates that the targeted sample was reached. The main strength of this study is by comparing MIRROR to more broadly used reference measures, it contributes to the highly needed evidence base of mobile apps with the potential to improve timely identification of psychological complaints (Ennis et al., 2018; Olf, 2015; Price et al., 2014).

### **Conclusions**

This study shows that MIRROR is a psychometrically sound, anonymous, and easily accessible self-help test for people who have experienced a PTE. It is able to identify both negative (PTSD symptoms) and positive (psychosocial resources) outcomes of PTEs and classify respondents in accordance with reference measures. This study will hopefully contribute to enhancing adequate and timely identification of people who suffer from psychological complaints after PTEs.

### **Funding**

This study was partially funded by the Interreg North-West Europe Programme which invested in the e-mental health innovation and transnational implementation platform North West Europe (eMEN) project, an EU-wide platform for e-mental health innovation and implementation formed by private and public partners in northwest Europe (Interreg NWE). This study was also funded by ARQ National Psychotrauma Centre and Victim Support Netherlands.

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## APPENDICES

Mobile Insight in Risk, Resilience, and Online Referral (MIRROR): Psychometric Evaluation of an Online Self-Help Test

### Appendix 1: Overview of MIRROR's outcomes

<b>Time since trauma: less than one week</b>			
	PTSD low	PTSD moderate	PTSD high
Functioning high	Green	Orange	Orange
Functioning moderate	Orange	Orange	Orange
Functioning low	Red	Red	Red
<b>Time since trauma: between one and four weeks</b>			
	PTSD low	PTSD moderate	PTSD high
Functioning high	Green	Green	Orange
Functioning moderate	Green	Orange	Red
Functioning low	Red	Red	Red
<b>Time since trauma: more than four weeks / repetitively</b>			
	PTSD low	PTSD moderate	PTSD high
Functioning high	Green	Green	Red
Functioning moderate	Green	Red	Red
Functioning low	Red	Red	Red

*Notes. PTSD complaints: 4 items, functioning: 1 item and resilience: 3 items. In total, MIRROR provides 27 unique types of advice texts, which take all levels of PTSD complaints, functioning and resilience and time passed since the event into account.*

**Appendix 2: Sample characteristics on reference measures and demography (N = 663)**

	<b>M</b>	<b>SD</b>	<b>Range</b>
<b>PTSD (PCL-5)</b>			
Total score	42.09	15.91	5 – 77
Intrusion	11.02	4.59	0 – 20
Avoidance	4.22	2.26	0 – 8
Alterations in cognition and mood	13.98	6.82	0 – 28
Negative alterations in arousal and reactivity	12.87	5.08	0 – 24
<b>Depression, anxiety and stress (DASS-21)</b>			
Depression	16.70	11.84	0 – 42
Anxiety	16.37	10.56	0 – 42
Stress	20.58	9.71	0 – 42
<b>Psychological resilience (RES)</b>			
Self-efficacy	13.42	4.75	0 – 24
Self-confidence	6.62	2.99	0 – 12
<b>Positive mental health (MHC-14)</b>			
Emotional wellbeing	8.26	3.71	0 – 15
Social wellbeing	11.08	6.15	0 – 25
Psychological wellbeing	16.27	7.36	0 – 30
<b>Gender</b> %			
Female	74.2		
Male	25.6		
Prefer not to answer	0.2		
<b>Age</b> %			
14 – 20 years	10.9		
21 – 30 years	27.5		
31 – 40 years	17.8		
41 – 50 years	18.7		
51 – 60 years	16.0		
61 – 70 years	7.7		
71+ years	1.5		
<b>Education</b> %			
Primary	2.9		
Pre-vocational secondary	14.6		
Secondary or vocational	35.3		
Higher	45.1		
Prefer not to answer	2.1		
<b>Marital status</b> %			
Single	42.8		
Married/cohabiting with children	25.6		
Married/cohabiting without children	17.3		
Steady relationship	9.0		
Prefer not to answer	5.1		





# 5.

## STRESS AT WORK: SELF-MONITORING OF STRESSORS AND RESOURCES TO SUPPORT EMPLOYEES

Published as: Van Herpen, M. M., Te Brake, H., & Olff, M. (2022). Stress at work: Self-monitoring of stressors and resources to support employees. *Stress and Health*, 38(2), 402-409.



## ABSTRACT

### **Background**

High levels of stress at work may have serious consequences for employee functioning and mental health. By providing employees with an easily accessible instrument to regularly evaluate stressors and resources, employee self-monitoring and guidance to support can be accommodated.

### **Methods**

We evaluated an online self-monitoring tool Brief Assessment of Stress and Energy (BASE). Through their organization, 139 railway emergency services employees were invited to complete BASE and six wellbeing measures. We assessed BASE in two ways: using multiple regression analysis (N = 102, 73.4%), as well as by telephone follow-up interviews during which experts and respondents evaluated the BASE outcome (N = 67, 65.7%).

### **Results**

Explained variances of BASE on the six wellbeing measures ranged between 26.6% and 49.9%. Telephone interviews confirmed the BASE outcome. The results indicate that BASE is associated with several measures of wellbeing and accurately refers respondents to counseling.

### **Conclusion**

This study shows that BASE is a promising instrument to encourage employees to self-monitor stressors and resources and identify those who need counseling.

### **Keywords**

BASE; employees; monitoring; resources, stressors; support

### **Acknowledgment of author contributions:**

*Research design and data collection:* van Herpen, M. M., te Brake, H. & Olf, M.

*Data analysis:* van Herpen, M. M. & te Brake, H.

*Paper writing:* van Herpen, M. M., te Brake, H. & Olf, M.

## INTRODUCTION

High levels of stress at work can have serious consequences for employee functioning and mental health (International Labor Organization, 2016). Various theoretical models explain how events in the (work) environment generate stress and stress responses (Bakker & Demerouti, 2017; De Lange et al., 2003; Folkman & Lazarus, 1984; Ganster & Rosen, 2013; Halbesleben et al., 2014; Karasek et al., 1998). Stressors can be defined as aspects that lead an individual to appraise their environment as exceeding their resources and threatening their wellbeing (Folkman & Lazarus, 1984). This translates to work aspects that cause stress and strain for an employee (Bakker & Demerouti, 2017). In addition to the influence of stressors, these models also include resources, emphasizing their importance in the stress process. According to Hobfoll et al. (2015) “resources are loosely defined as objects, states, conditions, and other things that people value” (Hobfoll et al., 2015, p. 2). In the work context, resources are aspects of work that motivate employees and buffer against stressors (Bakker & Demerouti, 2017). Research has shown that resources are a key component of occupational stress (Westman et al., 2005) and losing resources is a strong predictor of negative psychological outcomes (Hobfoll et al., 2015). As Hobfoll et al. (2015) state, having resources is crucial to build resilience. It is therefore important to support employees in acquiring and maintaining resources that may enhance resilience. Early detection of resources loss can contribute to the prevention of stress and a decrease in employee functioning (Westman et al., 2005).

In addition to resources, personal characteristics – aspects related to resilience and the perception of control and impact on one’s environment (Bakker & Demerouti, 2017; Barbier et al., 2013) – also play a role in the stress process. Research has shown a reciprocal association between personal resources, job resources and work engagement (Bakker & Demerouti, 2017; Barbier et al., 2013; Xanthopoulou et al., 2007).

Various occupational stress screening instruments exist (Faragher et al., 2004; Hicks et al., 2010; Inoue et al., 2014; Karasek et al., 1998). However, most of these instruments only focus on complaints or do not include positive aspects of work. In addition, they do not provide direct feedback to the employee or have to be interpreted by a professional. In effort to address these issues, we developed and evaluated an online self-monitoring tool; Brief Assessment of Stress and Energy (BASE). BASE can be used on a regular basis to self-monitor levels of stressors and resources. Four specific characteristics distinguish BASE from other instruments. First, BASE does not focus on psychological complaints (e.g. burnout symptoms) but on daily occupational factors (e.g. inadequate facilities or support from colleagues) that can cause stress or give energy, and includes personal characteristics (e.g. being able to switch easily between tasks). Second, BASE is an online and short instrument that employees can complete within five minutes, making the instrument more accessible and easy to use. Third, BASE provides direct feedback regarding stressors, resources and personal characteristics with relevant follow-up information, encouraging

self-monitoring, reflection, and seeking support. Fourth, BASE can be tailored to the organization, enhancing implementation of follow-up support within BASE.

We evaluated BASE among railway emergency services personnel in the Netherlands. This high-risk occupational group deals with organizational stressors and typically faces a variety of work-related critical incidents, such as (attempted) railway suicides, (fatal) accidents, violence, aggression or exposure to hazardous materials. The aims of this study were to: (1) assess the level of wellbeing of Dutch railway emergency service personnel; (2) examine the association between BASE and several wellbeing measures and (3) evaluate BASE's ability to refer respondents to counseling.

## METHODS

### Sample characteristics

We invited 139 railway emergency services employees to participate in the study, 102 (73.4%) completed the survey in Dutch. In our sample, the mean age was 47 years (SD = 10.9), mean tenure was eight years (SD = 8.3), 93.1% was male, 88.2% was married or living with a partner and 80.4% had children. Respondents rated their current level of functioning with a mean score of 7.7 (range: 3–10).

As suggested by Osborne (2013), we investigated individual cases to detect systematic answering patterns, such as identical answers on all items of the different measures. We found one case with an abnormal answering pattern and recoded the scores on the Depression, Anxiety and Stress Scale (DASS-21), the PTSD Checklist for DSM-5 (PCL-5) and the Resilience Evaluation Scale (RES) as missing. Results of BASE and the six wellbeing measures are presented in Table 1. Respondents scored average on BASE stressors and high on resources and personal characteristics. Respondents reported low levels of burnout, depression, anxiety and stress and PTSD symptoms, and high work engagement, social support and psychological resilience.

**Table 1.** Mean scores of BASE and wellbeing measures

Measure	N	M <sup>a</sup>	SD <sup>b</sup>	Range
Stressors (BASE)	102	2.05	.51	1.06 – 3.44 <sup>c</sup>
Resources (BASE)	102	3.61	.55	1.80 – 4.90 <sup>c</sup>
Personal characteristics (BASE)	102	4.13	.40	2.71 – 5.00 <sup>c</sup>
Burn-out symptoms (MBI)	102	1.13	1.13	0.00 – 5.11 <sup>d</sup>
Work engagement (UWES)	102	4.72	1.05	1.33 – 6.00 <sup>d</sup>
Depression, anxiety and stress (DASS-21)	101	.28	.32	0.00 – 1.43 <sup>e</sup>
PTSD symptoms (PCL-5)	100	.32	.42	0.00 – 2.55 <sup>f</sup>
Social support (SSL-12)	102	2.79	.49	1.42 – 4.00 <sup>g</sup>
Psychological resilience (RES)	100	3.17	.47	1.44 – 4.00 <sup>f</sup>

Abbreviations: BASE, Brief Assessment of Stress and Energy; DASS-21, Depression, Anxiety and Stress Scale; MBI-GS, Maslach Burnout Inventory-General Survey; PCL-5, PTSD Checklist for DSM-5; RES, Resilience Evaluation Scale; SSL-12, Social Support List; UWES, Utrecht Work Engagement Scale.

<sup>a</sup>Mean; <sup>b</sup>Standard deviation; <sup>c</sup>Maximum range: 1 – 5; <sup>d</sup>Maximum range: 0 – 6; <sup>e</sup>Maximum range: 0 – 3; <sup>f</sup>Maximum range: 0 – 4; <sup>g</sup>Maximum range: 1-4

### **Brief Assessment of Stress and Energy (BASE)**

Employees were offered a comprehensive support program that included BASE, telephone interviews and a face-to-face counseling session. Employees received an invitation to complete BASE every three months. Upon completion, respondents received direct personal feedback, accompanied by the color outcome green or orange. Green is indicative of low levels of stressors and high levels of resources and personal characteristics. Based on a green outcome, no further action is advised. Orange reflects an indication of higher levels of stressors and/or lower levels of resources and personal characteristics. The advice states that the respondent will receive telephone follow-up.

The items of BASE originate from a study within the Dutch police organization which consisted of a literature review, qualitative interviews and pilots, and a survey among 480 police employees. The Job-Demands Resources model was used as a framework to design the study in the police context (Gouweloos-Trines et al., 2014). We used 26 (out of 28) relevant items for the railway context, that were further adapted by incorporating existing research within the railway organization (Krommendijk, 2016) and discussing the items in a group interview with five employees. We added seven items specific to the railway work context. This resulted in a 33 item BASE (see Appendix 1 for details in Supplementary Material). BASE consists of three scales: stressors, resources and personal characteristics. Stressors were measured with items related to aspects of work or home that can cause stress for railway emergency services personnel. Resources were measured with items regarding aspects of work that give energy. Personal characteristics were measured with items relating to individual or contextual features that support employees with their work performance.

### **Procedure**

This study concerns the first pilot measurement of the comprehensive support program. The researchers attended several regular team meetings to inform employees about the program and the study, and to answer any questions. It was emphasized that participation was voluntary and anonymous.

BASE was administered online from January 16 until February 16, 2018. Two automatic reminders were sent during a 30 day period, one after 14 days and one last-minute reminder after 29 days. As part of the pilot measurement, BASE was supplemented by six measures to assess the overall level of wellbeing and to evaluate BASE. The following measures were added: the Maslach Burnout Inventory–General Survey (MBI-GS), the Utrecht Work Engagement Scale (UWES), the Depression Anxiety Stress scale (DASS-21), the PCL-5, the Social Support List (SSL-12) and the Resilience Evaluation Scale (RES), see Appendix 2 for details in Supplementary Material. Later measurements of the program did not include these additional questionnaires but only BASE. Respondents were presented with their BASE outcome after completing all measures.

Telephone follow-up interviews with respondents who scored above cut-off

took place between January and March 2018. Experts employed by an organization specialized in work-related psychological trauma in high-risk occupations conducted the interviews (see Appendix 3 for details in Supplementary Material). Prior to starting BASE, respondents could indicate that they wished to be excluded from telephone follow-up.

The Medical Ethical Committee of the Amsterdam University Medical Center exempted this study from formal review (W17\_365 # 17.425). Written informed consent was obtained, in accordance with the European General Data Protection Regulation.

### **Algorithm and telephone interview**

One aim of BASE was to refer employees to counseling in case of high stressors and/or low resources and personal characteristics. The algorithm was intentionally sensitive; respondents were included with only minor levels of complaints on BASE, MBI-GS, DASS-21 and PCL-5. Respondents scoring above the cut-off scores on any of the BASE subscales, or MBI exhaustion or cynicism, or on any of the DASS-21 subscales or on the PCL-5, received an orange outcome and telephone interview.

Cut-off scores for BASE were based on the outcomes of the study with Dutch police. High scores were defined by scores in the upper 25% of stressors (mean score  $\geq 2.50$ ), or in the lower 25% of both resources (mean score  $\leq 3.66$ ) and personal characteristics (mean score  $\leq 4.09$ ). The combination of high stressors or low resources and personal characteristics has been based on several studies that have shown that various job resources can buffer the impact of various job demands on negative outcomes (Bakker & Demerouti, 2007, 2014; Xanthopoulou et al., 2007). For the newly added items, cut-off scores were defined as scoring three on four items or scoring four or five on two items. MBI-GS cut-off scores were set at average complaints or worse on exhaustion (mean score  $\geq 0.99$ ) or on cynicism (mean score  $\geq 0.49$ ). DASS-21 cut-off scores were set at mild symptoms or worse on depression ( $\geq 9$ ) or anxiety ( $\geq 7$ ) or stress ( $\geq 14$ ). Each item on the PCL-5 rated as two (moderately) or higher was treated as a symptom endorsed. Cut-off scores were set at 1 B item, or 1 C item, or two D items or 2 E items (Weathers et al., 2013).

During the interview, experts and respondents discussed the BASE outcome to assess the respondent's perception of the BASE outcome. During the interview, experts asked respondents regarding perceived stressors and resources, and their preference for receiving counseling. The expert gave advice about referral to counseling, irrespective of the respondent's results. The outcome of the interview was based on the interaction between the expert and the respondent. If the respondent wished to receive counseling they could, even if the expert did not advise it. The experts reported the discussion and outcome on a standardized form, including their expert opinion and advice.

### **Statistical analyses**

We evaluated the internal consistency reliability of the BASE scales with inter-item correlations, corrected item-total correlations and Cronbach's alpha. Corrected item-

total correlations were computed to assess whether item scores regarding stressors, resources and personal characteristics were associated with overall scores of the three scales.

To explore the association of BASE with the wellbeing measures, we conducted multiple regression analyses. We performed separate regression analyses with each of the measures as dependent variables and BASE scales as independent variables. Diagnostic statistics (standardized residuals, Cook's distance, average leverage, Mahalanobis distance and covariance ratio) were used to examine extreme cases (Field, 2013; Osborne, 2010). We also assessed the assumptions for ordinary least squares (OLS) regression of linearity, normality, homoscedasticity and multicollinearity with visual inspection of the data (Field, 2013).

To assess BASE's ability to accurately refer employees to counseling, we first categorized respondents into three groups based on their scores on the MBI-GS, DASS-21 and PCL-5 and the telephone interview outcome. Group one concerned respondents who scored below the cut-off on all three measures (group label below cut-off). Group two included respondents who scored above the cut-off on one of the three measures and were not referred to counseling (group label no counseling). Group three concerned respondents who scored above the cut-off on one of the three measures and were referred to counseling (group label counseling). We computed the BASE score by summing all item scores for stressors, resources and personal characteristics (first reverse scoring the resources and personal characteristics items); thus, high scores reflect high stressors, low resources and low personal characteristics. We compared the BASE score between groups with one-way between-groups analysis of variance (ANOVA). We assessed the assumption of equal variances with Levene's test. All statistical analyses were conducted using SPSS.

## RESULTS

### **Association between BASE and measures of wellbeing**

The internal consistency reliability results are presented in Table 2. Internal consistency reliability can be considered good when most inter-item correlations are in the range of 0.15–0.50 (moderate magnitude) and Cronbach's alpha for the scale is  $> 0.80$  (Clark & Watson, 1995). Corrected item-total correlations  $> 0.20$  are recommended for including an item in a scale (Streiner et al., 2015).

Regarding the stressor scale, 75.0% of the inter-item correlations were in the recommended range. Cronbach's alpha coefficient was 0.85. This indicates good internal consistency. Corrected item-total correlations for this scale ranged between 0.36 and 0.63 with a mean of 0.47, indicating high item scores were associated with high scores on the overall stressor scale.

**Table 2.** Internal consistency reliability analysis (N = 102)

BASE scale	Inter-item correlations range (mean)	Corrected item total correlations range (mean)	Cronbach's alpha
Stressors (16 items)	.005- .627 (.259) <sup>a</sup>	.357- .631 (.467)	.847
Resources (10 items)	.106- .628 (.357) <sup>b</sup>	.327- .656 (.547)	.846
Personal characteristics (7 items)	-.008- .521 (.243) <sup>c</sup>	.242- .594 (.402)	.689

<sup>a</sup>75% recommended range; <sup>b</sup>82.22% recommended range; <sup>c</sup>61.91% recommended range

Of the resources scale, 82.22% of the inter-item correlations were in the recommended range. Cronbach's alpha coefficient was 0.85. This indicates good internal consistency. Corrected item-total correlations for this scale ranged between 0.33 and 0.67 with a mean of 0.55, indicating high item scores were associated with high scores on the overall resources scale.

In regard to the personal characteristics scale, 61.91% of the inter-item correlations were in the recommended range. Cronbach's alpha coefficient was 0.69. This indicates acceptable internal consistency. Corrected item-total correlations for this scale ranged between 0.24 and 0.59 with a mean of 0.40, indicating high item scores were associated with high scores on the overall personal characteristics scale. Cronbach's alpha of all scales could not be improved by deleting any items.

In the regression analysis, we examined extreme cases with diagnostic statistics. For several cases, the standardized residuals were equal or greater than 3 and the average leverage was more than three times as large. Therefore, we considered these cases as unreliable. As a result, one case was recoded as missing on all measures. Additionally, two cases on the MBI-GS, two cases on the UWES, one case on DASS-21, four cases on the PCL-5 and one case on SSL-12 were treated as missing in the analysis. All assumptions for OLS regression were met, except for the assumption of homoscedasticity that was violated in the models with burn-out (MBI-GS), depression anxiety and stress (DASS-21) and PTSD (PCL-5). When the homoscedasticity assumption is violated, Hayes and Cai (2007) recommend employing the heteroskedasticity-consistent standard error (HCSE) estimator of OLS parameter estimates. This estimates the standard errors without assuming homoskedasticity. We used the RLM macro for SPSS (Darlington & Hayes, 2016) to employ the HC4 estimator in all models (Hayes & Cai, 2007).

The significant F-statistics in Table 3 indicate that BASE was associated with all measures of wellbeing. The explained variance (R<sup>2</sup>) ranged between 26.6% and 49.9%. BASE explained most variance on burnout (49.9%) and work engagement (49.6%). The standardized regression coefficients indicate that higher stressors were significantly related to higher burnout symptoms, depression, anxiety and stress and PTSD symptoms. Higher resources were significantly related to higher work engagement and social support and lower burnout. Higher personal characteristics were significantly related to higher work engagement, social support and psychological resilience and to lower depression, anxiety and stress and PTSD symptoms.

**Table 3.** Ordinary least squares (OLS) regression analysis with BASE and wellbeing measures, using standard error estimates not assuming homoscedasticity (HC4<sup>a</sup>).

BASE scales	Measures	B	SE HC4	$\beta$	p	F	p	R <sup>2</sup>
	Burn-out (N= 100)					19.449	<.001	.499
Stressors		.433	.121	.370	<.001			
Resources		-.801	.212	-.471	<.001			
Personal characteristics		-.251	.348	-.071	.474			
	Work engagement (N= 100)					25.664	<.001	.496
Stressors		-.184	.104	-.166	.079			
Resources		.836	.163	.517	<.001			
Personal characteristics		.660	.305	.197	.033			
	Depression, anxiety and stress (N=100)					11.303	<.001	.363
Stressors		.327	.087	.403	<.001			
Resources		-.205	.123	-.177	.097			
Personal characteristics		-.469	.204	-.194	.023			
	PTSD symptoms (N= 96)					13.305	<.001	.362
Stressors		.294	.089	.360	.001			
Resources		-.189	.121	-.166	.122			
Personal characteristics		-.587	.188	-.254	.002			
	Social support (N= 101)					10.646	<.001	.310
Stressors		.128	.084	.178	.129			
Resources		.341	.127	.324	.009			
Personal characteristics		.827	.233	.381	<.001			
	Psychological resilience (N= 99)					12.596	<.001	.266
Stressors		-.004	.061	-.009	.944			
Resources		-.041	.077	-.058	.594			
Personal characteristics		.792	.149	.537	<.001			

<sup>a</sup>Heteroskedasticity-consistent standard error (HCSE) estimator of OLS parameter estimate, HC4.

### Expert opinion in telephone interview

Based on the cut-off scores of the MBI, DASS-21 and PCL-5, 67 (65.7%) of the 102 respondents could be included in the analysis. Four respondents were excluded because they gave no informed consent to be included, one respondent did not complete the PCL-5 and one respondent could not be reached after five attempts. This resulted in 61 (59.8%) respondents in the analysis.

Eighteen respondents received counseling and 45 respondent did not. Experts reported various reasons why respondents did not receive and/or want counseling, such as no reported problematic complaints or only frustrations regarding the organization, having sufficient resources, support and coping mechanisms. In addition, a few respondents indicated they had received counseling or therapy in the past.



We conducted a one-way between-groups analysis of variance (ANOVA) to investigate whether the BASE score differed between the three groups: below cut-off ( $N = 23$ ), no counseling ( $N = 45$ ) and counseling ( $N = 18$ ). The results showed there was a statistically significant difference in BASE score between the groups:  $F(2, 83) = 28.99, p < 0.001$ . Post-hoc comparisons using the Tukey HSD test indicated that the BASE score of the counseling group was significantly higher ( $M = 80.0, SD = 12.57$ ) compared to the no counseling group ( $M = 70.29, SD = 10.29, p < 0.002$ ) and the below cut-off group ( $M = 56.52, SD = 6.71, p < 0.001$ ). This significant difference indicated that respondents with the highest BASE scores also received counseling, thereby confirming BASE's outcome.

## DISCUSSION

The goal of this study was to evaluate BASE – a self-monitoring tool that aims to identify high stressors and/or low resources in employees and refer them to counseling. We demonstrated that BASE was associated with wellbeing and subsequent referral to further counselling was accurate. BASE can be considered a promising self-monitoring instrument for Dutch railway emergency services personnel.

A number of specific outcomes warrant further discussion. First, BASE stressors displayed a stronger association with negative wellbeing compared to positive. The reversed was true for BASE resources. This is in line with other studies that found that positive and negative aspects of work predict different (mental) health outcomes (Bakker & Demerouti, 2007, 2017; Schaufeli & Bakker, 2004). Second, BASE personal characteristics was significantly associated with psychological resilience, consisting of RES subscales self-confidence and self-efficacy. This is in line with other studies that also have related personal characteristics to resilience, including self-efficacy (Barbier et al., 2013; Bonanno, 2021; Connor & Davidson, 2003; Denckla et al., 2020; Van der Meer et al., 2018; Xanthopoulou et al., 2007). No association was found between BASE resources and psychological resilience. This could be due to BASE resources including items focusing on support at work – while BASE personal characteristics contains items in reference to support from friends and family. Apparently, psychological resilience is more closely related to support in the personal surroundings. Nevertheless, our findings suggest that strengthening both resources and personal characteristics is beneficial to employees, considering their significant relation to different measures of wellbeing. Support and recognition from supervisors and colleagues after a potentially traumatic event are crucial to one's wellbeing (Olf, 2012).

It could be argued that organizations have a moral, economic and legal obligation to support optimal employee functioning and mental health. BASE is part of a comprehensive support program that could be offered to employees regularly. This would allow to detect problematic levels of stressors and/or resources and offer support

to employees before effects become chronic. Implementing this stepwise approach could thus contribute to optimal functioning and mental health. Additionally, the program may also instigate a cultural change within organizations in which colleagues feel more at ease to share potential issues. Since perceived peer support is related to lower levels of distress, a supportive work context is beneficial to both employees and organizations (Gouweloos-Trines et al., 2017).

Some limitations to our study must be considered. Our study was conducted with railway emergency services personnel and further research is needed to learn whether our results translate to other professions. Furthermore, the study is cross-sectional and based on self-report. BASE and the wellbeing measures were administered at the same time, therefore common method variance may inflate the relationships found between BASE and the wellbeing measures. We tried to counteract this by not showing respondents their BASE outcome until they completed all measures. Other practical considerations also had an effect on this study's design. For instance, only respondents with the orange BASE outcome were included in telephone interview to limit the burden on respondents with no complaints. Though the algorithm included the wellbeing measures and was intentionally sensitive to include respondents with even the most minor complaints, exact numbers of true positives and false positives could therefore not be computed. Lastly, gender specific observations are impossible since our sample was predominantly male (93.1%).

Our study has several strengths. It adds to the evidence base of preventive monitoring tools at the employee level that aim to structurally assess employee wellbeing. It provides the evaluation of a method that could contribute to the prevention of reduced employee functioning and mental health problems. The high response rate is not only indicative for enthusiasm among respondents, but also provides representative results for the population. Lastly, by including expert opinion in assessing if BASE was able to correctly refer employees, a real-life evaluation step was added to the research design.

We recommend future research to evaluate BASE in different occupational settings, to assess the influence of stressors and resources on employee functioning and mental health. In addition, BASE's cost-effectiveness could be determined in longitudinal studies. Lastly, when BASE is provided on a regular basis it encourages employees to monitor themselves over time. The effect of this self-monitoring on both the individual as well as on the organizational culture could be investigated.

In sum, the results showed that BASE is a promising instrument that is able to accurately identify and refer railway emergency services personnel with high stressors and/or low resources. Psychosocial support guidelines accentuate the importance of detecting those with concerning levels of distress (Creamer et al., 2012; Te Brake & Duckers, 2013). At the same time, it is clear that guidelines cannot provide in the day-to-day implementation of their recommendations. Therefore, a gap exists between guidelines and practice (Te Brake & Duckers, 2013). This gap can only be closed by an

organizational culture free of mental health stigma, supportive leadership and peer support, timely detection and available care. Our results showed that BASE can be used for early detection in the intended population, an important step in bridging the gap between guidelines and practice.



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## APPENDICES

Stress at work: Self-monitoring of stressors and resources to support employees

### Appendix 1: Balance Assessment of Stress and Energy (BASE)

This appendix presents the items of BASE in English and Dutch. For this study, BASE was administered in Dutch. Translation of all items are presented here to facilitate reading. For each item, a 5-point scale measured the extent to which the item has been experienced during the past six to eight weeks, ranging from 1 (not at all) to 5 (to a very large extent).

#### BASE items in English

##### Stressors

In the past 6-8 weeks, to what extent have you experienced...

Item	1	2	3	4	5
1. High work pressure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inadequate facilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Immediate colleagues having insufficient knowledge/skills, or being inflexible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Burdensome regulations and procedures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Poor cooperation with colleagues from other departments within your own organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Poor cooperation with external partners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. A supervisor who is inarticulate or incompetent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Unit/agency reorganization and/or restructuring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Difficulty switching between work and home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Contact with suicidal individuals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Experiencing aggression or violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Being responsible for a safety mistake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Unsafe work situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Negative media coverage regarding your organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. An accumulation of suicide-related turnouts within a short period	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Stress at home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. 1 = not at all, 2 = a little, 3 = to some extent, 4 = to a great extent, 5 = to a very great extent.

**Resources**

In the last 6-8 weeks, to what extent have you gotten energy from...

Item	1	2	3	4	5
17. Support from colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Bringing an incident to a successful conclusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Humor of and among colleagues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Good cooperation with immediate colleagues in the team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Positive challenges at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Experiencing autonomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Contact with travelers and transport operators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Opportunities for personal development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Recognition and appreciation from management, the organization, external parties, or travelers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. The fact that management takes my suggestions for improvement seriously	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. 1 = not at all, 2 = hardly, 3 = to some extent, 4 = to a large extent, 5 = to a very large extent.

**Personal characteristics**

To what extent do you agree with the following statements:

Item	1	2	3	4	5
27. I unwind by exercising, spending time with others, enjoying music, or pursuing other hobbies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. I am able to keep emotional distance from the work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. I receive support from my partner, family and/or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. I have a stable home environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. I am able to switch easily between tasks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. I am sociable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. I am flexible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. 1 = not at all, 2 = hardly, 3 = to some extent, 4 = to a large extent, 5 = to a very large extent.

**BASE (Zelfscreener voor balans op het werk) in Dutch****Stressoren**

In hoeverre heb je de afgelopen periode (6-8 weken) last gehad van...

Item	1	2	3	4	5
1. Een hoge werkdruk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Gebrekkige faciliteiten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Directe collega's die te weinig kennis/kunde hebben, of niet flexibel zijn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Lastige regelgeving en werkwijzen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Gebrekkige samenwerking met collega's van andere afdelingen binnen de eigen organisatie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Gebrekkige samenwerking met externe partners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Een leidinggevende die onduidelijk of onkundig is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. De reorganisatie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Moeilijk kunnen schakelen tussen werk en privé	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Contact met suicidale personen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Het meemaken van agressie of geweld	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Het maken van een veiligheidsfout	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Onveilige werksituaties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Negatieve berichtgeving in de media over jouw organisatie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Een stapeling van het aantal uitrukken met betrekking tot suicides in korte tijd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Stress in je thuissituatie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. 1= niet, 2= nauwelijks, 3= in enige mate, 4= in sterke mate, 5= in zeer sterke mate.

**Energiebronnen**

In hoeverre haalde je de afgelopen periode (6-8 weken) energie uit...

Item	1	2	3	4	5
17. Steun van collega's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Een incident tot een goed einde brengen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. De humor van en met collega's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Een goede samenwerking binnen het team van directe collega's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. De uitdagingen in het werk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Het ervaren van autonomie	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Het contact met reizigers, vervoerders/verladers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. De mogelijkheden voor professionele ontwikkeling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. De erkenning en waardering vanuit de leiding, organisatie, externe partijen of reizigers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Dat het management jouw ideeën voor verbeteringen serieus neemt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. 1= niet, 2= nauwelijks, 3= in enige mate, 4= in sterke mate, 5= in zeer sterke mate.



**Persoonlijke kenmerken**

In hoeverre ben je het eens met de volgende uitspraken.

Item	1	2	3	4	5
27. Ik vind afleiding in sport, sociale contacten, muziek of andere hobby's	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Ik kan emotioneel afstand bewaren tot het werk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Mijn partner, familie en/of vrienden geven mij steun	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Mijn thuissituatie is stabiel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Ik kan snel schakelen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Ik ben sociaal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Ik ben flexibel	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note. 1= niet, 2= nauwelijks, 3= in enige mate, 4= in sterke mate, 5= in zeer sterke mate.

## Appendix 2: Measures

**Burn-out.** We used the Dutch version of the Maslach Burnout Inventory–General Survey (Utrecht Burn-out Scale) to assess burn-out symptoms. We included the subscales exhaustion (five items) and cynicism (four items) (Schaufeli et al., 2001; Schaufeli & Van Dierendonck, 2000; Schutte et al., 2000). We have chosen to only include exhaustion and cynicism because these two dimensions are considered the main dimensions of burn-out (Schaufeli et al., 2009). Moreover, it is questioned whether reduced personal accomplishment is a constituting element of burnout (Schaufeli & Taris, 2005; Te Brake et al., 2007). In addition, personal accomplishment shows high correlation with personal efficacy (Shoji et al., 2016), a dimension we already measure with the Resilience Evaluation Scale (see below). The MBI items are rated on a 7-point scale ranging from 0 (*never*) to 6 (*always/daily*). In this sample, internal consistency of the scales was high (Cronbach’s alphas were .92 and .87 respectively). The cut-off scores for inclusion in telephone interview were set at average complaints or worse on exhaustion (mean score of  $\geq 0.99$ ) or on cynicism (mean score of  $\geq 0.49$ ). We chose to include burn-out because based on other studies, we expected BASE’s stressors and resources to be associated with burn-out (Bakker & Demerouti, 2007).

**Work engagement.** We used the Dutch shortened version of the Utrecht Work Engagement Scale to measure work engagement, concerning subscales vigor (three items), absorption (three items) and dedication (three items) (Schaufeli et al., 2006). The items are rated on a 7-point scale ranging from 0 (*never*) to 6 (*always/daily*). Internal consistency of the scales was high (Cronbach’s alphas were .87, .82 and .89 respectively). We included work engagement because based on other studies, we expected BASE’s resources and personal characteristics to be associated with work engagement (Bakker & Demerouti, 2007; Barbier et al., 2013).

**Depression, anxiety and stress.** We assessed depression (seven items), anxiety (seven items) and stress (seven items) with the Dutch short version of the Depression Anxiety Stress scale (de Beurs et al., 2001; Lovibond & Lovibond, 1995). Internal consistency of the scales was acceptable or high (Cronbach’s alphas .80, .71 and .92 respectively). A 4-point scale measures the extent to which each state has been experienced over the past week ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*). To determine cut-off values, DASS-21 scores were multiplied by two, according to the scale’s manual. Cut-off scores for inclusion in telephone interview were set at normal symptoms or worse on depression ( $\geq 9$ ) or anxiety ( $\geq 7$ ) or stress ( $\geq 14$ ). We included the DASS-21 to measure common psychological complaints among Dutch railway first responders and to make sure respondents with minimal psychological complaints would be included in the telephone interviews.

**PTSD-symptoms.** The Dutch version of the PTSD Checklist for DSM-5 (PCL-5) was used to measure PTSD-symptoms (Blevins et al., 2015; Weathers et al., 2013). The PCL-5 is a 20-item self-report measure divided into four subscales: intrusion (five items,

cluster B), avoidance (two items, cluster C), negative alterations in cognitions and mood (seven items, cluster D) and alterations in arousal and reactivity (six items, cluster E). The items are answered on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). Internal consistency of these scales was high (Cronbach's alphas were .88, .84, .87 and .81 respectively). The cut-off scores for minimum symptom levels treated each item rated as 2 (*moderately*) or higher, as a symptom endorsed. Cut-off scores set at one B item, or one C item, or two D items or two E items (Weathers et al., 2013). We included the PCL-5 to measure PTSD symptoms among Dutch railway first responders, given the fact they are exposed to potentially traumatic events during their work on a regular basis. In addition, we included the PCL-5 to make sure respondents with minimal PTSD complaints would be included in the telephone interviews.

**Social support.** Social support was measured with the shortened Dutch version of the Social Support List (van Sonderen, 2012). It includes daily emotional support (four items), problem emotional support (four items) and esteem (four items). Internal consistency of the scales was high (Cronbach's alphas were .81, .81 and .82 respectively). Items are rated on a 4-point scale ranging from 1 (*never*) to 4 (*very often*). Based on other research, we know that support and recognition from supervisors and colleagues after a potentially traumatic event or during work stress are crucial to one's wellbeing (Gouweloos-Trines et al., 2017; Olf, 2012). Therefore, we expected BASE's stressors scale to be associated with social support as measured with the SSL-12.

**Psychological resilience.** The Dutch version of the Resilience Evaluation Scale (RES) was used to assess psychological resilience. The RES consisted of nine items, which measured self-confidence (3 items) and self-efficacy (six items). The RES is a valid and reliable instrument (Van der Meer et al., 2018). Items are rated on a 5-point scale ranging from 0 (*completely disagree*) to 4 (*completely agree*). Internal consistency of the scales was high (Cronbach's alphas .88 and .89 respectively). We included psychological resilience to measure the resilience concept as introduced by van der Meer et al. (2018) among Dutch railway emergency personnel. Based on the definition of BASE's personal characteristics (Bakker & Demerouti, 2007; Barbier et al., 2013) as used in the current study, we expected the scale to be associated with psychological resilience as measured with the RES.

**Appendix 3: Experts**

In this study, railway emergency services employees were offered a comprehensive support program, consisting of BASE, targeted follow-up telephone interviews and an optional subsequent face-to-face counseling session. The follow-up telephone interviews were conducted by 7 experts, consisting of certified psychologists and the first author. The psychologists have experience in the field of psychotrauma and were employees of a Dutch organization that is specialized in preventive, acute or curative measures in relation to shocking events and stressful situations at work. Job titles of the experts were: healthcare psychologist, psychotherapist, clinical psychologist or researcher.

In total, the seven experts conducted 69 telephone interviews. The majority of the interviews (47 interviews) was conducted by one expert and the first author. The other five experts conducted between two and seven interviews each. Before the interviews, the experts were informed by the first author about the study, the population and the metrics used during the study. The experts discussed together how to conduct the interview. Experts were asked to complete a standardized form after the interview to substantiate their decision, with the question whether the respondent recognized their BASE outcome and whether the expert agreed or disagreed with the BASE outcome. Differences in terms of judgement were not assessed.

The outcome of the telephone interview was based on the interaction between the expert and the respondent, i.e. the preference of the respondent for receiving counseling was taken into account as well. Out of 61 respondents that received the orange BASE outcome and were included in the analysis, only 18 respondents received counseling. This indicates that the discussion between the expert and the respondent led to a deliberate evaluation of the BASE outcome and decision to refer to counseling.

**Appendix 4: Pearson correlations of study variables (N= 102)**

<b>Pearson correlations</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
1. Stressors (BASE)									
2. Resources (BASE)	-.255**								
3. Personal characteristics (BASE)	-.465**	.475**							
4. Burn-out symptoms (MBI)	.548**	-.581**	-.509**						
5. Work engagement (UWES)	-.387**	.621**	.540**	-.703**					
6. Depression, anxiety and stress (DASS-21) <sup>a</sup>	.555**	-.383**	-.503**	.751**	-.573**				
7. PTSD symptoms (PCL-5) <sup>b</sup>	.541**	-.344**	-.483**	.695**	-.490**	.818**			
8. Social support (SSL-12)	-.106	.472**	.495**	-.228*	.398**	-.198*	-.217*		
9. Psychological resilience (RES) <sup>b</sup>	-.285**	.227*	.577**	-.329*	.359**	-.462**	-.362**	.446**	

\*\* p < .01; \*p < .05; <sup>a</sup>N= 101 <sup>b</sup>N= 100

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# 6.

## ONLINE ONE-STOP SHOP FOR DISASTER RESPONSE SERVICES AFTER THE MH17 AIRPLANE CRASH: AN EVALUATION STUDY

Published as: Van Herpen, M. M., Dückers, M. L. A., Schaap, R., Olf, M., & Te Brake, H. (2022). Online One-Stop Shop for Disaster Response Services After the MH17 Airplane Crash: An Evaluation Study. *Frontiers in public health*, 10.



## ABSTRACT

### Background

A one-stop shop for disaster response services provides a central location for information and advice in an accessible way. Yet little is known about its organization and outcomes. After the MH17 airplane crash, the one-stop shop concept was realized through a digital environment called the Information and Referral Center (IRC). The aim of this study was to evaluate the experiences of users and providers in regard to the IRC and to identify improvement points for future IRCs.

### Method

Data was collected among affected ones as well as involved organizations, using interviews, focus groups, surveys and online user information. Existing evaluation and quality models were combined to design the study and analyze the data.

### Results

First, affected ones and a variety of organizations involved were positive about the merits of the IRC. Affected ones indicated they perceived the IRC as a reliable source of information and appreciated the referral possibilities. Second, the feature of the IRC to serve as a community where affected ones could meet, share experiences and support each other was hardly used according to participants. Lastly, tracking evolving psychosocial needs and problems through the IRC was hampered due to difficulty in accessing relevant data.

### Conclusions

The IRC helped organizations to structure and align their services. Affected ones were positive about its reliability and accessibility. An IRC has to be embedded within the established care structures. Future research could indicate whether an IRC is useful in other event types and population contexts as well.

### Keywords

One-stop shop; disaster response; psychosocial care; evaluation; online

### Acknowledgment of author contributions:

*Research design and data collection:* Dückers, M. L. A., Schaap, R. & Te Brake, H.

*Data analysis:* Van Herpen, M. M., Dückers, M. L. A., Schaap, R., Olff, M., & Te Brake, H.

*Paper writing:* Van Herpen, M. M., Dückers, M. L. A., Schaap, R., Olff, M., & Te Brake, H.

## INTRODUCTION

On July 17, 2014, the disaster with the MH17 passenger flight from Amsterdam to Kuala Lumpur occurred above Ukraine. None of the 283 passengers and 15 crew members survived. Among the passengers were 196 individuals with the Dutch nationality. Consequently, the event had a severe impact on Dutch society among people directly and indirectly affected (Jeronimus et al., 2019; Jong et al., 2016, 2021; Lenferink et al., 2020; Lenferink et al., 2017; Yzermans et al., 2020). The on-site investigation, recovering and identification of the bodies, and the criminal investigation were impactful moments, especially for people who lost a loved one. Wednesday July 23, 2014, was declared a day of national mourning in The Netherlands, and on November 10, 2014, an official commemoration took place. Exactly three years after the disaster, on July 17, 2017, a monument was revealed in memory of the deceased.

The day after the MH17 airplane crash, the Dutch government and organizations involved in the response decided to establish an online one-stop shop called the Information and Referral Center (IRC). The IRC was launched on July 18, 2014, and offered an online central location for information and advice regarding practical, legal and psychosocial matters. The aims of the IRC were to: (1) provide current, appropriate and reliable information and referral, (2) foster contact between affected ones, and (3) acquire information on needs, problems, and risk groups.

Based on experiences with earlier disasters since the 1990s, the one-stop shop has become a typical element of the psychosocial response to disasters and major incidents in The Netherlands (Jacobs et al., 2019). More broadly, the concept of a one-stop shop as a support structure for groups of affected people, fits logically within the international post-disaster psychosocial support knowledge base. Scholars have extensively documented the severe impact of disasters and crises, such as with the MH17 passenger flight, can have on the mental and physical health of affected individuals (Bonanno, 2021; Bonanno et al., 2010; Comtesse et al., 2020; Doocy et al., 2013; Kristensen et al., 2017; Kristensen et al., 2020; Ripoll Gallardo et al., 2018; Safarpour et al., 2020; Yzermans et al., 2009). There is broad consensus among experts about the importance of adequate post-disaster psychosocial service delivery (Bisson et al., 2010; Dyregrov et al., 2019; Dyregrov & Kristensen, 2020; Hobfoll et al., 2007; Juen et al., 2016; Nilsen et al., 2018; Reifels et al., 2013; Suzuki et al., 2012; Te Brake & Dückers, 2013; Treml et al., 2021). These services entail practical, legal and psychosocial support. Efficient coordination and integration of disaster response services should aid in the continuity of existing health care and provide psychosocial services to those affected by the disaster, which can be challenging due to chaotic circumstances and various demands (Reifels et al., 2013).

In international guidelines of post-disaster psychosocial support the importance of providing affected individuals with a central coordination point or one-stop shop is emphasized (Bisson et al., 2010; Chalmers et al., 2020; Hobfoll et al., 2007; Inter-Agency

Standing Committee, 2007, 2017; Juen et al., 2016; Snider & Hijazi, 2020; Suzuki et al., 2012; Te Brake & Dückers, 2013; Te Brake et al., 2009), especially in the first phase after a disaster (Blanchard et al., 2005). A one-stop shop integrates a variety of information and services in an accessible way. Yet little is known about its organization and outcomes. A one-stop shop can include several types of support, both online and physical. It can have an outreaching aspect by providing support and referral to professional care. At the same time, affected ones can turn to a one-stop shop for self-help. Local governments should be prepared to establish a one-stop shop to disseminate information (Bonfield, 2009) and coordinate the immediate response and long-term services in order to ensure service continuity (McFarlane & Williams, 2012). A needs assessment among municipalities in The Netherlands showed that respondents considered a one-stop shop as one location that affected ones can turn to for questions and help with practical, legal and health-related problems (Dücker et al., 2019). Furthermore, it could serve as a solution to problems of psychosocial care after disasters that could be easily avoided (Yzermans & Gersons, 2002). However, an evaluation of 40 post-disaster mental health and psychosocial support programs showed that less than half of the programs included an integrated coordination point for the long-term coordinated provision of psychosocial care services (Bonfield, 2009).

Evaluation studies are important because potential lessons from these studies can improve the provision of psychosocial support during future events (Reifels et al., 2013). The importance of evaluating post-disaster interventions has been widely acknowledged in the literature (Cénat et al., 2020; Dieltjens et al., 2014; Dücker et al., 2018; Dücker & Thormar, 2015; Dyregrov et al., 2019; Haroz et al., 2020; Inter-Agency Standing Committee, 2017; Reifels et al., 2013; Tol et al., 2011a; Tol et al., 2011b). At the same time, although crucial for learning purposes, research into the implementation of a program, “consumer access, uptake and outcomes” is modestly available in the international literature (Reifels et al., 2013). To design the evaluation study and to structure and analyze the data, we used the evaluation framework by Stake (1967; 2004) that we combined with the healthcare quality model of Donabedian (1988). The framework by Stake (1967; 2004) includes antecedents, transactions and outcomes. Stake (2004) argues that outcome data usually receive most attention in evaluation studies, while the other two data sources are equally important. Donabedian (1988) developed one of the most influential quality evaluation models applied to healthcare programs (Dücker & Thormar, 2015). This model distinguishes structure, process and outcome as quality categories and has been used before as an evaluation framework to assess the quality of multiple mental health and psychosocial support programs (Dücker et al., 2018).

Both Donabedian (1988) and Stake (1967; 2004) argue that it is essential to collect data from multiple sources to conduct a high-quality evaluation. In line with Donabedian (1988), Stake (1967; 2004) argues that data on multiple domains should always be

collected in order to draw conclusions about the quality of a program or intervention. All domains should receive equal attention instead of focusing mainly on the outcomes of a program. Stake's model (1967; 2004) is different from the framework of Donabedian (1988) as it incorporates a comparison between the "intended" and "realized" program, while still recognizing the three interrelated components.

According to Stake (1967; 2004) antecedents are various background conditions and inputs that can be indicators of quality. Data should be collected regarding the intentions, the actuality and the perceived quality of the program. E.g., collaboration between organizations while implementing a program. Antecedents relate to the quality information category "structure," from the Donabedian model (1988). Structure determines the context and conditions in which a program is intended and realized. It includes expectations about the program and the socioeconomic context as well. For example, the coordination within the provider network that determines the context.

Transactions are program activities, operations, functions and processes (Stake, 2004). E.g., a program aims to provide reliable information. This component relates to the quality information category "process" of Donabedian (1988), relating to transactions between recipients and providers of care. In this study, we defined transactions as the methods of the instrument or intervention, in this case the IRC. This includes interaction with the target group; the affected ones.

Outcomes refer to data that provide insight in the accomplishments of the actual program. For example, providing psychosocial care that meets the needs of the recipient. According to Stake (2004), a program will never be delivered exactly as intended because necessary changes have to be made along the way. The program in place should be evaluated and compared with the intended program. This can be linked to the quality information category "outcome" of Donabedian (1988), that also refers to the actual outcomes of a program. Furthermore, Donabedian (1988) emphasizes the importance of including the needs of the target group; which should be clear beforehand since the outcomes build on these needs.

The current study entails a systematic evaluation of the online one-stop shop service environment, planned and implemented after the MH17 disaster. To design the evaluation, we used existing evaluation and quality frameworks (Donabedian, 1988; Stake, 1967, 2004). Based on these frameworks, we examined the extent to which the antecedents (the structure and conditions that set the context), transactions (process; all activities and measures) and outcomes as envisioned, relate to the actual implementation of the IRC. Our objective was to evaluate the experiences of users and providers with the IRC using both qualitative and quantitative data and the evaluation frameworks by Stake (1967; 2004) and Donabedian (1988). We aimed to answer the following research questions:

1. What were the experiences of users and providers in regard to the antecedents, transactions and outcomes of the IRC?

2. What were facilitating conditions and barriers in implementing the IRC and reaching its goals?
3. What potentially relevant implications for future IRCs can be identified?

## MATERIALS AND METHODS

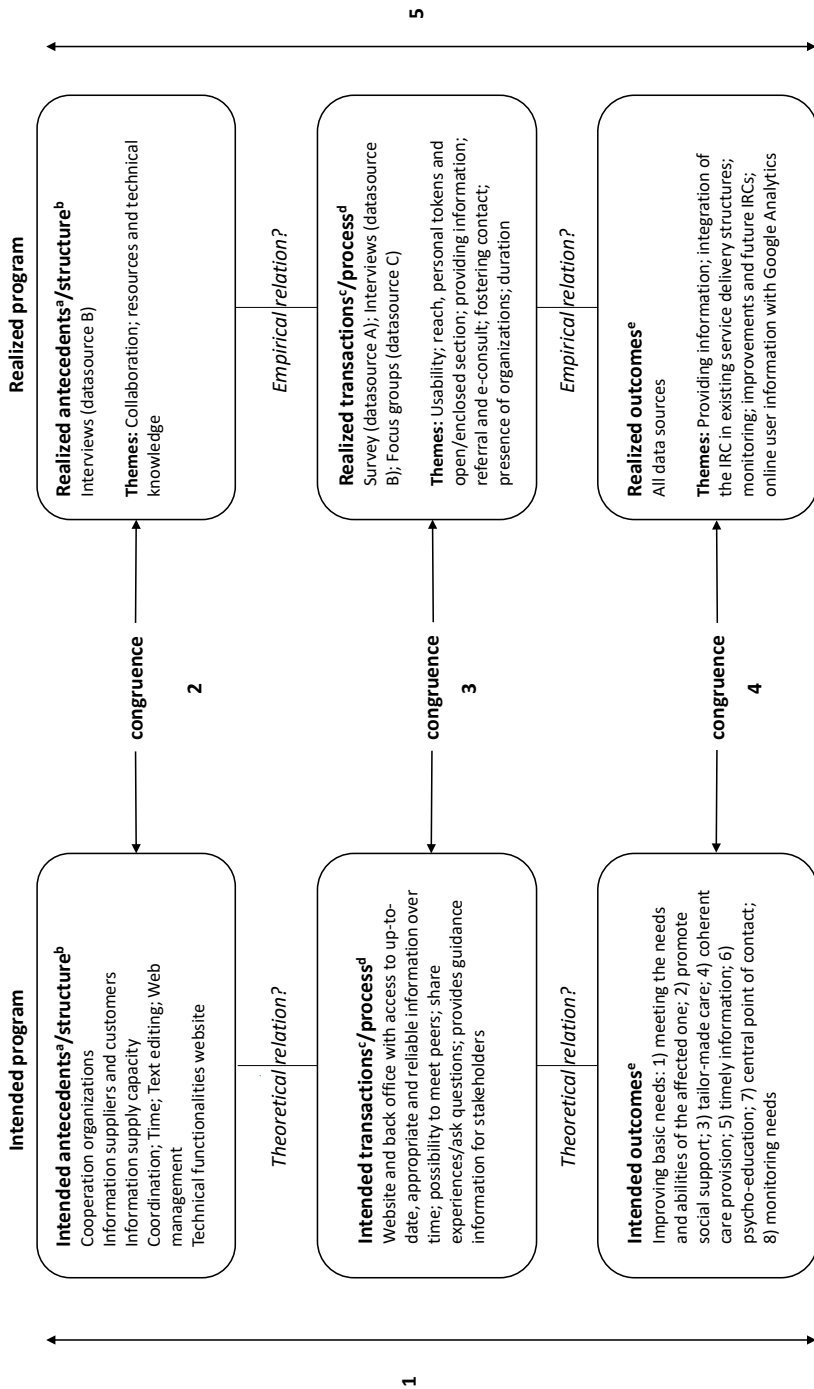
### **Participants and Procedure**

We collected data from three different sources: (1) affected ones, (2) online user information from the IRC website, and (3) employees from the organizations involved in the organization of the IRC, such as the Ministry of Justice and Security, the Ministry of Health, Welfare and Sports, the National Police, Public Prosecution Service, Victim Support Netherlands (Victim Support NL hereafter) and ARQ Centre of Expertise for the Impact of Disasters and Crises (ARQ Impact hereafter).

ARQ Impact was head of the editorial council that was responsible for the IRC's development and implementation. The evaluation of the IRC was an integral part of its development. To ensure the independency of the evaluation and help develop the evaluation plan, a peer-review group consisting of four independent experts was established. The affiliations of the experts are included in the acknowledgments.

### **Intended Program**

In this section, the intended program of the IRC is described, structured according to the evaluation framework (see the left side of Figure 1). The realized program is described in the Results (Paragraph Realized Program) based on the information from the three sources.



**Figure 1.** Evaluation framework of Stake (1967; 2004) and Donabedian model of quality (1988) applied to the IRC evaluation.

<sup>a</sup>Antecedents are various background conditions and inputs (2004); <sup>b</sup>Structure refers to the context and conditions (1988); <sup>c</sup>Transactions are program activities, operations, functions and processes (2004); <sup>d</sup>Process refers to transactions between care recipients and providers (1988); <sup>e</sup>Outcomes refer to the accomplishments or actual outcomes of the program (Stake, 2004; Donabedian, 1988).



### **Intended Antecedents**

Good collaboration between the organizations was essential for the successful development and implementation of the IRCs. Good collaboration is dependent on various conditions, such as trust, a central coordinator and conflict management. (Dückers et al., 2017b) assessed the various organizations that play a role in the planning, implementation and evaluation of psychosocial care following disasters and crises in The Netherlands. A national collaborative of key organizations, consisting of governance organizations, coordinating organizations, executive organizations and a psychosocial care expert partner, was recommended. Depending on the various characteristics of a specific disaster or crisis, the collaborative has to be adapted.

An editorial council was established to facilitate the development and implementation of the IRCs content. The council consisted of Victim Support NL and ARQ Impact, together with representatives from the government, police and Public Prosecution Service. The collaboration within the editorial council was not formalized beforehand. Victim Support NL and ARQ Impact were responsible for the content and led the editorial council. The editorial council monitored and co-wrote new content for the IRC and ensured a consistency in style and form. Given the nature of the disaster, a group of experts regarding loss and traumatic grief were involved to advise the editorial council on grief and mourning. New content and the appropriate tone of voice were discussed by the council. In addition, Victim Support NL was responsible for the technical implementation, maintenance and development of new features of the IRC, in compliance with IT security guidelines. Another intended antecedent was the supply of information to IRC visitors. At the start of the IRC, all sections were accessible to all visitors.

### **Intended Transactions**

The IRC was developed based on three main objectives. The first aim was to provide up to date, appropriate and reliable information and referral. In addition to people close to the deceased, the IRC was also established for other affected ones such as colleagues, but also institutions such as schools and leisure/sports organizations. The information was tailored to the different phases of the aftermath. If required, IRC visitors could be referred to (health)care providers. The second aim of the IRC was to foster contact between affected ones. The visitors were provided with the opportunity to contact each other through a forum on the enclosed section of the IRC. This also provided them with the opportunity to ask questions to other affected ones, public authorities and experts. The third aim of the IRC was to acquire information on needs, problems, and risk groups. The online environment generated group level information, which could help public authorities and providers of support services to decide if additional measures were required.

### **Intended Outcomes**

The main intended outcome of the IRC was to improve psychosocial care for affected

ones of the MH17 airplane crash. Based on the Dutch multidisciplinary guideline for psychosocial care after disasters and crises, psychosocial care could be implemented according to eight evaluation criteria. It should be: (1) an approach that starts from the needs and capacities of the affected one; (2) stimulating social support; (3) individually appropriate care, taking diversity among individuals affected into account; (4) offering care that is coherent and complementary, even though provided by different organizations; (5) providing incident-related information; (6) providing information on common emotional reactions; (7) providing a service point for questions and practical issues; and 8) monitoring individuals affected and initiating follow-up where needed (Impact, 2014).

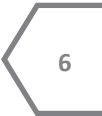
## DATA SOURCES AND MEASUREMENTS

### Topic List

In this study, we collected data from different sources as recommended in the literature (Donabedian, 1988; Dückers, 2021; Stake, 1967, 2004). We developed a topic list based on the evaluation frameworks described above, input from the peer review group, and the aims of the IRC. See Table 1 and Figure 1 for an overview of the evaluation framework as applied to the evaluation of the IRC. The topic list guided all measures of this study. Not all topic list items were applicable to all measures and/or data sources.

**Table 1.** Topic list items and corresponding data sources and measurements.

Topic	Survey affected ones	Interviews involved organizations	Focus groups affected ones
<b>Antecedents</b>			
<b>Collaboration between involved organizations</b>			
1		X	
2		X	
3		X	
4		X	
5		X	
6		X	
7		X	
8		X	
9		X	
10		X	
11		X	
12		X	
13		X	





**Table 1.** CONTINUED.

	<b>Topic</b>	<b>Survey affected ones</b>	<b>Interviews involved organizations</b>	<b>Focus groups affected ones</b>
<b>Transactions</b>				
1	Usability: User friendliness	X	X	X
2	Usability: Clear structure	X	X	X
3	Usability: Lacking and superfluous features	X	X	X
4	Usability: Use of the forum			X
5	Usability: E-consult	X	X	X
6	Duration of the availability of the IRC	X	X	X
7	Security and accessibility	X	X	X
8	Personal token	X	X	X
9	Providing good psychosocial support with the IRC		X	
10	Coordinating the different organizations in providing psychosocial care in a coherent manner with the IRC			X
11	Fostering contact: Presence of other affected ones	X	X	X
12	Fostering contact: Sharing personal stories	X	X	X
13	Fostering contact: Opportunity to get in touch with others	X	X	X
14	Information: Reliability	X	X	X
15	Information: Meeting the needs	X	X	X
16	Information: Central location	X	X	X
17	Information: Comprehensibility	X	X	X
18	Information: Practical information, e.g. regarding mourning and loss	X	X	X
19	Taking into account the personal situation of affected ones and adapting accordingly	X	X	X
20	Referral to follow-up care		X	X
21	Presence of involved organizations on the IRC	X	X	X
22	Difference between open and enclosed section	X	X	X
23	Groups that were not reached		X	X
24	Ways to become familiar with the IRC	X	X	X
25	Moment of becoming familiar with the IRC	X	X	X
26	Visiting the IRC	X	X	X
27	Frequency of visits	X		X
<b>Outcomes</b>				
1	The goal of the IRC	X	X	X
2	View on whether this goal has been reached		X	X
3	View on what the goal of the IRC should be		X	X
4	Potential improvements		X	X
5	Rationale for or against an IRC		X	X
6	Monitoring of affected ones		X	X
7	The complementarity and integration of the IRC to other available (care) resources			X

### Survey With Affected Ones (Data Source A)

We developed a 14-item survey based on the topic list (see Table 1). All items are answered on a 5-point scale, ranging from 1 (completely disagree) to 5 (completely agree).

agree), also including answering option 6 (no opinion). To limit the burden on affected ones, the survey items were included in a larger study that was conducted by the University of Twente, University of Groningen, Intervict and ARQ Centrum'45. Written informed consent was obtained from all respondents (Lenferink et al., 2017). Affected ones were individuals who lost a loved one during the MH17 airplane crash, e.g., child, spouse, parent, sibling or other.

The survey was provided online. An invitation was posted on the enclosed section of the IRC in May 2015 and was included in the IRC newsletter as well. Furthermore, the Airplane Disaster MH17 Foundation (a representative body of affected ones) paid attention to the survey during general meetings and distributed the survey among affected ones. The survey was available until October 2015. Respondents who started the survey online but did not complete it received the survey hardcopy as well.

### **Interviews With Involved Organizations (Data Source B)**

We conducted semi-structured interviews with participants employed by the different organizations that were involved in the development and implementation of the IRC. The interview guide was developed by the researchers. It was based on the evaluation framework and the study's overall topic list (see Table 1 and Figure 1) and focused on the perceptions of the different organizations regarding the processes of organizing the IRC. The interviews lasted between 1 and 2 hours and were conducted by two researchers (except for one interview). The interviews were conducted at the workplace of participants. Participants were representatives of their organization and the number of participants interviewed per organization was determined by the organization's responsibilities. Before the interview started, participants were informed of the goals of the study and the use of their information. Oral informed consent was obtained from all participants. This procedure was described in a manual, prior to the start of the study. At the end of the interview, participants were asked if any topics were not discussed. The interviews were recorded and the transcripts were sent back to the participants for approval, so aberrations could be corrected. Also, the transcripts were reviewed by the other researcher present at the interview.

### **Focus Groups With Affected Ones (Data Source C)**

Focus groups were held with affected ones. Affected ones were individuals who lost a loved one during the MH17 airplane crash, e.g., child, spouse, parent, sibling or other. Participants were recruited through the survey [see Interviews With Involved Organizations (data source B)]. The topic list of the semi-structured focus groups was developed by the researchers, based on the evaluation framework and the study's overall topic list (see Table 1). During the focus groups, the use of the IRC was discussed, as well as improvements, information and resources.

Each focus group was chaired by a professional facilitator. The focus groups were

conducted at two central locations in The Netherlands. The travel distance of the participants was taken into account. At least one researcher was present to make sure the topic list was fully covered. There was ample room for the expression of emotions and sharing personal stories, more open questions were asked. Therefore, the focus groups were less structured than the interviews (data source B). Because of the sensitive content and to provide participants with a maximum sense of safety, the focus groups were not audio recorded. Rather, elaborate minutes were made by the researcher that were transcribed elaborately afterwards. The minutes were reviewed by another researcher who was also present at the focus group. Before the interview started, participants were informed regarding the goals of the study and the use of their data. Oral informed consent was obtained from all participants. This procedure was described in a manual, prior to the start of the study.

### **Website Pop-Up Survey (Data Source D)**

To evaluate the IRCs features and user friendliness, a brief pop-up survey was implemented on the IRC. Visitors were presented with the survey during their visit. The pop-up survey items are presented in Table 3. Items were answered on a 5-point scale, ranging from 1 (completely agree) to 5 (completely disagree). The pop-up survey was available from November 2015 until January 2016. No informed consent was obtained because no personal data was saved.

### **Google Analytics (Data Source E)**

Google Analytics is a feature provided by Google and tracks website performance and collects data on visitor behavior. We used Google Analytics data to gain insight in trends of IRC user behavior. Unique page visits and information regarding a session were used to assess these trends. A session is defined as a set of user interactions that take place on a website within a certain period of time. For example, one session can include multiple screen or page views, events or social interactions.

### **Analyses**

The topic list and evaluation framework directed the analyses of the qualitative data from the interviews and focus groups and the analyses of the quantitative data from the survey and pop-up survey. The survey and pop-up survey data were analyzed using frequency distributions in SPSS. Google Analytics data was analyzed in Microsoft Excel.

Because our study is based on a theoretical framework and to be able to compare our samples, we took a deductive approach to analyze the qualitative data (Linneberg & Korsgaard, 2019). A deductive approach helps focus the coding process on the evaluation framework by Stake (1967; 2004) and Donabedian (1988) and assures structure and relevance to the framework. We developed the topic list based on the evaluation framework that guided all measures of the study and the coding process. In line with the

deductive approach, we pre-defined a list of codes before data collection started (Miles et al., 2018). We ensured flexibility during the coding process so we would not miss new themes that emerged from the data. First, the interviews with the involved organizations (data source B) were reviewed and then coded based on the topic list in MAXQDA by RS. During the coding process, new themes were added when they emerged from the data. Authors RS and HtB discussed the codes of each separate interview and the themes until consensus was reached. Next, the focus groups with affected ones (data source C) were reviewed and then coded by RS. Again, authors RS and HtB discussed the codes of each separate interview and the themes until consensus was reached. During the coding process, we adapted the coding frame when new interesting themes emerged from the data that were related to the research questions or when we found that data was not coded by the existing codes. We compared the interviews and focus groups regarding similarities and differences between the themes. Next, the comparison and interpretation of the themes were discussed among all authors. To illustrate our findings and provide more insight into the experiences expressed by participants during the interviews and focus groups, quotes are presented throughout the Results between brackets.

## RESULTS

### Participants

In total, 127 respondents completed the survey (data source A), 105 online. The sample was 57.5% female, 42.5% male. The mean age was 54 years old (SD = 15.5, range: 20–88 years). The level of education was rather high: 68.3% respondents completed higher education.

We interviewed 16 participants from 9 different organizations (data source B) between October 2015 and February 2016. The sample was 43.8% female. Furthermore, 22 affected ones participated in 5 focus groups (data source C) between July and October 2015. Six potential participants were recruited through the IRC, four participated. Via the survey, 43 potential participants were invited, of which 18 participated.

The pop-up survey (data source D) was completed by 25 respondents. The sample was 60% male and mean age was 61.6 years.

Google Analytics data was available from November 6, 2014 until February 15, 2016. The results showed 44.000 unique visits.

### Realized Program

In this section, the realized program of the IRC is analyzed according to the evaluation framework (see the right side of Figure 1). The corresponding data sources are specified.

### **Realized Antecedents**

The supply of information to IRC visitors changed rapidly in the beginning of the IRC. At the start of the IRC, all sections were accessible to all visitors. After the first few days, on July 22, 2014, affected ones were provided with a special token to access an enclosed section of the website. This allowed for sharing information that was meant only for affected ones. In addition, it was possible to communicate on a private forum. Still some days later, from July 27, 2014, onwards, a newsletter was sent to all affected ones who received the special token. The newsletter summarized new information of the private section of the IRC.

### **Collaboration**

The interviews with the involved organizations (data source B) were used to investigate the realized antecedents. Participants labeled collaboration in the starting phase as a “journey of discovery” (“I think it was a bit messy, we were figuring out our activities, how to perform these, who should participate, deciding on the decision-making process, who had the final say, when to coordinate with each other and the different roles” – Participant B1). Especially during the first weeks, the content and visual presentation of the IRC changed rapidly, as did the editorial council and the division of labor. Collaboration was perceived as complex due to group size, role unclarity and time pressure. Processes, division of labor and responsibilities within the editorial council were unclear and not formalized according to participants. However, participants regarded the collaboration as constructive (“It was alright, we had to work together. We were able to launch the IRC very quickly and within a very short period of time” – Participant B2). There was a shared perception of responsibility for developing the IRC, which made it easier to make decisions. Participants indicated that over time, the different tasks and responsibilities became more clear and the collaboration more efficient. For example, content and technical issues were discussed in separate meetings. Also, the number of organizations involved in the editorial board was decreased to facilitate more efficient collaboration.

Most participants indicated that one organization should be in charge of coordinating the content. Sufficient technical and human capacity was found essential. At first, Victim Support NL was responsible for posting all information on the enclosed section of the IRC. Due to a lack of capacity and because other organizations wanted to post their own information, this process was changed and other organizations could now post information as well. Not all participants agreed with this change, being afraid it would negatively affect the privacy and safety of the affected ones because of the visibility of their personal information on the enclosed section of the IRC (“That is the moment I said, now we have to be very careful, it is not acceptable for affected ones to think that they are communicating with each other in a private environment, while in reality half the world is watching.” – Participant B5). In addition, participants worried that it could lead to an inconsistent communication style.

Participants indicated that they thought the IRC's main objective was providing information and that this goal was clear to them ("Providing information from all the different organizations involved and offering the possibility to affected ones to be able to ask questions to these organizations as well. That is the main feature of an application like this." – Participant B4). However, they felt a shared perspective on the content and implementation seemed to be lacking. The other goals of the IRC were unclear to participants. Participants of ARQ Impact indicated that the two other objectives of the IRC were not given enough attention. Participants indicated that the Dutch Ministry of Justice and Safety commissioned the IRC but did not formulate clear criteria. This allowed different interpretations.

During the interviews, participants indicated that providing information to affected ones did not always proceed correctly. It occurred that information was shared by the media or the IRC first, before the family detectives could communicate this to the affected ones. This was a problem for the family detectives as their relationship with affected ones could be damaged. Moreover, the police indicated feeling bypassed when Victim Support NL answered certain questions from affected ones without consulting the editorial council. Other participants felt that questions from affected ones remained unanswered for too long ("Sometimes it would have been good if we had sent out a process statement as a response to questions that we didn't have an immediate answer to." – Participant B7).

Several participants from ARQ Impact, the police and the Public Prosecution Office felt they were not visible enough on the IRC because the branding style of Victim Support NL was used ("We could be more visible as an organization in that respect. But when we were trying to achieve this, we got into a conflict and asked ourselves if that was worth it. But, in my opinion, next time it should be more clear that this is a joint effort and not just a Victim Support NL initiative." – Participant B7). Participants worried it was confusing to IRC visitors and it would lead to unclarity about the organization they were communicating with. Therefore, participants preferred a unique branding style for the IRC.

Most participants thought the collaborative was complete ("No, I think we've been fairly complete, I wouldn't be able to say what other organizations should have participated." – Participant B3). However, a web developer could have been useful, because certain developments were not implemented due to technical limitations.

### ***Resources and Technical Knowledge***

Other antecedents assessed with the interviews with participants of involved organizations (data source B) were budget, time and technical knowledge. No budgetary limitations were experienced by participants. All participants mentioned the enormous time pressure in the acute phase after the crash as a point of concern ("Yes, we were under time pressure. I know that this work is not for everyone. It is inherent in these types of situations (...) I thought we had two weeks to develop the enclosed section,

but at a certain point it had to be finished the next day.” – Participant B5). Almost all participants had to put (a lot of) their regular work on hold in order to be able to focus on the IRC.

All participants agreed that the IRC should be up to date and adapted to current technological standards. Participants described the IRC as adequate but outdated, static and limited (“What I do struggle with sometimes is that the technical possibilities are quite limited. Which means a lot of things can’t be done. I think that also restricts how appealing it can be made.” – Participant B7). A dynamic website with possibilities to interact was not possible due to the outdated technology. Quick technical adjustments were limited because Victim Support NL outsourced the technical realization (“I think there was limited capacity available to quickly tackle certain issues, resulting in having to wait for the next release, while an emergency release would have been more appropriate at certain times.” – Participant B6). Functionalities such as a search engine, top-5 news items, and links to the newsletter became available at a later stage. Participants indicated that the IRC could not follow technical developments, including smartphone compatibility. Moreover, releasing new content was delayed due to limited capacity at Victim Support NL.

**Realized Transactions**

***Usability of the IRC***

Table 2A shows that 85.1% of affected ones perceived the IRC as valuable and 89.4% thought that its goals were clear (data source A). Respondents were less positive about the coordination of services and information provided tailored to personal situations, 30.8% viewed this in a negative light. In addition, not all respondents were satisfied with the user friendliness and structure of the IRC. This was in line with participants’ experiences in the focus groups (data source C), during which participants stated that the IRC structure was a bit messy in the beginning (“It looks messy, but I am able to find everything” – Participant C1). This improved after a search engine was implemented. Nevertheless, participants indicated that a clear structure was lacking.



**Table 2A.** Survey results of affected ones (data source A); frequency distribution in % N = 94.

Statement	1	2	3	4	5	6
The IRC* has added value for affected ones	0	1.1	9.6	33.0	52.1	4.3
The IRC’s* objective is clear to me	0	3.2	6.4	46.8	42.6	1.1
The information is provided in an easy-to-understand language	0	2.1	3.2	63.8	29.8	1.1
Questions of affected ones to involved organizations are taken seriously	0	1.1	14.9	48.9	29.8	5.3
The personal token performs well	2.1	4.3	7.4	42.6	41.5	2.1
The IRC* is easy to use	3.2	12.9	14.0	46.2	20.4	3.2
The IRC* is clearly structured, I can find the information I am looking for	5.4	17.2	17.2	40.9	18.3	1.1
Services and information provided by the IRC* could be better tailored to my personal situation (e.g. age)	2.1	28.7	39.4	11.7	6.4	11.7

Range: 1 (completely disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (completely agree), 6 (no opinion); \*Information and Referral Center; IRC

In general, the focus groups with affected ones (data source C) showed that participants were satisfied with the IRC. Especially in the first months, participants noticed the developments of the IRC that they assessed as improvements (“Every change was an improvement. The IRC became more complete. If I was missing something, I would ask questions and those were addressed.” – Participant C2). In addition, being able to ask questions to organizations was appreciated. However, some participants perceived not all questions were answered quickly.

Predominantly, participants (data source C) appreciated that information was first shared with them before it was published by the media. The information was perceived as reliable and it met their needs. Moreover, it followed new developments, which was appreciated (“It feels like a digital companion. Warm and familiar. That is because of the quick responses, being able to find things, and that it is being updated.” – Participant C3). Shortly after the crash, information was predominantly of practical nature. Later on, more attention was given to topics like grief and peer support.

Although the IRC consisted of an enclosed section, information leaked to the media nonetheless. Participants (data source C) thought this was difficult to prevent. Fellow affected ones were responsible for sharing the information (“Keeping it private is impossible. Because people can pass on their tokens. That’s hard to prevent.” – Participant C4). Participants did not think of this as a priority and said not everyone’s needs can be met considering the large group of affected ones.

Overall, participants of the involved organizations (data source B) were satisfied with the IRC performance, especially given the time pressure and the difficult task to provide affected ones with information from the different organizations. The primary feature of the IRC, providing information, was developed accordingly and was experienced as effective (“I think the IRC is a very good addition to the source of information toward the affected ones, an information repository. Also, the possibility to communicate in a private environment given the public and enclosed sections is beneficial.” – Participant B10).

### ***IRC Reach, Personal Tokens and Open/Enclosed Section***

Data source A provided more information about IRC use and reach, see Tables 2B–E for details. The survey results show that 90% of affected ones were informed about the IRC, mostly by a family detective. 91.8% of the respondents were informed within one month after the plane crash. The survey results were in line with the results of the focus groups (data source C). Most participants when informed about the IRC, visited the IRC directly. Others indicated they did not desire to visit the IRC right away and did so at a later moment. Most participants had no clear expectations when first visiting the IRC but hoped to find information and to ask questions (“Information. The news was filled with: “probably”. I only accept facts from the government. I used the IRC to fact-check information.” – Participant C5). Some participants also expected interaction between affected ones.



**Table 2B – 2E.** Survey results of affected ones (data source A).

	<b>% (N)</b>
<b>2B. How were you informed regarding the establishment of the IRC*?</b>	
Family detective	46.0 (58)
Information meeting Nieuwegein July 21, 2014	16.7 (21)
I was not informed	10.3 (13)
Through other affected ones	9.5 (12)
Other	9.5 (12)
Case manager of Victim Support Netherlands	7.9 (10)
Total	100 (127)
<b>2C. When were you informed regarding the establishment of the IRC*?</b>	
Within a week after the plane crash	42.7 (47)
Between a week and a month after the plane crash	49.1 (54)
More than a month after the plane crash	8.2 (9)
Total	100 (110)
<b>2D. Did you visit the IRC*?</b>	
Yes (at least once)	84.1 (95)
No, I did not visit the IRC, because...	15.9 (18)
Total	100 (113)
<b>2E. Did you use the personal token?</b>	
Yes, I used my token	90.5 (86)
No, I did not receive a token	1.1 (1)
No, my family's contact person uses the token and informs us	5.3 (5)
No, I did not use the token, because...	3.2 (3)
Total	100 (95)

\* Information and Referral Center; IRC.

Most respondents, 84.1% (data source A), visited the IRC at least once. Respondents who did not visit the IRC indicated they received information from others and did not need the IRC. Most respondents visited the IRC on a daily basis. Visitation numbers decreased over time from daily visits to weekly. Most survey respondents (90.5%) indicated they used their personal token to access the enclosed section of the IRC. The difference between the open and enclosed section was not clear to many affected ones (data source C). Most of them said they only visited the enclosed section. They also thought the IRC was only meant for affected ones while the publicly available information could be useful to others, such as friends, as well. The enclosed section was perceived as safe (“It gave a nice feeling of being in a protected environment.” – Participant C11). The difference between the open and enclosed section was also not clear to all participants from the involved organizations (data source B). The involved organizations (data source B) considered the safety of the enclosed section of the IRC as sufficient (“All of the security issues have been resolved at a very high pace, so overall, I’m very happy with it.” – Participant B5).

Affected ones (data source C) indicated during the focus groups that they visited the IRC on a daily basis in the beginning, sometimes multiple times a day (“Very often, every day, visits sometimes lasted up to an hour and a half. Due to the changing flow of

information I felt the urge not to miss a thing.” – Participant C6). Their visits decreased over time, partially because other information channels were established and partially because the amount of new information itself decreased. Participants indicated that they used the IRC newsletter (sent by Victim Support NL) to determine what messages they preferred to read. Visitation time varied greatly between participants, from 10 to 90 minutes.

**Providing Information**

Table 2F shows that 90.4% of affected ones (data source A) considered the information provided on the IRC as reliable. In addition, most respondents (95.8%; data source A) deemed it important that information was posted on the IRC first before it was published in the media. Affected ones indicated during focus groups (data source C) that they predominantly searched for information from the government or service providers. Mainly in the early stage of the IRC the need for information was high (“Information, all kinds of information, we wanted to know everything.” – Participant C7).

**Table 2F.** Survey results of affected ones (data source A), frequency distribution in % N = 94.

Statement	1	2	3	4	5	6
It is important the information is posted on the IRC* before it is published by the media	0	0	2.1	16.0	79.8	2.1
It is important the IRC* provides information in one central location	1.1	0	4.3	24.5	69.1	1.1
The information on the IRC* is reliable	0	0	8.5	40.4	50.0	1.1
The information meets my needs	2.1	0	19.1	48.9	28.7	1.1
The information is clear and complete	0	3.2	19.1	48.9	26.6	2.1

Range: 1 (completely disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (completely agree), 6 (no opinion); \*Information and Referral Center; IRC.

Participants of the involved organizations (data source B) were satisfied with the information feature of the IRC. All participants stated the importance of providing reliable and up to date information to affected ones in one central location. Participants also indicated the importance of background information—such as legal and practical information—and information on grief and mourning. Participants considered the coordination between the organizations involved in providing information to affected ones as a great strength of the IRC (“People in these kinds of situations just want sound and high-quality information. The information provided has to be backed up by all organizations involved, that is a great strength of the IRC.” – Participant B10).

Participants (data source B) stated that the way in which information was provided could be improved by introducing more variation (“There could be more, a bit more interactive and with more energy. Recently, we have been making videos that still need to be posted. We have been making blogs that also need to be posted.” – Participant B2). Affected ones may have difficulties with concentrating, therefore long text may not be



appropriate and the structure could be improved.

The IRC also served as an archive. This provides the opportunity to retrieve and read information previously posted on the IRC. Given the continuous supply of information, the archive was considered important to affected ones to allow them to read the information at a later stage. Retrieving archived information was perceived as convenient and was appreciated by affected ones (data source C).

**Referral and e-Consult**

Participants of the involved organizations (data source B) stated it could be useful to affected ones to be able to screen themselves for (mental) health problems (“Perhaps adding types of e-health tools to assess how you are doing, based on ten questions to see how you are feeling or whether you should seek help in case of a certain outcome.” – Participant B9). Additionally, available care should be outlined in a clear manner. Most participants indicated they had limited insight in the performance of the referral feature.

Table 2G shows that 72.7% of the survey respondents (data source A) were aware of and positive about the e-consult feature. However, respondents were less positive about using the e-consult or recommending it to someone else. Not all participants of the focus groups (data source C) were aware of the existence of the e-consult. Most participants stated they would not use the e-consult because they preferred their own resources (“I have read it, but have already found my own way. Otherwise, I can also talk to the case manager of Victim Support NL. I already had my own resource for questions.” – Participant C8).

**Table 2G.** Survey results of affected ones (data source A), frequency distribution in %, N = 95.

Statement	1	2	3	4	5	6
The e-consult is beneficial	0	0	18.9	43.2	29.5	8.4
I would recommend the e-consult feature to someone that has questions regarding mourning and loss or when I want to know where one can go for psychological help	2.1	7.4	23.2	30.5	25.3	11.6
I would use the e-consult feature when I have questions regarding mourning and loss or when I want to know where I can go for psychological help	5.3	16.8	22.1	28.4	20.0	7.4

Range: 1 (completely disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (completely agree), 6 (no opinion).

**Fostering Contact Between Affected Ones**

The IRC feature of communicating with other affected ones was used very little. Participants of the involved organizations (data source B) indicated that affected ones met each other in person instead (“I think there are few calamities imaginable whereafter so many meetings were organized in such a short period of time. So all things considered (...) we have had at least 5 information meetings.” – Participant B5). Also differences



in background, stage of the mourning process and needs in having contact with other affected ones influenced this.

Table 2H shows that a little over half of respondents (59%; data source A) agreed the IRC should offer the possibility of getting in touch with other affected ones. Respondents were negative about feeling supported by other affected ones (17.9%; data source A). Table 2I shows that 68.4% did not wish to get in touch with other affected ones through the IRC. Only 16.8% met others through the IRC. 14.7% wanted to get in touch but did not manage to do so yet.

**Table 2H.** Survey results of affected ones (data source A), frequency distribution in %, N = 95

Statement	1	2	3	4	5	6
I think that the IRC* should provide the opportunity to get in touch with other affected ones	0	3.2	30.5	37.9	21.1	7.4
The presence of other affected ones on the IRC* makes me feel supported	5.3	12.6	27.4	36.8	13.7	4.2
Because of the IRC* I feel like I am in touch with other affected ones	9.5	14.7	31.6	26.3	11.6	6.3
I think it is important that other affected ones can respond to my story	10.5	12.6	41.1	17.9	9.5	8.4
I think it is important to share my story on the IRC*	13.7	15.8	41.1	15.8	7.4	6.3

Range: 1 (completely disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (completely agree), 6 (no opinion); \*Information and Referral Center; IRC.

**Table 2I.** Survey results of affected ones (data source A), N = 95

Have you made contact with other affected ones through the IRC*?	% (N)
No, I did not want to	68.4 (65)
Yes	16.8 (16)
No, I want to but did not manage yet	14.7 (14)
Total	100 (95)

\*Information and Referral Center; IRC.

The results of the focus groups with affected ones (data source C) showed that participants perceived the forum as a useful addition. The need for sharing personal stories varied among participants. This was due to individual needs and also with the forum’s atmosphere, that was determined by a small group of visitors who posted frequently. Participants indicated they preferred face-to-face contact instead of the forum. Other participants shared positive experiences with sharing their story on the forum (“I asked a question once. It made a safe impression, not that I was exposing myself in front of the whole world.” – Participant C9).

The experiences of participants (data source C) in getting in touch with other affected ones varied. Some had a positive experience while others expressed they thought the IRC was not the appropriate location for peer contact, because it was too large scale (“When people communicate with each other through the IRC it creates chaos. The group is too large and too diverse. Therefore, I think you should not be looking for that



part on the IRC.” – Participant C10). Other participants had no desire for getting in touch with other affected ones at all.

**Presence of Involved Organizations**

The focus groups with affected ones (data source C) showed that it was not clear to all participants what organizations were involved in the IRC and what their different responsibilities were. Participants appreciated the presence of the involved organizations in one central location (“It was nice that everything was posted in one location.” – Participant C12). They were positive about the information the government posted on the IRC and the possibility to ask questions.

**Duration of the IRC**

The intended duration of the IRC was 2 years. All participants of the involved organizations (data source B) considered this as the minimum. More than half of affected ones (60.6%; data source A) agreed with this. See Table 2J for details. Participants (data source B) differed in opinion whether the IRC should be available for a longer period of time (“The functionalities of the open section should not be deleted, perhaps it could be archived. But the enclosed part of the IRC should be scaled down, two years is an appropriate amount of time for it to continue” – Participant B8). Features such as the information archive and e-consult could remain active after 2 years. Most participants of the focus groups (data source C) stated that the IRC should be available for a longer period of time (“To me, it’s not over until the perpetrators are in jail. Until then you want to have a location where all that information is stored.” – Participant C13). Ending the IRC should be communicated clearly and proceed slowly. Participants wished to maintain the information archive feature of the IRC.



**Table 2J.** Survey results of affected ones (data source A)

<b>For how long should the IRC* remain available to you?</b>	<b>% (N)</b>
The IRC can be cancelled now	3.2 (3)
At least one year after the event	21.3 (20)
At least two years after the event	38.3 (36)
More than two years after the event	22.3 (21)
No opinion	14.9 (14)
Total	100 (94)

\*Information and Referral Center; IRC.

## Realized Outcomes

### Primary Goal of the IRC

Participants of involved organizations (data source B) indicated that providing reliable information in one central location as the primary goal of the IRC, before it was published by the media. Participants stated that this objective has been achieved (“In my opinion, you can really find everything you need there.” – Participant B5). Affected ones (data source C) also considered providing information as the main goal of the IRC (“Reliable information, that was good.” – Participant C14).

Most respondents of the pop-up survey (80%; data source D) thought the information of the IRC was easy to understand. 36% of respondents (data source D) were negative about connecting with (the experiences of) others through the IRC. See Table 3 for details.

**Table 3.** IRC\* pop-up survey items mean and standard deviations, frequency distribution in %, N = 25.

Statement	1	2	3	4	5
I consider the IRC* easy to use	8.0	8.0	28.0	32.0	24.0
The information of the IRC* is easy to understand	8.0	0	12.0	60.0	20.0
I can easily find the information I am looking for on the IRC*	8.0	12.0	20.0	48.0	12.0
The IRC* has helped me to connect with (the experiences of) other affected ones	16.0	20.0	32.0	20.0	12.0
The information on grief and loss has been very helpful to me	8.0	16.0	24.0	32.0	20.0
I have benefited a lot from the practical and legal information	8.0	12.0	20.0	44.0	16.0
I have benefited greatly from the information provided by the organizations involved	8.0	4.0	28.0	32.0	28.0
I appreciate the opportunity to respond to messages from the organizations involved	4.0	4.0	20.0	48.0	24.0
The IRC* has been an important part of the psychosocial care provided to me	12.0	8.0	16.0	32.0	32.0

Range: 1 (completely disagree), 2 (disagree), 3 (neutral), 4 (agree), 5 (completely agree), 6 (no opinion); \*Information and Referral Center; IRC.

### Integration of the IRC in Existing Service Delivery Structures

All participants (data source B) agreed that the IRC should complement existing healthcare and support facilities (“Also, when it comes to referral, the IRC is complementary. The e-consult is not the gateway to all care, it’s meant for the people who don’t get to the right place through regular routes. I don’t think the IRC has a main role in everything but that it is complementary.” – Participant B7). These have been outlined and information on how to find support are provided on the IRC. In addition, the IRC can refer visitors to care through the e-consult. Participants (data source B) indicated they had limited insight in the performance of this feature. Affected ones (data source C) expressed a need for contact with fellow affected ones. The IRC could be an appropriate tool for this (“Yes, it would have been nice to have some contact with peers, on a forum. That would have brought recognition and acknowledgment (...) I would like to get in touch with others who have a similar relationship with the deceased one, so you are able to share the same dynamics that are at play.” – Participant C15). Still, participants expressed

reluctancy in getting in contact through the IRC. They indicated this was partly due to previous experiences with the IRC.

### **Monitoring**

With regard to the monitoring of affected ones, some participants (data source B) indicated that they had expected to get a clearer picture of the (mourning) process of affected ones and their associated needs (“I expected that we would get a clearer picture of where people are, what their needs are. We haven’t really been able to do that now. We don’t really have a tool for that now.” – Participant B7). Only few participants identified the peer support feature of the IRC as important. Those who mentioned peer support, indicated that they saw it as a subordinate feature. Participants indicated that this goal of the IRC did not receive enough priority due to a lack of time and capacity.

### **Improvements and Future IRCs**

Participants (data source B) expressed that technical capacity is essential to meet user expectations in future IRCs. Participants explained that if what is provided does not match user expectations, it could reduce the effectiveness of an IRC. To anticipate this, most participants (data source B) proposed realizing a “basic IRC” that receives frequent maintenance (“A sort of annual drill to assess if it all still works, if we know what we are doing, and how everything works.” – Participant B9). Participants were aware of the required financial and material resources as complicating factors.

Respondents of all organizations (data source B) indicated the importance of sustaining the IRC collaborative for a rapid collaboration during future events (“To keep direct lines of communication so that when the time comes we know how to find each other.” – Participant B11). They indicated that this collaborative should include at least the government, Victim Support NL, ARQ Impact and a website developer.

In regard to potential improvements, several affected ones (data source C) suggested during the focus groups that the tone of voice on the forum could be monitored by a moderator (“I do recognize that you shy away from that anger that people showed. You actually need to get a moderator on that.” – Participant C16). Giving a moderator such a role should be implemented with caution. Also, language was perceived as too complicated and texts too long by some participants. This could be improved by providing summaries.

### **Online User Information (Data Source E)**

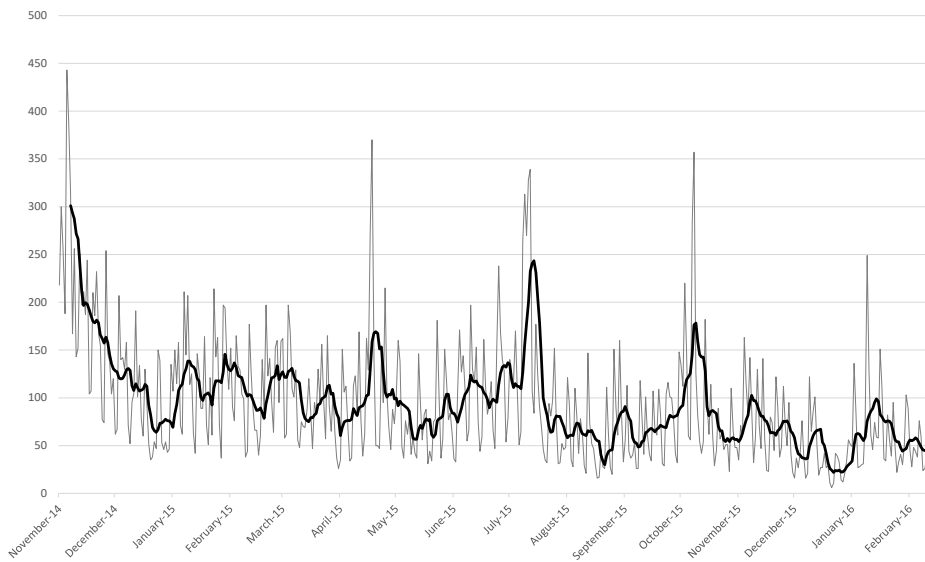
Google Analytics data was available from November 6, 2014, until February 15, 2016. Due to technical issues, data from July 2014 until October 2014 was not stored and therefore unavailable for analysis. The results are presented in Table 4. The results showed over 44.000 sessions from 1 IP address. Most visitors were from The Netherlands. Figure 2 presents the number of sessions from November 6, 2014, until February 6, 2016, that

shows a slight decline. The number of weekly visitors from early 2015 to February 2016 declined from approximately 150 to between 50 and 100 visits. In addition, a fluctuation in the number of sessions is shown as well. Visitation peaks are in concurrence with specific events or moments involving increased (media) attention, see Table 5.

**Table 4.** IRC\* Google Analytics data from November 6, 2014 until February 15, 2016

<b>Google Analytics</b>	
Number of sessions	44.429
Total number of visited pages	366.108
Average page views per session	8.42 pages
Average session time	4 minutes 16 seconds
Dutch	93.9%
Foreign	6.1%

\*Information and Referral Center; IRC



**Figure 2.** IRC daily sessions from November 6, 2014, until February 15, 2016.



**Table 5.** IRC\* Google Analytics data visitation peaks

Date	Subject	Numbers	Peak
April 22, 2015	Sensitive information was shared in a Dutch TV news show for study purposes, that became public and led to public commotion.	343	Yes, additional IRC* newsletter sent
April 30, 2015	End of repatriation mission	184	Yes, additional IRC* newsletter sent on this date
May 1, 2015	Debate in House of Representatives (Minsk II)	74	No
June 15, 2015	Letter LTFO** about professor Maat	189	Yes, additional IRC* newsletter sent on this date

\*Information and Referral Center; IRC. \*\*Dutch National Forensic Investigation Team (LTFO).

Google Analytics is a useful tool to monitor user behavior. Unfortunately it has not been used to its full potential in case of the IRC because reliable data from the beginning of the IRC (before November 6, 2014) is missing. Also, no data was tracked regarding the use of the personal tokens or visitation differences on the open and enclosed sections. Nevertheless, the data that was gathered provided a useful insight in user behavior trends.

## DISCUSSION

The objective of this study was to evaluate the experiences of users and providers with the online Information and Referral Center (IRC) established after the MH17 airplane crash using both qualitative and quantitative data and the evaluation framework based on Stake (1967; 2004) and Donabedian (1988). First, regarding the experiences of users and providers in regard to the antecedents, transactions and outcomes of the IRC (research question 1); participants were positive about the merits of the IRC. Affected ones indicated that they perceived the IRC as a reliable source of information and appreciated the referral possibilities. Organizations stated that the IRC helped them to structure and align their services. The feature of the IRC to serve as a community where affected ones could meet, share experiences and support each other was hardly used according to participants. Tracking evolving psychosocial needs and problems through the IRC was hampered due to difficulty in accessing relevant data. Second, several facilitating conditions and barriers in the implementation of the IRC could be identified (research question 2), such as good collaboration, having sufficient resources and technical capacity, and the diversity of needs that changed over time. Third, potential relevant implications for future IRCs (research question 3) from the point of view of affected ones included clear communication regarding the functionalities and goals of an IRC. From the organizations' point of view, potential relevant implications regarded role clarity, a shared vision regarding goals and functionalities, and clear agreements beforehand.

As can be expected in the aftermath of a disaster or crisis, the intended program was not worked out meticulously beforehand. In addition, the intended and realized program were not entirely congruent because necessary changes were made along the way. The evaluation framework as used in this study includes an interpretation of the congruence between the intended and realized program, see Figure 1. First, the interpretation of the congruence between the intended and realized antecedents concerned the collaboration between the organizations involved in the development and implementation of the IRC. This collaborative concerned an opportunistic structure of organizations in which key players actively engaged. Because the process, division of labor and responsibilities were not formalized beforehand, resulting in role unclarity that complicated the collaboration. The process of who could post information on the IRC was changed along the way. Also, a joint perspective on the content and implementation was lacking and the second and third goal were unclear to some organizations and were given insufficient attention.

Second, the interpretation of the congruence between the intended and realized transactions concerned the background conditions, program activities and goals of the IRC. The structure of the IRC was perceived as messy in the beginning by users, but this improved along the way. Features such as a search engine and archive function were implemented at a later stage, improving the intended program according to users.

Third, the interpretation of the congruence between the intended and realized outcomes relate to the implementation of the IRC according to eight evaluation criteria (Impact, 2014). First, the IRC focused on the needs and capacities of the affected ones (principle 1) by adapting to the different phases of the aftermath. Through the IRC, organizations tried to encourage social support (principle 2) through the enclosed section and forum option, that did not work as expected. Because the group of affected ones was so diverse, it sometimes proved difficult to take all the different needs into account (principle 3). Affected ones were provided with the opportunity to ask questions to the different organizations involved and a referral option was established, thereby offering coherent and complementary care (principle 4). The information posted on the IRC followed incident-related developments (principle 5) and information regarding common emotional reactions, grief and mourning was provided (principle 6). The IRC also provided information on practical and legal matters, and visitors could ask questions (principle 7). The monitoring of affected ones and initiating follow-up where needed (principle 8) was difficult due to limited user data.

Our study suggests that the IRC had value in the aftermath of the MH17 airplane crash. According to users, the IRC delivered what affected ones perceived as important; reliable information and referral options. It indicated that an IRC has the potential to serve as a valuable psychosocial care instrument, both in the acute phase of a disaster (Blanchard et al., 2005) and in the longer term. Furthermore, it helped organizations to structure and align their services (McFarlane & Williams, 2012). Our study provides a comprehensive and in-depth understanding of the experiences of both users and

providers of an intervention such as the IRC.

To our knowledge, this is one of the first evaluations of a post-disaster intervention such as the one-stop shop using both quantitative and qualitative data and including users and providers. By including multiple data sources, we did not only focus on the outcomes of the IRC, but also on the background conditions and program activities. Although the inclusion of data from affected ones is a strength of this study, our sample is a convenience sample which results in limited generalizability. Given the nature of the event, retrieving a representative sample was difficult while also limiting the burden on the population. In addition, the small sample size of the survey and pop-up survey increases the risk of selection bias, this should be kept in mind when interpreting the results. Another limitation of our study is that the qualitative data—the transcripts from interviews and focus groups—were coded by one researcher only, where this ideally is done by multiple researchers. However, the codes and interpretations were discussed extensively among a team of researchers. Including multiple researchers (triangulation) in data collection and analysis decreases the risk of bias. Furthermore, limited availability of Google Analytics data restricts drawing conclusions regarding user behavior. Lastly, each disaster and its aftermath is unique, this is also the case for the MH17 airplane crash. This study focuses on this particular event and therefore caution should be exercised in generalizing the results to other settings. This includes taking into account that the availability of resources will vary between countries and this IRC was implemented in a country with ample resources available.

From the perspective of affected ones, a potentially relevant implication for future IRCs is that clear communication regarding the functionalities and goals of an IRC is required. For example, the open section of the IRC contained a lot of information that was publicly available, while this was not clear to everyone. Most affected ones and organizations indicated that they focused on the enclosed section. The services of the open section could have been communicated by national and regional media outlets. Website design could aid in this as well. Moreover, affected ones stated that they appreciated receiving information through the IRC before it was published by the media; this is an aspect of the IRC that should definitely be implemented in future IRCs as well. Needs regarding the IRC varied between individuals and also changed over time, as is typically the case with disasters. An IRC that monitors these changing needs and adapts accordingly fulfills an invaluable psychosocial crisis management function (Dückers et al., 2017a). The archive feature of the IRC, which can help in the mourning process, should be implemented. The atmosphere on the forum was perceived as unsafe by some affected ones. Therefore, a private chat feature could be considered for future IRC.

What we can learn from the perspective of the involved organizations is that role clarity is essential to successful implementation. A shared vision on the goals and functionalities of the one-stop shop support environment is important according to participants. Collaboration would benefit from clear agreements beforehand. This is

difficult to realize in the acute phase following a disaster and something that probably needs to grow as the platform and the network behind it evolves. Nevertheless, attention should be paid to selecting the organizations that have to be included in the collaborative at an early stage. It is important to develop a scenario with clear roles and responsibilities, that can guide future IRCs. Participants recommended preparing and developing information for future service delivery platforms as far possible, so this is readily available during future crises. Participants proposed to develop and maintain a basic IRC for training purposes and as a starting point for acute situations. All this could enable and structure prompt collaboration at the time of a new disaster. This corresponds with a study by Bonfield (2009), that suggests that governments should be ready to implement an one-stop shop. Furthermore, user friendliness according to current modern standards and cyber security should receive ample attention according to participants. Lastly, including sufficient technical capacity in the collaborative and ensuring cyber security was also deemed important.

In conclusion, this study suggests that an IRC has the potential to be a useful and appreciated psychosocial support instrument that, in the case of the MH17 airplane disaster, helped organizations with aligning their communication and interactions after the MH17 airplane crash, internally as well as toward target groups. Affected ones were positive about the IRC, predominantly about its reliability and accessibility. Like any psychosocial intervention, an instrument such as an IRC has to be embedded within the established structure of care providers. Future research could indicate if an IRC is useful in other event types and population contexts as well, and indicate what aspects of an IRC are deemed most important by users and providers.

### ***Funding***

This study was funded by the Dutch Ministry of Justice and Security. The Ministry had no involvement in the writing of the manuscript.

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7.

GENERAL DISCUSSION

## GENERAL DISCUSSION

The overall objective of this dissertation was to contribute to the understanding of and provision of psychosocial support to people who have been exposed to a potentially traumatic event (PTE) in different contexts. Part one of the dissertation focused on furthering our understanding of which factors contribute to a resilient response after experiencing a PTE and how psychosocial support is defined and perceived in different contexts. The second part of this dissertation aimed to provide and evaluate three different psychosocial support instruments in various contexts.

In this final chapter, we will provide a summary of the main findings of this dissertation. This will be followed by a discussion and integration of the findings within the literature. Furthermore, we will reflect on directions for future research, practical implications, limitations, and strengths of this dissertation. Lastly, we will end with a few concluding remarks.

## SUMMARY OF MAIN FINDINGS

### **Part one: Understanding the resilient response to PTEs and psychosocial support needs in challenging contexts**

**In chapter 2** we aimed to answer the research question of which factors contribute to the wellbeing of professionals in high-risk organizations and their resilient response to PTEs. Using a qualitative study design, we aimed to further our understanding of the factors underlying wellbeing in a population with a particularly demanding work context: Helicopter Emergency Services (HEMS) personnel. HEMS personnel provide on-scene trauma care to patients with high mortality risk under challenging conditions. They work in small teams and autonomously. The HEMS work context is characterized by a very high exposure to PTEs, emotionally demanding patient encounters and performing under pressure with limited resources. The results suggest that HEMS personnel use various strategies to successfully cope with PTEs, such as keeping an emotional distance and informal peer support. Their wellbeing can be affected in several ways but at the same time, motivation and work engagement are high. The perceived need for organizational support and follow-up care is low and seen as complicated given the unique work context in which being operational at all times is considered paramount. We found that dispatches involving children and the emotions and despair of patients' family members had the most emotional impact on participants. In addition, we found that when participants were able to identify with the patient or the situation that also had an emotional impact on them. In addition to PTEs, HEMS personnel also has to deal with other stressors such as long shifts, night shift and stress at home.

We examined two other particular contexts **in chapter 3** – people who have

experienced a PTE and people with Spinal Muscular Atrophy (SMA) to answer the research question of which psychosocial support aspects are considered important by recipients and how these can be measured in order to evaluate the quality of psychosocial support in practice. Therefore, the twofold aim of this study was to contribute to (1) understanding which psychosocial support aspects are considered important by its recipients and relevant stakeholders; (2) developing instruments to test and integrate those aspects in practice, in order to evaluate the quality of psychosocial support from the recipient's perspective. Using concept mapping and surveys, we derived key themes of psychosocial support. We found a pattern between both contexts, notably the importance of matching the needs and capabilities of recipients and coordination within the provider network. As expected, we also found differences. For example, psychosocial support in the PTE context often needs to be organized quickly. In contrast, psychosocial support in the SMA context is organized to evolve with the recipient's life course and implemented within day-to-day healthcare. This implies that context matters; different aspects of psychosocial support are considered important.

### **Part two: Providing and evaluating psychosocial support instruments in practice**

In part two of this dissertation, three different psychosocial support instruments were provided and evaluated in practice: visitors of the Victim Support Netherlands website, railway emergency services personnel and those affected by the MH17 airplane crash.

What are the psychometric and classification properties of a web-based screening instrument that can be provided to individuals that are exposed to a PTE? The purpose of **chapter 4** was to evaluate the psychometric and classification properties of the screening instrument MIRROR (Mobile Insight in Risk, Resilience, and Online Referral). MIRROR is a web-based self-help test to identify individuals who develop psychological complaints after a PTE, encourage them to seek help, and support self-reliance. MIRROR was embedded in the website of Victim Support Netherlands so visitors could use MIRROR. We compared MIRROR's outcomes to reference measures of PTSD symptoms (PTSD Checklist for DSM-5), depression, anxiety, stress (Depression Anxiety Stress Scale-21), psychological resilience (Resilience Evaluation Scale), and positive mental health (Mental Health Continuum Short Form). Factor structure, internal consistency, convergent and divergent validity were assessed. Our results indicated that MIRROR is a valid and reliable self-help test to detect negative outcomes (PTSD core symptoms) and positive outcomes (psychosocial functioning and resilience). MIRROR is able to correctly classify respondents according to their PTSD complaints and scores on reference measures. This study showed that MIRROR is a psychometrically sound, anonymous, and easily accessible self-help test for people who have experienced a PTE. It is able to assess both negative (PTSD symptoms) and positive (psychosocial resources) outcomes of PTEs and classify respondents in accordance with reference measures. MIRROR could contribute to enhancing adequate and timely identification of people who develop

psychological complaints after PTEs.

In addition to a screening instrument, we evaluated a monitoring tool called BASE (Brief Assessment of Stress and Energy) in **chapter 5** to provide insight into what work-related and personal characteristics are associated with employee wellbeing and how these can be monitored. BASE can be used by employees to regularly self-monitor their stressors and resources. BASE aims to identify high stressors and/or low resources in employees and refer them to counseling. We evaluated BASE among Dutch railway emergency services employees. Respondents completed BASE and six measures to assess the overall level of wellbeing (burn-out symptoms, work engagement, depression, anxiety and stress, PTSD symptoms, social support, and psychological resilience). We assessed BASE in two ways: using multiple regression analysis (N = 102, 73.4%), as well as by telephone follow-up interviews during which experts and respondents evaluated the BASE outcome (N = 67, 65.7%). We demonstrated that BASE was associated with wellbeing and subsequent referral to further counseling was accurate. BASE can be considered an adequate self-monitoring instrument for Dutch railway emergency services personnel. The results showed that BASE is a promising instrument that can accurately identify and refer emergency services personnel with high stressors and/or low resources.

The third psychosocial support instrument that was evaluated is included in **chapter 6**. In this chapter, we aimed to answer the questions of what the experiences of users and providers were regarding an online one-stop shop and which facilitating conditions and barriers to the implementation could be identified. The objective of this study was to evaluate the experiences of users and providers with the online Information and Referral Center (IRC) established after the MH17 airplane crash using both qualitative and quantitative data and existing evaluation frameworks (Donabedian, 1988; Stake, 1967, 2004). First, participants were positive about the merits of the IRC. Affected ones indicated that they perceived the IRC as a reliable source of information and appreciated the referral possibilities. Organizations stated that the IRC helped them to structure and align their services. The feature of the IRC to serve as a community where affected ones could meet, share experiences and support each other was hardly used. Tracking evolving psychosocial needs and problems through an instrument such as the IRC requires adequate data collection management. Several facilitating conditions and barriers in the implementation of the IRC could be identified, such as good collaboration, having sufficient resources and technical capacity, and the diversity of needs that changed over time. Potential relevant implications for future IRCs from the point of view of affected ones included clear communication regarding the functionalities and goals of an IRC. From the organization's point of view, potential relevant implications regarded role clarity, a shared vision regarding goals and functionalities, and clear agreements beforehand. This study suggests that an IRC has the potential to be a useful and appreciated psychosocial support instrument that, in the case of the MH17 airplane

disaster, helped organizations align their communication and interactions after the MH17 airplane crash, internally as well as towards target groups. The affected ones were positive about the IRC, predominantly about its reliability and accessibility.

## INTEGRATION AND DISCUSSION OF FINDINGS

### **Contributing to the dialogue between research, policy and practice**

Research has by now provided a wealth of knowledge on the mental health consequences of potentially traumatic events and the accompanying risks, problems, vulnerabilities and needs of people affected (Bonanno, 2021; Bonanno et al., 2010; Doocy et al., 2013; Ripoll Gallardo et al., 2018). Several international evidence-based psychosocial support guidelines are available to enhance service delivery in different contexts. The guidelines contain consensus among experts regarding psychosocial support principles and interventions (Bisson et al., 2010; Colvin et al., 2018; Gibson et al., 2021; Jacobs et al., 2019; Jacobsen & Wagner, 2012; Roberts et al., 2019; Te Brake et al., 2022) and are essential in the response to the consequences of PTEs. However, there is a lack of knowledge on how to actually implement these interventions and support services in practice. The context in which psychosocial support is provided complicates implementation due to contextual factors and varying needs. Despite the growing evidence for the efficacy of psychosocial support interventions, each PTE is unique and so are its consequences and impact. This requires that psychosocial support services are adapted to a particular event, situation, individual or community (Reifels et al., 2013).

In order to provide psychosocial support that meets the needs of those affected by a PTE, stakeholders belonging to the research, policy and practice domains should engage in a continuous and reciprocal dialogue and work together (Généreux et al., 2019; Te Brake et al., 2022). Généreux and colleagues (2019) describe a framework that includes six steps of how scientific knowledge can be translated into practice and policy: problem, research, knowledge, transfer, adoption and diffusion. The first three steps result in the development of knowledge and the latter three steps in the practical application and dissemination of the acquired knowledge. In order for research to inform policy and practice, knowledge generated from research has to be translated in a way that is useful so it can be applied (Généreux et al., 2019). This means that policy and practice have to provide input for science and vice versa. The organization of providing recommended psychosocial support services in a systematic way includes an effective dialogue between the three domains, involving a feedback loop of gaps or needs in knowledge from policy and practice to science and the other way around (Généreux et al., 2019; Te Brake et al., 2022). Each chapter in this dissertation can be seen as a contribution to the dialogue between research, policy and practice. If the three domains work together effectively, this will contribute to the improvement of psychosocial support in different contexts.

This effective collaboration can only be achieved by involving relevant stakeholders from each domain. The findings in this dissertation provide insight into how to enhance the implementation of research output in practice by involving stakeholders. The importance of involving relevant stakeholders from the three domains of research, policy and practice is evident in all chapters. In each step, from the research problem to the implementation, stakeholders were involved in various ways as will be discussed below.

In chapter 2, the problem statement was initiated by stakeholders from the practice domain, from a HEMS team in The Netherlands specifically. Team members wondered how they were able to maintain a healthy level of functioning despite being exposed to PTEs on a very frequent basis during their work. The loop from practice to science took place through discussions between stakeholders from both domains. Next, members of the research population (practice domain) were involved in the development of the research design and with the interpretation of the analysis and results. A continuous dialogue took place between science and practice to make sure the generated knowledge was applicable and useful in practice. In addition, knowledge from this study can inform the policy domain on what aspects of the work context play a role in how to provide psychosocial support to this population. One of the main findings was that informal peer support is crucial to the wellbeing of HEMS personnel. Team members receive support from each other and this is an important coping strategy to deal with the impact of this challenging occupation. This finding is in line with earlier research (Auth et al., 2022; Clompus & Albarran, 2016) and shows that social cohesion is inherent to team culture. This is important information for policy and practice.

In chapter 3, relevant stakeholders from research, policy and practice were included in the process of reaching a consensus on the definition of high-quality psychosocial support. The results showed that there is overlap but also substantial differences between contexts in how stakeholders from the different domains define and view psychosocial support. At a future moment in time, it can be evaluated whether or not the services provided met the definitions and needs of the various stakeholders. When this evaluation is conducted in collaboration with stakeholders from the three domains, this ensures a joint starting point for the evaluation and implementation of subsequent findings.

The concept mapping method was applied in chapter 3 as a way to organize reaching a consensus regarding the benchmarks of evaluation criteria that psychosocial support has to meet. This method creates shared ownership between stakeholders from policy, practice and research (Burke et al., 2005). It also enhances the implementation of the quality measures that were developed in this study. It enables including relevant stakeholders from the three domains from an early stage up until the implementation. Implementation research aims to conduct studies that foster ownership, collaboration and influence, together with stakeholders from different fields (Theobald et al., 2018). It

is concerned with the users of research and the real-world context in which the research is conducted and the results have to be implemented (Peters et al., 2013). This dialogue between the domains was also applied to the evaluation of the online one-stop shop or Information and Referral Center (IRC) established after the MH17 airplane crash in chapter 6. In this study, we evaluated an organized form of psychosocial support service. Both providers and users of the IRC were included in the evaluation of this psychosocial support service and stakeholders from the science and policy domain were involved as a peer-review group overseeing the evaluation study. Involving the affected population in the evaluation allows for the identification of problems, resources and potential solutions (Inter-Agency Standing Committee, 2006). Through the IRC, a variety of stakeholders that had an interest in their services being provided in one central location over a longer period of time had the opportunity to collaborate and improve their services. With this evaluation, we tried to retrieve what happened during the establishment and implementation of the IRC with the help of multiple research methods and involving both users and providers, that could aid in the implementation of an instrument such as an IRC. Including these stakeholders can answer research questions on why and how psychosocial support interventions work or do not work in a particular context (Peters et al., 2013).

Screening and monitoring instruments can contribute to the exchange between research, policy and practice by collecting data on needs, protective factors, problems, risks and vulnerabilities following a PTE or regularly. The data is collected for the purpose of understanding these factors and to provide accurate referral and/or follow-up support options. This information can aid in the provision of psychosocial support that matches the needs of individuals within the practice domain, a basic element of psychosocial support (Impact, 2014). In turn, data collected with screening and monitoring instruments can help to generate knowledge that can inform policy and practice (Généreux et al., 2019). There is a large body of knowledge on mental health and psychosocial support (MHPSS) literature that consistently emphasizes the importance of monitoring needs, problems and risks (Impact, 2014; Inter-Agency Standing Committee, 2006; Juen et al., 2016) but unclarity remains on how this can be implemented in practice. Screening and monitoring instruments can fill this gap and are practical applications of psychosocial support guidelines. With these instruments, problematic levels of complaints, stressors and/or resources can be detected and support can be offered before effects become chronic. The data can also inform organizations or policymakers on what support services should be provided.

The development and implementation of screening and monitoring instruments should include a collaboration between stakeholders from science, policy and practice, that use existing protocols and guideline recommendations. The practice domain can get involved during the implementation process. For example, increasing user uptake of MIRROR was achieved by conducting a pilot assessment to acquire information on



user uptake and user-friendliness from the perspective of users. Another possibility to include the practice domain in the implementation and to enhance user uptake is answering any questions stakeholders might have and making small adjustments to the instruments accordingly (Peters et al., 2013). This was done with BASE during presentations given by the researchers to potential users. In addition, in the development process of BASE, several members of the research population were involved in tailoring the instrument. The items were evaluated with the help of several stakeholders to assess whether all items were applicable to the specific context and to check for comprehensibility and any ambiguities in the items. It is important to implement instruments within other support structures that are already in place. BASE was part of a comprehensive support program that could be offered to employees regularly and was implemented within other support structures that were already established. MIRROR was provided on the website of Victim Support Netherlands with other support services with easy access. After this, research can come back into play to solidify the quality of the instruments, as was done in chapters 4 and 5.

### **Can we find common ground in psychosocial support principles?**

There is consensus in the scientific literature and in international guidelines that psychosocial support should be provided to those affected by a PTE or other life events (Bisson et al., 2010; Roberts et al., 2019; Te Brake & Dückers, 2013), but we do not yet know what recipients regard important aspects of psychosocial support. In chapter 3, we asked recipients in different contexts to define high-quality psychosocial support from their point of view. The first context consisted of people who were exposed to different types of one-time PTEs, for example a train accident or plane crash. The second context consisted of people with the rare, genetic, progressive, neuromuscular disease Spinal Muscular Atrophy (SMA). To broaden the context from SMA specifically to severe somatic diseases in general, we added the Dutch quality standard on psychosocial care for severe somatic diseases to compare contexts. Various stakeholders, including patients, were involved in the development of the quality standard (Kennisinstituut van de Federatie Medisch Specialisten, 2019). While being diagnosed with a life-threatening illness is considered a PTE in the literature, it could be argued that the experience of a one-time PTE that happens spontaneously and chaotically, is a more isolated event compared to living with a severe somatic disease that affects all phases and transitions in life (Birnbrant et al., 2018; Bonanno et al., 2011; Kennisinstituut van de Federatie Medisch Specialisten, 2019; Qian et al., 2015). For clarity of the comparison, we therefore will refer to the 'PTE context' and the 'SSD context'.

We expected that psychosocial support characteristics would show both similarities and differences between and within the contexts. It is interesting to reflect on the similarities and differences in regard to psychosocial support. We found five general characteristics that play a role in all contexts. These are central principles that are

important and applicable in all contexts: 1) providing information, 2) coordination and collaboration between (health)care providers within the provider network, 3) tailor-made psychosocial support, 4) attitude of the provider towards the recipient, and 5) social support. Figure 1 provides an overview of the central principles. We also found differences in psychosocial support between all contexts and also within the contexts.

The first central principle that stands out across all contexts is *providing information*. Both groups identify the need for information, that should be easy to find and access, reliable, accurate, clear and unambiguous. It is clear that providing information is considered an aspect of high-quality psychosocial support in both contexts. The importance of providing information is in line with guidelines on psychosocial support in the PTE and healthcare context (Birnkrant et al., 2018; Bisson et al., 2010; Jacobsen & Wagner, 2012; Te Brake & Dückers, 2013). Also, it can be related to two of the five essential intervention principles ‘sense of safety’ and ‘calming’ described by Hobfoll (2007). Providing corrective information can promote a sense of safety to those affected in regard to future threats and it can prevent the sharing of rumors and their collateral turmoil. The promotion of calming can be achieved by providing objective and accurate information (Hobfoll et al., 2007). As can be expected, the specific content of the information differs between and within the PTE and SSD contexts. People who experienced a PTE need information about the incident, on normal emotional reactions they may experience after the incident, including explanations and advice, and a central service point where they can find all information and advice on practical matters, e.g. legal issues. People with an SSD need information about the specific disease and what psychosocial support entails. Providers should discuss the impact of the disease on various aspects of the patient’s life (Kennisinstituut van de Federatie Medisch Specialisten 2019). In chapter 6, we learned that the information that was provided by the online Information and Referral Center (IRC) was perceived as reliable and easy to access in a time when the need for information was high. Affected ones appreciated that information was posted on the IRC first before it was published by the media.

Another central principle is the need for *coordination and collaboration between healthcare providers within the provider network*. In all contexts, multiple actors are involved in providing (psychosocial) support. The various parties involved must cooperate and work complementary to each other, so recipients do not fall between two stools. Adequate coordination, knowing where to find each other, mutual consultation and clear leadership is necessary in order to prevent unnecessary and unclear referrals. Collaboration between providers ensures accessible support and good relationships between providers and recipients. Context-specific principles can also be identified. People in the PTE context refer to a central service point that integrates psychosocial support services for affected ones. In international guidelines for post-disaster psychosocial support it has been underscored that providing affected individuals with a central coordination point or one-stop shop is important (Bisson et al., 2010; Inter-

Agency Standing Committee, 2006, 2017; Juen et al., 2016; Snider & Hijazi, 2020; Te Brake & Dücker, 2013). In chapter 6, organizations involved in the development and implementation of the IRC indicated that it helped them to structure and align their services for affected ones. After the first phase of a PTE ends, the responsibility to provide psychosocial support should be transitioned to the regular healthcare structures, such as general practitioners. In the SSD context, psychosocial support is seen as an integral part of healthcare that requires capacity, responsibility and competency within healthcare organizations. Psychosocial support should be integrated into the team of healthcare professionals. It also is important that healthcare facilities provide insight into which psychosocial support providers are available (Kennisinstituut van de Federatie Medisch Specialisten, 2019).

Third, a central principle was that psychosocial support should be *tailor-made*. In all contexts, adequate timing in providing psychosocial support is part of a tailor-made approach. Recipients should be approached at the right time and monitored over time, for example with monitoring instruments. Timely and adequate detection of the need for psychosocial support is deemed essential to provide appropriate support. This is in line with *watchful waiting* (National Institute for Health and Care Excellence, 2018). Tailor-made also refers to an approach that takes into account diversity regarding gender, age, ethnicity, culture and religion. Of course, there are also context-specific principles to consider. In the PTE context, tailor-made also includes whether the recipient experienced the PTE themselves or witnessed it from a distance. Asking the recipient about the appropriate timing and careful follow-up support are part of this principle. An aspect in line with this was the active monitoring of affected ones and initiating follow-up when needed. In the SSD context, a tailor-made approach refers to adapting to the various phases of life and the ever-changing future prospects (Birnkrant et al., 2018). Psychosocial support needs can change over the course of a severe somatic disease (Kennisinstituut van de Federatie Medisch Specialisten, 2019).

A fourth central principle that was found was the *attitude of the provider towards the recipient*. In all contexts, psychosocial support providers are expected to support and strengthen the individual autonomy and self-reliance of recipients. Furthermore, the attitude of providers should be respectful and without judgment and is characterized by empathy, careful listening, genuine involvement, and proper recognition of emotions. In particular in the SSD context, a context-specific principle is the desire to be seen as a person rather than a patient. In line with the concept of shared decision making, it should be decided together with the person who has an SSD whether psychosocial support is needed and where they would like to receive it (Kennisinstituut van de Federatie Medisch Specialisten 2019). Instead of focusing only on limitations or complaints the central focus should be on the capabilities and individual strengths of the recipient. The desire to be treated by providers with respect is consistent with what is seen in other patient groups (De Boer et al., 2010). It is also important that providers create a

safe environment. In the PTE context, it is deemed important that providers proactively approach recipients, and identify and take care of stressors.

The last and fifth central principle is the importance of *social support*, which overlaps with central principle 4 (*attitude of the provider towards the recipient*). Providers are expected to support the self-reliance of recipients, which can be done by facilitating social support. Social support has been recognized as an important factor of wellbeing and an important element of psychosocial support (Birnkrant et al., 2018; Bisson et al., 2010; Hobfoll et al., 2007; Juen et al., 2016; Olf, 2012; Te Brake & Dückers, 2013). In the PTE context, social support is of crucial importance in the early phases after the incident, but could also take place during a commemoration. The accounts of people who have had a similar experience can help those affected to regain perspective. In addition, providers in all contexts should include the social context of the recipient by mobilizing and supporting individuals in that social network. In the SSD context, the needs of family and friends of people with an SSD may differ from the recipient that also should be taken into account. Providers should also pay attention to the impact of the SSD on the psychosocial wellbeing of the person's loved ones (Kennisinstituut van de Federatie Medisch Specialisten 2019).



**Figure 1.** Overview of central principles of psychosocial support

The central principles and context-specific aspects described above imply that while there are five central principles that are important across all contexts, context matters to the specific form of psychosocial support between and within the contexts. Different aspects of psychosocial support are considered important in different contexts. This is in line with earlier research that showed that the priorities of patients were different between patient groups. Priorities might be dependent on the worst possible outcome as a consequence of the situation or condition (De Boer et al., 2010). High-quality psychosocial support is a joint responsibility of providers and individual recipients. There is a strong wish for tailor-made psychosocial support focused on individual needs. This makes sense because people have different needs, probably also the ones that are considered to be part of the same group or context.

### **Resilient response to potentially traumatic events: the role of personality traits, social support and (work) context**

A resilient response to PTEs is a reoccurring topic in several chapters of this dissertation. Over the last two decades, the construct of resilience has received increasingly more attention and has been identified as the most common response trajectory after exposure to a PTE (Bonanno, 2021; Galatzer-Levy et al., 2018). However, no clear consensus exists on the definition of this construct (Denckla et al., 2020; Panter-Brick, 2014; Southwick et al., 2014). There is much debate regarding the definition and characteristics of resilience. In this dissertation, we measured resilience according to the *psychological resilience* concept as introduced by Van der Meer et al (2018). Psychological resilience refers to the internal capacity of an individual; the extent to which one sees themselves as resilient. The authors developed the Resilience Evaluation Scale (RES), operationalizing psychological resilience as self-confidence (having trust in oneself) and self-efficacy (having positive beliefs about being able to adaptively cope with adverse situations), based on the secondary appraisal concept by Lazarus and Folkman (1984). Secondary appraisal refers to the extent to which an individual self-assesses their own capability and resources to successfully handle adverse events (Van der Meer et al., 2017).

During the interviews with HEMS personnel in chapter 2, psychological resilience was not explicitly discussed. However, HEMS personnel perceived themselves as being able to deal successfully with challenges and PTEs at work, which could be seen as self-efficacy. They also were confident in their abilities as a professional in trauma care, which could be interpreted as self-confidence. Furthermore, we found that HEMS personnel are highly motivated and engaged in their work despite the very high exposure to PTEs. Work motivation has been associated with higher resilience, defined as the ability to deal with problems, in emergency medical personnel. Higher work motivation includes a more positive attitude at work, a higher commitment to the organization and colleagues (Ebadi et al., 2019). Self-determination theory has been applied in studies investigating motivation and resilience (Trigueros et al., 2019). Autonomous motivation has a positive effect on resilience in sportspeople, in the sense that they were able to better deal with stressful situations or adversities (Trigueros et al., 2019). This may be speculative, but it might be the case that the high work motivation in HEMS personnel is a protective factor and increases their psychological resilience.

A question that arises from the results of chapter 2 is whether self-selection plays a role in the resilience of HEMS personnel and other high-risk occupations. Could it be that individuals with certain personality traits are better able to cope with PTEs and are more likely to choose this line of work? Several studies have focused on the personality traits of emergency medical personnel (Mirhaghi et al., 2016). Although research is moving away from seeing resilience as a trait (Denckla et al., 2020) and personality traits cannot explain everything, they do show consistent modest associations with resilience and psychological complaints (Bonanno, 2021). Therefore, they are worth exploring further

in the HEMS context specifically. There may be no such thing as the ‘ideal personality’ for emergency services personnel (Wagner et al., 2009), but the Big Five personality traits from psychological trait theory might give some direction in determining which personality traits will help HEMS personnel cope with PTEs (Mason et al., 2020).

The Big Five personality traits represent a continuum of openness to experience, agreeableness, extraversion, conscientiousness and neuroticism (Barrick & Mount, 1991). During the interviews with HEMS personnel in chapter 2, participants talked about what personality traits were important to them in themselves and their colleagues. A rather long list of desired personality traits was mentioned, the most important ones being a team player, being able to stick to your role, being receptive to the wellbeing of colleagues, being able to make pragmatic choices and being able to keep calm. During the interviews, the high motivation, calmness, confidence, articulateness, reflectiveness and discipline were striking in all participants. This again may be speculative, but it could be the case that HEMS personnel have low neuroticism, a trait that has been associated with higher psychological resilience, which makes them more suitable for this type of work (Burtaverde et al., 2021; Oshio et al., 2018). HEMS personnel have to be able to stay calm during a dispatch, notwithstanding the often extreme nature of the incident. During the interviews, HEMS personnel indicated that good collaboration is characterized by a dispatch being carried out with competent colleagues that can stay calm. Being organized and emotionally stable are also crucial in the paramedic work context (Mirhaghi et al., 2016).

Furthermore, being a team player was consistently mentioned as a crucial trait to be able to function within the HEMS team. The team is dependent on each other during a dispatch. This could be related to the personality trait of agreeableness. This trait was associated with high levels of resilience, which could be explained by having prosocial values and empathy (Burtaverde et al., 2021). HEMS personnel has to be able to work conform to a protocol and with a clear division of tasks, otherwise the collaboration would not work. Conscientiousness has been associated with higher resilience, relating it to problem-focused coping styles and high levels of self-control, diligence and motivation (Burtaverde et al., 2021). Taken together, several traits observed during the interviews with HEMS personnel could potentially be beneficial to their resilient response to PTEs.

Another point of view that could provide more information on understanding the link between job motivation, a resilient response to PTEs and the role of context, can be found in the management literature, specifically the concept of person-environment (P-E) fit. P-E fit is defined as the extent to which an individual matches their environment. When this is not compatible, it could become a significant source of stress according to P-E fit theory (Warr & Inceoglu, 2012). P-E fit is important to employee wellbeing, in which job satisfaction is seen as a passive form of wellbeing and job engagement as an active form of wellbeing showing distinct patterns (Warr & Inceoglu, 2012). In chapter 5, we found that job resources were positively associated with work engagement in

railway emergency services personnel, underlining the importance of job resources in the wellbeing of professionals in high-risk organizations. A type of P-E is person-job fit (P-J), a concept that has been used in selecting employees. It indicates a match between what an employee wants and receives from a job. P-J fit has been associated with positive outcomes such as job satisfaction, motivation, performance and low job stress (Sekiguchi, 2004). In the public administration literature, higher levels of public service motivation in police officers were associated with higher job satisfaction. This association was mediated by P-J and P-E fit (Prysmakova & Vandenabeele, 2020).

In addition to internal factors that contribute to a resilient response to PTEs, external factors also play an important role (Bonanno et al., 2010; Denckla et al., 2020). Resilience, thus, is seen as a multidimensional concept containing both internal and external factors. The context an individual finds oneself in will have an influence on their resilience (Denckla et al., 2020). An important factor in this respect is social support, which is also a reoccurring topic in multiple chapters of this dissertation. Screening instrument MIRROR in chapter 4 includes an item about social support within its resilience scale. MIRROR's resilience scale showed strong correlations with psychological resilience measured with the RES. Monitoring instrument BASE contains a scale on personal characteristics, including an item on social support from friends and family. This scale was associated with higher psychological resilience as measured with the RES as well. This indicates that social support is associated with psychological resilience. Informal peer support and support from friends and family also play a crucial role in the ability of HEMS personnel to deal with PTEs.

Another external factor that could contribute to a resilient response to PTEs in the workplace. The workplace is an important context for the implementation of preventive interventions and the promotion of good mental health in employees (Gayed et al., 2018). Organizations have a moral, economic and legal obligation to provide psychosocial support to their employees in order to support their wellbeing. Mental health issues are associated with increased sickness, absenteeism, and employee turnover, as well as decreased job performance and productivity (Van der Meer et al., 2017). Mental health stigma impedes help-seeking behavior in individuals with problems (Clement et al., 2015). This is especially true for high-risk organizations with reported 'macho cultures' such as the military (Held & Owens, 2013) or among physicians (Brower, 2021; Cho & Huang, 2020). Also, access to treatment can become a barrier to seeking help (Brower, 2021). In both chapter 2 and chapter 5, help-seeking behavior was low. This could be due to the non-existence of mental health problems but might also have something to do with individual personality traits, organizational culture, and stigma.

### ***The value of qualitative research***

This dissertation contains studies with a quantitative research design as well as studies with a qualitative research design. Qualitative research has been dismissed as unreliable

and unscientific, while several measures can be taken to increase the rigor of qualitative studies, such as researcher triangulation, member validation and peer debriefing (Boeije, 2010). Critics see relying on qualitative evidence as a concern. In recent years, however, the number of studies using a qualitative research design has increased (Lefèvre et al., 2019), which is a positive development. Qualitative research aims to describe, explain or understand a research phenomenon and allows for a more in-depth understanding of a topic and therefore takes a different approach than quantitative research (Boeije, 2010; Braun & Clarke, 2019). We believe it is important to include the experiences of study subjects especially while evaluating the performance of psychosocial support instruments, that are meant to meet the needs of the recipient, such as the interviews and focus groups conducted in chapter 6 or the concept mapping method in chapter 3. Qualitative research methods not only provide the opportunity to gain in-depth insight into the experiences, interpretations and responses of participants, but can also reveal contextual variability and processes through which public policies achieve their goals (Maxwell, 2020). Furthermore, qualitative research methods can aid in answering questions on how and why psychosocial support instruments work (Hamilton & Finley, 2019). This information can help with the implementation of psychosocial support instruments, as with the one-stop shop in chapter 6. We believe that lessons from the perspective of psychosocial support recipients can enhance and improve psychosocial support. Assessing perspectives of employee wellbeing and psychosocial support such as with HEMS personnel in chapter 2 can prevent the implementation of interventions that miss the mark. Qualitative research provides the opportunity to address questions concerned with developing an understanding of the meaning and experience of participants (Fossey et al., 2002).

### **Limitations and strengths**

Besides the specific limitations and strengths mentioned in each chapter, we will reflect on a few overall limitations and strengths of this dissertation. One limitation to consider is that we were unable to differentiate for gender, age, ethnicity and culture in all analyses. HEMS and railway emergency services personnel in chapters 2 and 5 are mostly male and the samples were too small to differentiate between gender, age or ethnicity. However, the majority of these populations are male, which is the case in most high-risk organizations (Stergiou-Kita et al., 2015). The sample included to evaluate the screening instrument MIRROR in chapter 5 was predominantly female, which could be explained by that females are more likely to seek medical or health-related information online (Smail-Crevier et al., 2019). Not being able to differentiate between gender, age or ethnicity leads to the question of whether the results are applicable to all genders, ages and ethnicities.

In the evaluation studies of MIRROR and BASE in chapters 4 and 5, we did not include the perspective of users in relation to how they experience the instruments, whether



they perceive the instruments as useful, and if they gained more insight into their situation. Therefore, in the case of MIRROR, we were unable to assess whether follow-up support options that are provided with the advice were used. Another limitation is that we did not compare screening/monitoring instruments at this stage, thus are uncertain whether MIRROR and BASE perform better than other tools such as TSQ, IES-R, GPS, SAM and the BJSQ (Dekkers et al., 2010; Frewen et al., 2021; Inoue et al., 2014; Mouthaan et al., 2014; Olff et al., 2020; Van der Meer et al., 2017). We may argue that MIRROR is particularly suited for general populations who experienced a recent stressful or potentially traumatic event, where the majority is likely to be resilient and where we like to identify those who will develop psychological complaints and need professional help. We may further argue that BASE is best implemented within work settings that are characterized by frequent exposure to potentially traumatic events and other work-related stressors. When comparing instruments, their approach, development process and goals have to be taken into account.

This dissertation constitutes several strengths. The various study populations provide a comprehensive insight into the consequences of PTEs and various needs in regard to psychosocial support. It includes the general population in chapters 3, 4 and 6 and professionals in high-risk organizations in chapters 2 and 5. In addition, the combination of quantitative and qualitative research methods complements each other in answering the research questions and providing insight into the main aim from different perspectives. Also, by including several stakeholders from the three domains of research, policy and practice, the findings in this dissertation can be used directly in practice, such as the different psychosocial support instruments in part two of this dissertation. Finally, the findings of this dissertation are relevant to the field of psychosocial support because it contributes to the evidence base of different psychosocial support instruments to support those that have been exposed to a PTE.

### **Directions for future research and implications for practice**

Based on the findings of this dissertation, several directions for future research and implications for practice can be formulated. First, what do we know about the effect of the accumulation of stressors? We found that HEMS personnel in chapter 2 considered a frequent exposure to PTEs as part of the job and are able to cope with these challenges. Only a few participants indicated during the interviews that the accumulation of PTEs was a burden to them. In chapter 5, railway emergency services personnel (N = 102) were asked if they experienced stress from an accumulation of suicide-related turnouts in the past six to eight weeks. Only 6.9% reported having experienced stress from this to a great or very great extent and 11.8% to some extent. Both populations are exposed to PTEs on a frequent basis and some study participants indicated the accumulation of PTEs was a burden to them. Therefore, it would be interesting to investigate the effect of an accumulation of PTEs further in high-risk professionals.

Should organizations facilitate informal peer support? Informal peer support was found to play a crucial role in the HEMS work context in chapter 2, as HEMS personnel used this as an important coping strategy. Informal peer support in the HEMS context differs from formal peer support because formal peer support is an early intervention strategy during which a trained colleague provides psychosocial support after a PTE at work as applied in the healthcare context (Van Buschbach et al., 2020). Informal peer support should be facilitated and enhanced by the organization. Future research could unravel the working elements of informal peer support. It could assess how informal peer support is influenced by surrounding social structures and organizational context. We recommend that the possibilities an organization has to facilitate informal peer support and what lies outside their range of options should be investigated further, to better understand and foster informal peer support.

How do we tailor psychosocial support to individual needs? An overlap was found between central principles of psychosocial support between contexts in addition to important context-specific differences. Also in the other chapters of this dissertation, context-specific needs were found. This indicates that context matters when it comes to providing psychosocial support. The influence of context can even be found in studies examining the effect of oxytocin, the biological pendant of psychosocial support, on social bonding, stress regulation and mental health (Olf et al., 2013). This strengthens our notion that psychosocial support should always be tailored to a specific situation or context and that it should include social support. In addition, the occurrence of PTEs always takes place in a certain context, with differences in terms of mental health awareness, views on trauma, views on social support, and appropriate treatment (Sijbrandij & Olf, 2016). Concept mapping is a suitable method to take into account context by starting the dialogue between stakeholders from research, policy and practice in order to reach a consensus on a complex phenomenon such as psychosocial support (Burke et al., 2005). In the development of guidelines, affected ones are usually not included. This might be an important missing link in making guidelines more easily applicable in policy and practice. Organizing concept mapping meetings with stakeholders from the three domains, specifically including recipients of psychosocial support, facilitates the implementation of guideline recommendations.

Does psychosocial support instigate cultural changes within organizations? Future research should assess cultural changes within high-risk organizations after implementing psychosocial support instruments such as MIRROR and BASE. In this way, mechanisms that influence cultural change within organizations through psychosocial support services can be examined and utilized in the development and implementation of future psychosocial support. Hopefully, interventions have a positive influence on openness among colleagues and management. Measures on stigma and informal peer support should be included, in addition to the cost-effectiveness for organizations in terms of preventing absenteeism.

How can the evidence base of psychosocial support instruments and interventions be expanded? The study in chapter 6 was an example of how a psychosocial support instrument can be evaluated by including its users and providers. It showed that providing reliable and easy to access information to affected ones following a disaster or crisis is highly appreciated by affected ones and should therefore be given priority. Future research could expand the evaluation of screening and monitoring instruments such as MIRROR and BASE. Using a longitudinal study design the development of complaints, functioning, and resilience over time and whether these instruments encourage users to take action can also be identified.

### **Concluding remarks**

The aim of this dissertation was to contribute to the understanding of and provision of psychosocial support to people who have been exposed to a potentially traumatic event (PTE) in different contexts. Since most people will experience one or more PTEs during their life (Benjet et al., 2016; Kessler et al., 2017), psychosocial support is needed for affected individuals. The findings in this dissertation showed that individuals have different responses to PTEs and also different needs when it comes to receiving psychosocial support. Various and different aspects of psychosocial support are considered important by recipients and other stakeholders. Central principles can be distinguished but context-specific idiosyncrasies are also found and have to be considered at all times. The findings in this dissertation show that various factors contribute to the wellbeing of professionals in high-risk organizations that are frequently exposed to PTEs, such as social support and job resources. Also, this dissertation showed the importance of including relevant stakeholders in the feedback loop of gaps or needs in knowledge from policy and practice to science and vice versa. Various lessons from the evaluation studies from the perspective of users and providers give direction for the implementation of psychosocial support during future events. We conclude that, when it comes to the understanding and providing of psychosocial support, context matters.

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# A.

SUMMARY IN ENGLISH  
SUMMARY IN DUTCH /  
SAMENVATTING IN HET NEDERLANDS  
PORTFOLIO  
ABOUT THE AUTHOR  
DANKWOORD



## SUMMARY IN ENGLISH

Most people will experience a potentially traumatic event (PTE) during their life. As much as 70% of the global population experienced at least one PTE. In The Netherlands, this percentage was found to range between 71% and 81%. People can be exposed to a wide variety of PTEs, the unexpected death of a loved one and accidents/injuries are the most common.

Psychosocial support should be provided to those who experienced a PTE. Psychosocial support can be defined as all the support and care directed at the psychological wellbeing and health of people affected during or after an event. With this dissertation, we aimed to contribute to the understanding of and provision of psychosocial support to people who have been exposed to a PTE in different contexts. Part one of the dissertation focuses on understanding which factors contribute to a resilient response after a PTE and how psychosocial support is defined and perceived in different contexts. Part two provides and evaluates three different psychosocial support instruments in practice.

### **Part one: Understanding the resilient response to PTEs and psychosocial support needs in challenging contexts**

Which factors contribute to the wellbeing of high-risk professionals and their resilient response to PTEs? Using a qualitative study design in **chapter 2**, we aimed to further our understanding of the factors underlying the wellbeing of a population that operates in a particularly challenging work context: Helicopter Emergency Medical Services (HEMS) personnel. HEMS personnel provide on-scene trauma care to patients with high mortality risk. They work in small teams, autonomously and under challenging conditions. The HEMS work context is characterized by exceptionally high exposure to PTEs when compared to other groups of emergency services personnel. We conducted 16 semi-structured interviews with HEMS personnel from a University Hospital in The Netherlands. To analyze the data, we used a generic qualitative research approach inspired by grounded theory. We categorized our findings and assessed their relationships. The results show that HEMS personnel, despite their frequent exposure to PTEs, are highly motivated and engaged in their work. Several aspects of the HEMS work give personnel a lot of energy, notably working together as a team and helping patients. They use various strategies to cope with the emotional impact of PTEs, such as keeping an emotional distance by focusing on technical activities and relying on informal peer support. HEMS work can have an emotional impact but this usually diminishes after a few days. The perceived need for organizational support and follow-up care is low and seen as complicated because it is detrimental to the availability of the team. Our study underlines the importance of job resources and social support to HEMS personnel wellbeing.

International evidence-based guidelines reflect a consensus among experts regarding

psychosocial support. However, it is not clear what recipients of psychosocial support consider important. This is relevant information to evaluate and improve psychosocial support. In addition, very few convenient and reliable instruments to evaluate the quality of psychosocial support *from the recipient's perspective* are available. In **chapter 3**, we explored the psychosocial support characteristics and needs within two very distinct contexts; people that were involved in different types of PTEs (including a train accident and two plane crashes) and people with Spinal Muscular Atrophy (SMA; a genetic and progressive neuromuscular disorder). The first aim of this study was to contribute to the understanding of which psychosocial support aspects are considered important by the recipients themselves. The concept mapping method was used to achieve consensus on key themes of psychosocial support. Concept mapping is a participatory qualitative method that incorporates all stakeholders' views on complex topics. This resulted in eight key themes in the PTE context and six in the SMA context. The second aim of this study was to develop instruments to evaluate the quality of psychosocial support from the recipient's perspective. The concept mapping results were operationalized in surveys and pilot tested in all contexts. The PTE survey (N= 132) and SMA survey (N= 57) results showed which key themes are perceived as most important and which need the most improvement. We found similarities between all contexts, e.g. the importance of matching the needs of recipients. As expected, we also found differences. For example, psychosocial support in the PTE context often needs to be organized quickly. In contrast, psychosocial support in the SMA context has to be organized to evolve with the life course. The similarities support the notion that there are universal aspects of psychosocial support. At the same time, the context-specific idiosyncrasies we found underscore the necessity to always adapt to context.

### **Part two: Providing and evaluating psychosocial support instruments in practice**

The impact of a PTE is not the same for every individual. Most individuals are able to maintain a healthy level of functioning; they are considered resilient. Psychological complaints usually diminish over time without professional help. However, a small but significant group of individuals does develop psychological complaints. Experts advise 'watchful waiting', which refers to the regular monitoring of people who experience some PTSD symptoms after a PTE. In this way, individuals who need support can be identified on time. Short and easy-to-use online or mobile screening instruments can be used by individuals to self-identify and monitor possible symptoms. Therefore, Mobile Insight in Risk, Resilience and Online Referral (MIRROR) was developed. MIRROR is a web-based self-help test to identify individuals who develop psychological complaints after a PTE, encourage them to seek help, and support self-reliance. The aims of the study in **chapter 4** were to assess MIRROR's use, examine MIRROR's psychometric properties and evaluate how well MIRROR classifies respondents into different outcome categories compared with reference measures. We compared MIRROR's outcomes to reference

measures of PTSD symptoms, depression, anxiety, stress, psychological resilience, and positive mental health. The results indicated that MIRROR is a valid and reliable self-help test to identify negative outcomes (PTSD core symptoms) and positive outcomes (psychosocial functioning and resilience). MIRROR was able to correctly classify respondents into green (no further action needed), orange (encourage self-monitoring), or red (encourage seeking consultation) outcome categories and advice compared with the other measures. This study showed that MIRROR is a psychometrically sound, anonymous, and easily accessible self-help test for people who have experienced a PTE. MIRROR could contribute to enhancing adequate and timely identification of people who develop psychological complaints after PTEs.

High levels of stress at work may have serious consequences for employee functioning and mental health. We evaluated an online self-monitoring tool called Brief Assessment of Stress and Energy (BASE) in **chapter 5**. BASE can be used on a regular basis to self-monitor levels of stressors and resources. BASE does not focus on psychological complaints (e.g. burnout symptoms) but on daily occupational factors (e.g. inadequate facilities or support from colleagues) that can cause stress or give energy. It also includes personal characteristics (e.g. being able to switch easily between tasks). BASE provides direct feedback to employees about their stressors, resources and personal characteristics with relevant follow-up information. It aims to encourage self-monitoring, reflection, and seeking support. The personal feedback is accompanied by the color outcome green (no action) or orange (referral to counseling). In case of an orange outcome, respondents received telephone follow-up from a licensed expert. During the telephone interview, experts and respondents evaluated the BASE outcome. We evaluated BASE among high-risk professionals: railway emergency services personnel. Respondents completed BASE and measures of burnout symptoms, work engagement, depression, anxiety and stress, post-traumatic stress disorder symptoms, social support and psychological resilience. We assessed BASE in two ways: using multiple regression analysis (N = 102, 73.4%), and by telephone follow-up interviews during which experts and respondents evaluated the BASE outcome (N = 67, 65.7%). The regression analysis showed that explained variances of BASE on the six wellbeing measures ranged between 26.6% and 49.9%. Telephone interviews confirmed the BASE outcome. The results of this study indicate that BASE is associated with several measures of wellbeing and accurately refers employees to counseling. BASE is a promising instrument to encourage employees to self-monitor stressors and resources and identify those who need counseling.

In addition to providing psychosocial support on the individual level, it can also be offered on the group level. On July 17, 2014, the disaster with the MH17 passenger flight from Amsterdam to Kuala Lumpur occurred above Ukraine. None of the 283 passengers and 15 crew members survived. The day after the crash, an online one-stop shop was established; the Information and Referral Center (IRC). The IRC offered an online central location for information and advice regarding practical, legal and psychosocial matters.

The objective of the study in **chapter 6** was to evaluate the experiences of users and providers with the IRC. Data was collected among affected ones as well as involved organizations, using interviews, focus groups, surveys and online user information. The results show that affected ones perceived the IRC as a reliable source of information and appreciated the referral possibilities. Organizations stated that the IRC helped them to structure and align their services to support affected ones. Affected ones hardly used the IRC as a community where they could meet other affected ones and share experiences and support each other. There were several facilitating conditions and barriers that influenced the implementation of the IRC, e.g. good collaboration between the involved organizations. Potential relevant implications for future IRCs from the point of view of affected ones included clear communication regarding the functionalities and goals of an IRC. From the organization's point of view, potential relevant implications regarded role clarity, a shared vision, and clear agreements beforehand. The study indicates that the IRC implemented after the MH17 airplane disaster helped organizations align their communication and interactions. Affected ones were positive about the IRC, predominantly because they perceived it to be reliable and easily accessible. Like any psychosocial intervention, an instrument such as an IRC has to be embedded within the established structure of care providers.

### **General discussion**

On the one hand, a wealth of knowledge is available on the mental health consequences of PTEs and international evidence-based guidelines are available to enhance psychosocial support. On the other hand, there is a lack of knowledge on how to actually implement psychosocial support services in practice. Each PTE is unique and so are its consequences and impact. This requires that psychosocial support is always adapted to context. In order to provide psychosocial support that meets the needs of those affected by a PTE, stakeholders belonging to the research, policy and practice domains should engage in a continuous and reciprocal dialogue and work together. Based on an existing framework, we showed how each chapter in this dissertation can be seen as a contribution to the dialogue between the three domains. In chapter 2, members of the research population (Helicopter Emergency Medical Services (HEMS) personnel) were involved in the development of the research design and the interpretation of the results. A continuous dialogue took place between science and practice to make sure the knowledge generated was applicable and useful in practice. In chapter 3, relevant stakeholders from research, policy and practice were included in the process of reaching a consensus on the definition of high-quality psychosocial support during concept mapping meetings. Screening instrument MIRROR and monitoring instrument BASE in chapters 4 and 5 can be seen as practical applications of psychosocial support guidelines and enable the monitoring of needs, problems and risks in affected ones so support can be provided accordingly. In addition, stakeholders from the three domains were involved

during the development and implementation of the instruments. Lastly, in chapter 6, we tried to retrieve what happened during the establishment and implementation of the IRC with the help of multiple research methods and involving both users and providers. Therefore, relevant implications for future IRCs could be identified.

Next, we asked ourselves the question of whether there is common ground in psychosocial support principles between individuals who were exposed to different types of one-time PTEs and people with severe somatic diseases. Indeed, we found five central principles of psychosocial support that seem applicable to all contexts: 1) providing information, 2) coordination and collaboration between (health)care providers within the provider network, 3) tailor-made psychosocial support, 4) attitude of the provider towards the recipient, and 5) social support. These principles are considered important aspects of psychosocial support in all contexts, although the details within each principle differ, for example, the type of information people want to receive. The similarities and differences imply that context matters; different aspects of psychosocial support are considered important in different contexts.

Furthermore, we tried to further unravel the resilient response to PTEs, a reoccurring topic in several chapters of this dissertation. No clear consensus exists on the definition of resilience. In this dissertation, we measured resilience according to the psychological resilience concept. Psychological resilience is operationalized as self-confidence (having trust in oneself) and self-efficacy (having positive beliefs about being able to adaptively cope with adverse situations). Although research is moving away from seeing resilience as a trait and personality traits cannot explain everything, they do show consistent modest associations with resilience and psychological complaints. We reflected on the question of whether individuals with certain personality traits are better able to cope with PTEs and are more likely to choose a high-risk profession. We speculated that HEMS personnel in chapter 2 have certain personality traits that make them more suitable for this type of work, such as low neuroticism which has been associated with higher psychological resilience. In addition to internal factors, we reflected on the external factors that contribute to a resilient response to PTEs, such as social support. Screening and monitoring instruments MIRROR and BASE in chapters 4 and 5 both include social support, a factor that was found to be associated with psychological resilience. Social support also plays a crucial role in the ability of HEMS personnel to deal with PTEs.

### **Directions for future research and implications for practice**

Based on the findings of this dissertation, several directions for future research and implications for practice are formulated:

1. We found that some HEMS personnel and railway emergency services personnel perceived an accumulation of PTEs as a burden. Future research with high-risk professionals should incorporate and elaborate on the effects of the accumulation of PTEs.

2. Should organizations facilitate informal peer support? We found that informal peer support is crucial to HEMS personnel wellbeing. Future research can unravel the working elements of informal peer support and how this is influenced and fostered by surrounding structures and organizational context.
3. We found five central principles of psychosocial support, but also context-specific aspects. This indicates that context matters when it comes to providing psychosocial support and that it should always be tailored to a specific situation or context. Concept mapping is a suitable method to start the dialogue between stakeholders from research, policy and practice in order to reach a consensus on a complex phenomenon such as psychosocial support. In the development of guidelines, recipients are often not included in the development process. This might be an important missing link in making guidelines more easily applicable to policy and practice.
4. Future research should assess cultural changes within high-risk organizations after implementing psychosocial support instruments such as MIRROR and BASE. In this way, mechanisms that influence cultural change within organizations through psychosocial support can be examined and utilized in the development and implementation of future psychosocial support.
5. How can the evidence base of psychosocial support instruments and interventions be expanded? Future research could expand the evaluation of psychosocial care instruments such as MIRROR and BASE. Using a longitudinal study design the development of complaints, functioning, and resilience can be studied, as well as whether these instruments encourage users to take action.

## Conclusion

The aim of this dissertation was to contribute to the understanding of and provision of psychosocial support to people who have been exposed to a potentially traumatic event (PTE) in different contexts. Central principles of psychosocial support can be distinguished but context-specific idiosyncrasies are also found and have to be considered at all times. The results of this dissertation show that various factors contribute to the wellbeing of high-risk professionals that are frequently exposed to PTEs, such as social support and job resources. Also, this dissertation shows the importance of including relevant stakeholders in the dialogue between science, policy and practice to enhance the implementation of psychosocial support. Various lessons from evaluation studies from the perspective of users and providers give direction to the implementation of psychosocial support during future events. We conclude that, when it comes to the understanding of and provision of psychosocial support, context matters.

## SUMMARY IN DUTCH / SAMENVATTING IN HET NEDERLANDS

De meeste mensen maken een potentieel traumatische gebeurtenis (PTG) mee gedurende hun leven. Maar liefst 70% van de wereldbevolking heeft ten minste één PTG meegemaakt. In Nederland varieert dit percentage tussen 71% en 81%. Mensen kunnen worden blootgesteld aan een grote verscheidenheid van PTG's. De onverwachte dood van een dierbare en ongevallen/letsels komen het vaakst voor.

Psychosociale ondersteuning dient te worden geboden aan mensen die een PTG hebben meegemaakt. Psychosociale ondersteuning kan worden gedefinieerd als alle steun en zorg gericht op het psychologisch welzijn en de gezondheid van getroffenen tijdens of na een PTG. Met dit proefschrift willen we bijdragen aan het verder begrijpen en bieden van psychosociale ondersteuning aan personen die in verschillende contexten zijn blootgesteld aan een PTG. Deel één van het proefschrift focust op het begrijpen van welke factoren bijdragen aan een veerkrachtige reactie na het meemaken van een PTG en hoe psychosociale ondersteuning wordt gedefinieerd en ervaren in verschillende contexten. Deel twee bevat en evalueert drie verschillende instrumenten voor psychosociale ondersteuning in de praktijk.

### **Deel één: Inzicht in de veerkrachtige respons op PTG's en de behoeften aan psychosociale ondersteuning in uitdagende contexten**

Welke factoren dragen bij aan het welzijn en een veerkrachtige reactie op PTG's bij professionals in hoog-risico beroepen? Met behulp van een kwalitatieve onderzoeksopzet in **hoofdstuk 2** beoogden we meer inzicht te krijgen in de factoren die ten grondslag liggen aan het welzijn van een populatie die werkzaam is in een bijzonder uitdagende werkcontext: medewerkers van een Mobiel Medisch Team (MMT). MMT-medewerkers verlenen traumazorg aan patiënten die een hoog risico hebben om te overlijden. Zij werken in kleine teams, onder uitdagende omstandigheden en volledig autonoom. De werkcontext van het MMT wordt gekenmerkt door een uitzonderlijk hoge blootstelling aan PTG's in vergelijking met andere hulpverleningsdiensten. Wij hebben 16 semigestructureerde interviews afgenomen bij MMT-medewerkers van een academisch ziekenhuis in Nederland. Om de data te analyseren gebruikten we een generieke kwalitatieve procedure gebaseerd op *grounded theory*. We hebben onze bevindingen gecategoriseerd en de onderlinge relaties vastgesteld. De resultaten laten zien dat MMT-medewerkers, ondanks de regelmatige blootstelling aan PTG's, zeer gemotiveerd en bevlogen zijn in hun werk. Verschillende aspecten van het werk geven veel energie, vooral de samenwerking met het team en het kunnen helpen van patiënten. MMT-medewerkers gebruiken verschillende strategieën om met de emotionele impact van PTG's om te gaan, zoals het bewaren van een emotionele afstand door zich te concentreren op technische handelingen en door informele collegiale steun. Het MMT

werk kan een emotionele impact hebben, maar dit vervaagt meestal na een paar dagen weer. De ervaren behoefte aan organisatorische ondersteuning en nazorg is laag en wordt als ingewikkeld gezien omdat het ten koste gaat van de inzetbaarheid van het team. Onze studie onderstreept het belang van energiebronnen en sociale steun voor het welzijn van MMT-medewerkers.

Internationale *evidence-based* richtlijnen zijn beschikbaar die de consensus beschrijven onder deskundigen over de invulling van psychosociale ondersteuning. Het is echter niet duidelijk wat *ontvangers van psychosociale ondersteuning* als belangrijk beschouwen. Dit is relevante informatie om psychosociale ondersteuning te verbeteren. Bovendien zijn weinig handzame en betrouwbare instrumenten beschikbaar om de kwaliteit van psychosociale ondersteuning vanuit het perspectief van de ontvanger te evalueren. In **hoofdstuk 3**, zijn de kenmerken en behoeften aan psychosociale ondersteuning binnen twee verschillende contexten onderzocht – personen die verschillende PTG's hebben meegemaakt (waaronder een treinongeluk en twee vliegtuigcrashes) en mensen met Spinale Musculaire Atrofie (SMA; een erfelijke en progressieve spierziekte)- was het eerste doel om meer inzicht te krijgen in welke aspecten van psychosociale ondersteuning belangrijk worden gevonden door ontvangers. De *concept mapping* methode is gebruikt om consensus te bereiken over de belangrijkste elementen van psychosociale ondersteuning. *Concept mapping* is een participatieve kwalitatieve methode die de meningen van stakeholders over complexe onderwerpen in kaart brengt. Dit leidde tot acht kernprincipes in de PTG context en zes in de SMA context. Het tweede doel van deze studie was het ontwikkelen van instrumenten om de kwaliteit van psychosociale ondersteuning vanuit het perspectief van de ontvanger te evalueren. De *concept mapping* resultaten zijn geoperationaliseerd in een vragenlijst en getest in alle contexten. De resultaten in de PTG context (N= 132) en SMA context (N= 57) laten zien welke kernprincipes als het belangrijkste worden beschouwd en welke de meeste verbetering nodig hebben. We vonden overeenkomsten tussen alle contexten, bijvoorbeeld het belang van afstemming op de behoeften van ontvangers. Zoals verwacht, vonden we ook verschillen. Zo moet psychosociale hulp in de PTG-context vaak snel georganiseerd worden. Daarentegen moet psychosociale ondersteuning in de SMA-context meebewegen met de levensloop. De overeenkomsten die zijn gevonden ondersteunen de aanname dat er universele aspecten van psychosociale ondersteuning zijn. Tegelijkertijd onderstrepen de gevonden context-specifieke verschillen de noodzaak om altijd aan de context aan te passen.

### **Deel twee: Het bieden en evalueren van psychosociale ondersteuningsinstrumenten in de praktijk**

De impact van een PTG is niet voor elk persoon hetzelfde. De meeste individuen zijn in staat goed te blijven functioneren; zij worden als veerkrachtig beschouwd. Psychische klachten nemen meestal na verloop van tijd af zonder professionele hulp.



Een kleine maar significante groep mensen ontwikkelt echter wel psychische klachten. Deskundigen adviseren ‘*watchful waiting*’; het regelmatig monitoren van mensen die na een PTG enige PTSS-symptomen ervaren. Op die manier kunnen mensen die steun nodig hebben op tijd worden geïdentificeerd. Korte en gebruiksvriendelijke online of mobiele screeningsinstrumenten kunnen door personen worden gebruikt om mogelijke symptomen zelf te herkennen en te monitoren. Daarom is *Mobile Insight in Risk, Resilience, and Online Referral* (MIRROR) ontwikkeld. MIRROR is een online zelfhulptest om personen te signaleren die psychische klachten ontwikkelen na een PTG, hen aan te moedigen hulp te zoeken en zelfredzaamheid te ondersteunen. De doelen van het onderzoek in **hoofdstuk 4** waren om het gebruik van MIRROR te beoordelen, de psychometrische eigenschappen van MIRROR te onderzoeken en te evalueren hoe goed MIRROR gebruikers indeelt in verschillende uitkomstcategorieën in vergelijking met verschillende uitkomstmaten. We vergeleken de uitkomsten van MIRROR met uitkomstmaten voor PTSS-symptomen, depressie, angst, stress, psychologische veerkracht, en positieve mentale gezondheid. De resultaten laten zien dat MIRROR een valide en betrouwbare zelfhulptest is om negatieve uitkomsten (PTSS-kernsymptomen) en positieve uitkomsten (psychosociaal functioneren en veerkracht) te identificeren. MIRROR is in staat om gebruikers correct in te delen in uitkomstcategorieën groen (geen verdere actie nodig), oranje (aanmoediging om over twee weken MIRROR nogmaals in te vullen), of rood (aanmoediging om hulp te zoeken) in vergelijking tot de uitkomstmaten. Deze studie toonde aan dat MIRROR een psychometrisch correcte, anonieme en makkelijk toegankelijke zelfhulptest is voor mensen die een PTG hebben meegemaakt. MIRROR zou kunnen bijdragen aan het verbeteren van adequate en tijdige signalering van individuen die psychische klachten ontwikkelen na een PTG.

Een hoge mate van stress op het werk kan ernstige gevolgen hebben voor het functioneren en de mentale gezondheid van medewerkers. In **hoofdstuk 5** evalueerden we een online monitoringsinstrument, genaamd *Brief Assessment of Stress and Energy* (BASE). BASE kan op regelmatige basis worden gebruikt om de mate van stressoren en hulpbronnen zelf te monitoren. BASE richt zich niet op psychische klachten (bijvoorbeeld burn-out symptomen) maar op dagelijkse beroepsfactoren (bijvoorbeeld gebrekkige faciliteiten of steun van collega’s) die stress kunnen veroorzaken of energie kunnen geven. BASE bevat ook vragen over persoonlijke kenmerken (bijvoorbeeld gemakkelijk kunnen schakelen tussen taken). BASE geeft directe feedback aan medewerkers over hun stressoren, hulpbronnen en persoonlijke kenmerken, met relevante vervolginformatie. Het is de bedoeling om met BASE zelfmonitoring, zelfreflectie en het zoeken naar ondersteuning aan te moedigen. De persoonlijke feedback bevat een groene (geen actie) of oranje (verwijzing naar ondersteuning) uitkomst. In het geval van een oranje uitkomst, werd dit opgevolgd door een telefonisch interview met een bevoegde deskundige. Tijdens het telefoongesprek evalueerden de deskundige en de respondent de BASE uitkomst. We hebben BASE geëvalueerd onder professionals met een hoog-risico beroep:

spoorwegpersoneel in Nederland. Respondenten vulden BASE in en uitkomstmaten voor burn-out symptomen, werkbevlogenheid, depressie, angst en stress, posttraumatische stressstoornis symptomen, sociale steun en psychologische veerkracht. We evalueerden BASE op twee manieren: met behulp van multipele regressieanalyse (N = 102, 73,4%), en door telefonische interviews waarbij deskundigen en respondenten de BASE uitkomst evalueerden (N = 67, 65,7%). Uit de regressieanalyse bleek dat verklaarde varianties van BASE op de zes uitkomstmaten varieerden tussen 26,6% en 49,9%. Telefonische interviews bevestigden de BASE uitkomst. De resultaten van deze studie geven aan dat BASE samenhangt met verschillende maten van welzijn en medewerkers accuraat doorverwijst naar aanvullende ondersteuning. BASE is een veelbelovend instrument om medewerkers aan te moedigen zelf stressoren en hulpbronnen in de gaten te houden en diegenen te identificeren die aanvullende ondersteuning nodig hebben.

Naast het verlenen van psychosociale ondersteuning op individueel niveau, kan dit ook op groepsniveau worden geboden. Op 17 juli 2014 voltrok zich boven Oekraïne de ramp met passagiersvlucht MH17 die onderweg was van Amsterdam naar Kuala Lumpur. Geen van de 283 passagiers en 15 bemanningsleden overleefden de crash. De dag na de crash werd een online *one-stop-shop* opgezet, het Informatie- en Verwijscentrum (IVC). Het IVC bood een online centrale locatie voor informatie en advies met betrekking tot praktische, juridische en psychosociale zaken. Het doel van de studie in **hoofdstuk 6** was het evalueren van de ervaringen van gebruikers en betrokken organisaties met het IVC. Data is verzameld onder getroffenen en betrokken organisaties, met behulp van interviews, focusgroepen, vragenlijsten en online gebruikersinformatie. De resultaten laten zien dat getroffenen het IVC als een betrouwbare bron van informatie zagen en de doorverwijsmogelijkheden waardeerden. Organisaties verklaarden dat het IVC hen hielp bij het structureren en afstemmen van hun diensten om getroffenen te ondersteunen. Getroffenen gebruikten het IVC nauwelijks als een forum waar ze andere getroffenen konden ontmoeten, ervaringen konden uitwisselen en elkaar konden steunen. Er waren verschillende bevorderende en belemmerende factoren die van invloed waren op de implementatie van het IVC, zoals een goede samenwerking tussen de betrokken organisaties. Vanuit het perspectief van getroffenen waren duidelijke communicatie over de functionaliteiten en doelen van het IVC een verbeterpunt voor toekomstige IVC's. Vanuit het perspectief van de organisaties waren mogelijke verbeterpunten: rolduidelijkheid, een gedeelde visie, en duidelijke afspraken vooraf. Het evaluatieonderzoek laat zien dat het IVC, geïmplementeerd na de MH17 ramp, organisaties heeft geholpen bij het afstemmen van hun communicatie en interacties. Getroffenen waren positief over het IVC, vooral omdat zij het als betrouwbaar en toegankelijk zagen. Zoals elke psychosociale interventie moet een instrument als een IVC worden ingebed in de bestaande zorgstructuur.

## Algemene discussie

Eenzijds is er een schat aan kennis beschikbaar over de gevolgen van PTG's voor mentale gezondheid, en internationale *evidence-based* richtlijnen zijn beschikbaar om psychosociale ondersteuning te verbeteren. Aan de andere kant is er een gebrek aan kennis over hoe psychosociale ondersteuning in de praktijk moet worden geïmplementeerd. Elke PTG is uniek en dat geldt ook voor de gevolgen en de impact ervan. Dit betekent dat psychosociale ondersteuning altijd moeten worden aangepast aan de context. Om psychosociale ondersteuning te kunnen bieden die voldoet aan de behoeften van getroffenen, moeten stakeholders op het gebied van onderzoek, beleid en praktijk een voortdurende en wederkerige dialoog voeren en met elkaar samenwerken. Op basis van een bestaand model hebben we laten zien hoe elk hoofdstuk in dit proefschrift kan worden gezien als een bijdrage aan de dialoog tussen de drie domeinen. In hoofdstuk 2 werden leden van de onderzoekspopulatie (MMT-medewerkers) betrokken bij de ontwikkeling van de onderzoeksopzet en bij de interpretatie van de resultaten. Er vond een voortdurende dialoog plaats tussen onderzoek en praktijk om ervoor te zorgen dat de gegenereerde kennis toepasbaar en bruikbaar was in de praktijk. In hoofdstuk 3 werden relevante stakeholders uit onderzoek, beleid en praktijk betrokken bij het proces om consensus te bereiken over de definitie van kwalitatief hoogwaardige psychosociale ondersteuning tijdens *concept mapping* bijeenkomsten. Screeningsinstrument MIRROR en monitoringinstrument BASE in de hoofdstukken 4 en 5 kunnen worden gezien als praktische toepassingen van richtlijnen over psychosociale ondersteuning en maken het mogelijk om behoeften, problemen en risico's bij getroffenen te monitoren, zodat passende ondersteuning kan worden geboden. Bovendien zijn stakeholders uit de drie domeinen betrokken bij de ontwikkeling en implementatie van de instrumenten. Ten slotte hebben we in hoofdstuk 6 geprobeerd te achterhalen wat er tijdens de opzet en implementatie van het IVC is gebeurd met behulp van meerdere onderzoeksmethoden waarbij zowel getroffenen als betrokken organisaties zijn onderzocht. Hierdoor konden relevante implicaties voor toekomstige IVC's worden geïdentificeerd.

Vervolgens stelden wij onszelf de vraag of er raakvlakken zijn in psychosociale ondersteuningsprincipes tussen personen die blootgesteld zijn aan diverse soorten eenmalige PTG's, zoals treinongevallen en vliegrampen, en mensen met ernstige somatische ziekten. Inderdaad vonden we vijf centrale principes, die de specifieke context lijken te overstijgen: 1) informatievoorziening, 2) coördinatie en samenwerking tussen (zorg)aanbieders binnen het netwerk, 3) psychosociale ondersteuning op maat, 4) houding van de aanbieder tegenover de ontvanger, en 5) sociale steun. Deze centrale principes worden in alle contexten als belangrijke aspecten van psychosociale ondersteuning beschouwd, hoewel de details binnen elk van de principes verschillen, bijvoorbeeld welk type informatie getroffenen willen ontvangen. De overeenkomsten en verschillen impliceren dat de context ertoe doet; verschillende aspecten van psychosociale ondersteuning worden in verschillende contexten belangrijk gevonden.

Daarnaast hebben wij geprobeerd de veerkrachtige respons op PTG's verder te ontrafelen, een construct dat in verschillende hoofdstukken van dit proefschrift terugkomt. Er bestaat geen duidelijke consensus over de definitie van veerkracht. In dit proefschrift hebben we veerkracht gemeten volgens het concept psychologische veerkracht. Psychologische veerkracht wordt geoperationaliseerd als zelfvertrouwen en *self-efficacy* (de positieve overtuigingen hebben over het vermogen om zich aan te kunnen passen bij tegenslagen). Hoewel deskundigen veerkracht niet (meer) als een persoonlijkheidskenmerk zien en persoonlijkheidskenmerken niet alles kunnen verklaren, vertonen ze wel een bescheiden maar constante samenhang met veerkracht en psychische klachten. We hebben nagedacht over de vraag of individuen met bepaalde persoonlijkheidskenmerken beter in staat zijn om te gaan met PTG's en meer geneigd zijn om te kiezen voor een hoog-risico beroep. We speculeerden dat MMT-medewerkers in hoofdstuk 2 bepaalde persoonlijkheidskenmerken hebben die hen meer geschikt maken voor dit soort werk, bijvoorbeeld het hebben van laag neuroticisme, een kenmerk dat samenhangt met hogere psychologische veerkracht. Naast interne factoren hebben we ook nagedacht over de externe factoren die bijdragen aan een veerkrachtige reactie op PTG's, zoals sociale steun. De screening- en monitoringinstrumenten MIRROR en BASE in hoofdstukken 4 en 5 bevatten allebei sociale steun, wat samenhangt met psychologische veerkracht. Sociale steun speelt ook een cruciale rol in het vermogen van MMT-medewerkers om met PTG's om te gaan.

### **Aanbevelingen voor toekomstig onderzoek en implicaties voor de praktijk**

Op basis van de bevindingen van dit proefschrift worden verschillende richtingen voor toekomstig onderzoek en implicaties voor de praktijk geformuleerd:

1. Wij vonden dat enkele MMT-medewerkers en medewerkers van de spoorwegdienst een opeenstapeling van PTG's soms als een belasting ervaarden. Toekomstig onderzoek naar professionals met een hoog-risico beroep zou de effecten van de opeenstapeling van PTG's moeten meenemen.
2. Moeten organisaties informele collegiale steun faciliteren? Wij vonden dat informele collegiale steun van cruciaal belang is voor het welzijn van MMT-medewerkers. Toekomstig onderzoek kan de werking van informele collegiale steun verder ontrafelen en uitzoeken hoe dit beïnvloed en bevorderd wordt door omringende structuren en organisatorische context.
3. We vonden vijf centrale principes van psychosociale ondersteuning, maar ook context-specifieke aspecten. Hieruit blijkt dat context ertoe doet als het gaat om het verlenen van psychosociale ondersteuning en dat het altijd moet worden aangepast aan een specifieke situatie of context. *Concept mapping* is een geschikte methode om de dialoog op gang te brengen tussen stakeholders uit de domeinen onderzoek, beleid en praktijk om consensus te bereiken over een complex begrip als psychosociale ondersteuning. Bij de ontwikkeling van richtlijnen worden ontvangers

- niet vaak betrokken. Dit zou een belangrijke ontbrekende schakel kunnen zijn om richtlijnen gemakkelijker toepasbaar te maken voor beleid en praktijk.
4. Toekomstig onderzoek moet culturele veranderingen binnen hoog-risico organisaties beoordelen na de implementatie van psychosociale ondersteuningsinstrumenten zoals MIRROR en BASE. Op deze manier kunnen mechanismen die van invloed zijn op culturele veranderingen binnen organisaties door middel van psychosociale ondersteuning worden onderzocht en benut bij de ontwikkeling en implementatie van toekomstige psychosociale ondersteuning.
  5. Hoe kan de kennisbasis van instrumenten en interventies voor psychosociale steun worden uitgebreid? Toekomstig onderzoek zou de evaluatie van psychosociale ondersteuningsinstrumenten zoals MIRROR en BASE kunnen uitbreiden. Met behulp van een longitudinale studieopzet kan de ontwikkeling van klachten, functioneren en veerkracht worden bestudeerd, en ook of deze instrumenten gebruikers aanzetten tot actie.

### **Conclusie**

Het doel van dit proefschrift was om bij te dragen aan het begrijpen en bieden van psychosociale ondersteuning aan mensen die zijn blootgesteld aan een potentieel traumatische gebeurtenis (PTG) in verschillende contexten. Er kunnen centrale principes van psychosociale ondersteuning worden onderscheiden, maar er worden ook context-specifieke aspecten aangetroffen waarmee te allentijde rekening moet worden gehouden. De resultaten van dit proefschrift laten zien dat verschillende factoren bijdragen aan het welzijn van professionals in hoog-risico beroepen die regelmatig worden blootgesteld aan PTG's, zoals sociale steun en energiebronnen. Ook toont dit proefschrift het belang aan van het betrekken van relevante stakeholders in de dialoog tussen onderzoek, beleid en praktijk om de implementatie van psychosociale ondersteuning te verbeteren. Verschillende lessen uit de evaluatiestudies vanuit het perspectief van gebruikers en aanbieders geven richting aan de implementatie van psychosociale ondersteuning tijdens toekomstige gebeurtenissen. We concluderen dat, als het gaat om het begrijpen en bieden van psychosociale ondersteuning, context ertoe doet.



## PORTFOLIO

**Name PhD student:** Merel van Herpen

**PhD period:** April 1, 2017 – June 1, 2022 – *Parttime in combination with position of policy researcher/adviser at ARQ Centre of Expertise for the Impact of Disasters and Crises*

**Names of PhD supervisor(s) & co-supervisor(s):** Prof. Dr. Miranda Olf and Dr. Hans te Brake

	Year	ECTS
<b>1. PhD training</b>		
<b>General courses</b>		
Amsterdam UMC World of Science	2017	0.7
Project Management	2018	0.6
Searching for a Systematic Review	2018	0.1
Endnote	2018	0.1
PubMed	2018	0.1
Zoeken voor een CAT	2018	0.1
Scientific Writing in English	2019	1.5
<b>Specific courses</b>		
Practical biostatistics	2017	1.4
Clinical Epidemiology: Systematic Reviews	2018	0.7
Summer School: Introduction to Structural Equation Modeling using Mplus at Utrecht University	2018	1.4
eBROK	2019	1.5
Qualitative Research by Evers Research	2020	0.6
<b>Seminars, workshops and master classes</b>		
Weekly psychotrauma research group meetings, Amsterdam UMC, University of Amsterdam	2017 – 2022	4
6-weekly research meetings at ARQ National Psychotrauma Centre	2017 – 2022	1.5
6-weekly PhD meetings at ARQ National Psychotrauma Centre	2017 – 2022	3
Congress 'Complexiteit van stress', Ede	2017	0.3
Symposium 'Duurzaam Gezond Inzetbaar', Nijkerk	2017	0.3
Training consultative selling at ARQ National Psychotrauma Centre	2018	0.4
Symposium Politie Academie, NLDA, Vi, TOS en MMGZ, Doorn	2018	0.3
Seminar on improving people performance in healthcare, Utrecht University	2018	0.3
Professional Performance Summit 'omgaan met disruptie en onzekerheid', Utrecht University	2020	0.1
ESTSS online symposium 'Celebrating 10 years of the European Journal of Psychotraumatology'	2021	0.2
Intervision sessions 'verwerven van opdrachten' at ARQ National Psychotrauma Centre	2021	0.3
Workshop 'constructief onderhandelen' at ARQ National Psychotrauma Centre	2021	0.1
Masterclass 'de rol van ARQ bi een landelijke crisis' at ARQ National Psychotrauma Centre	2021	0.1
Supervision qualitative research from KwaliMetrika	2021 – 2022	0.2

## CONTINUED.

**Presentations**

Oral; 'Zelfscreener Veerkracht' to four railway emergency services teams, Zwolle, Schiphol, Eindhoven and Rotterdam	2017	0.5
Oral; 'Inleiding over visieverschuiving: van klacht naar (veer)kracht' at 7 <sup>e</sup> Wetenschapsdag Uitzendgerelateerde Klachten van de Raad voor civiel-militaire Zorg en Onderzoek (RZO) in Doorn together with Dr. Hans te Brake	2017	0.5
Workshop; 'Interactieve sessie van klacht naar (veer)kracht' at 7 <sup>e</sup> Wetenschapsdag Uitzendgerelateerde Klachten van de Raad voor civiel-militaire Zorg en Onderzoek (RZO) in Doorn together with Dr. Hans te Brake and Dr. Joris Haagen	2017	0.5
Oral; 'Resultaten Zelfscreener Veerkracht' to the management team of the railway emergency services, Utrecht	2018	0.5
Oral; 'Zelfscreener: Vroeg-signalering en ondersteuning op de werkvloer' at RZO/PACO & LZV Wetenschapsdag, Doorn	2018	0.5
Oral; 'Mentale Weerbaarheid' at 'GGZ Delfland scholingsdag', Delft	2018	0.5
Oral; 'Vroegtijdige interventies ter ondersteuning van veerkracht' at Kenniskring PSH GGD GHOR NL, Bilthoven	2018	0.5
Poster; 'SupportingRailway First Responders at Work' at the ESTSS conference 2019, Rotterdam	2019	0.5
Oral; 'MIRROR app, Insight into its approach, development, pilot studies and emerging results' at the eMental Health Opportunities for the Third Sector conference in Dublin, Ireland	2020	0.5
Oral; 'Werken aan Balans, Mobiel Medisch Team' to HEMS team, online	2022	0.5

**(Inter)national conferences**

European Society for Traumatic Stress Studies (ESTSS) conference in Rotterdam, The Netherlands	2019	0.9
2nd Dutch Veterans' Mental Health Day Conference, Doorn	2019	0.3
eMental Health Opportunities for the Third Sector, Dublin, Ireland	2020	0.3

**Other**

Co-organization and attending of ARQ research writing week	2017 – 2019	4
Co-organization and attending of I-AM-PhD meeting at ARQ, Diemen	2018	1
Attending I-AM-PhD Meeting at NKVTS, Oslo, Norway	2019	0.9
Co-organization and attending of online I-AM-PhD meeting	2020	0.3

**2. Teaching**

<b>Lecturing</b>	n/a	n/a
<b>Tutoring, mentoring</b>	n/a	n/a
<b>Supervising</b>	n/a	n/a
<b>Other</b>	n/a	n/a

**3. Parameters of Esteem****Grants**

AMC Acquisition Grant to write a Horizon2020 application together with Prof. dr. Miranda Olf, Dr. Anne Bakker and Dr. Hans te Brake	2018
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**Awards and prizes**

n/a



CONTINUED.

**4. Publications****Peer reviewed**

- Van Herpen MM, Boeschoten MA, te Brake H, van der Aa N, Olf M. Mobile Insight in Risk, Resilience, and Online Referral (MIRROR): Psychometric Evaluation of an Online Self-Help Test. *J Med Internet Res* 2020;22(9):e19716 2020
- van Herpen, M. M., te Brake, H., & Olf, M. (2021). Stress at work: Self-monitoring of stressors and resources to support employees. *Stress and Health*, 1–8. <https://doi.org/10.1002/smi.3084> 2021
- van Herpen MM, Dückers MLA, Schaap R, Olf M and te Brake H (2022) Online One-Stop Shop for Disaster Response Services After the MH17 Airplane Crash: An Evaluation Study. *Front. Public Health* 10:832840. doi: 10.3389/fpubh.2022.832840 2022

**Other**

- Jacobs, J., van Herpen, M.M. and te Brake, H. (2016). Getagd voor het leven. Een verkennende studie naar de effecten op professionals van het filmen en online plaatsen van (beeld)materiaal van professioneel handelen. Diemen: Impact. 2016
- Van Herpen, M.M. and te Brake, H. (2018). Inzet en ontwikkeling van een Zelfscreener Veerkracht voor ProRail. Diemen: Impact. 2018
- Van Herpen, M.M. and te Brake, H. (2019). Ontwikkeling van Quality of Psychosocial Care voor Spinale Musculaire Atrofie. Diemen: Impact. 2019
- Van Herpen, M.M. and te Brake, H. (2021). Evaluatie Zelfscreener ProRail Incidentenbestrijding. Diemen: ARQ Kenniscentrum Impact van Rampen en Crises. 2021
- Kennis, M., van Herpen, M., & te Brake, H. (2021). Blog: Een bewonderenswaardige veerkracht in crisistijd. Retrieved from: <https://www.zorgvisie.nl/blog/eenbewonderenswaardige-veerkracht-in-crisistijd/> 2021
- Van Herpen, M.M. and te Brake, H. (2022). Een smartphone app ter ondersteuning van de veerkracht van politiemedewerkers. Inventarisatie van beïnvloedingsfactoren op de implementatie. Diemen: ARQ Kenniscentrum Impact van Rampen en Crises. 2022
- Van Herpen, M.M. and te Brake, H. (2022). Werken aan balans. Mobiel Medisch Team, Amsterdam UMC. Diemen: ARQ Kenniscentrum Impact van Rampen en Crises. 2022





## ABOUT THE AUTHOR

Merel van Herpen (1991) obtained a Bachelor's degree in sociology with a minor in conflict studies at Utrecht University. After graduation, she worked for a non-governmental organization specialized in conflict resolution based in Boston, Massachusetts for one year. After returning to The Netherlands, Merel graduated from Utrecht University with a Master's degree in Conflict Studies and Human Rights.

Merel worked as a trainer at Critical Mass and as junior lecturer at the sociology department of Utrecht University. In April 2016, she started working as a researcher and policy adviser at ARQ Centre of Expertise for the Impact of Disasters and Crises. Here, she was involved in different research and implementation projects regarding psychosocial support. One of the first research projects was a qualitative study investigating the impact on public professionals such as police officers of being filmed and posted on social media. In 2017, Merel started combining her work at ARQ Centre of Expertise for the Impact of Disasters and Crises with a PhD position at Amsterdam University Medical Center. During her PhD research, Merel was involved in co-organizing and attending several I-AM-PhD meetings, to bring together international PhD students in the field of psychotrauma. She presented her research at several national and international conferences.

Currently, Merel works as a researcher and policy adviser at ARQ Centre of Expertise for the Impact of Disasters and Crises.

## DANKWOORD

Met veel plezier heb ik de afgelopen jaren aan dit proefschrift gewerkt. Het schrijven ervan is met ups en downs gegaan. Een heleboel mensen hebben een onmiskenbare bijdrage geleverd aan de totstandkoming van dit proefschrift, aan wie ik veel dank verschuldigd ben. Ik wil een aantal graag speciaal bedanken:

Ten eerste mijn promotor, Miranda Olf. Ik heb veel van je geleerd de afgelopen vijf jaar. Je (digitale) deur stond altijd open, wat erg fijn was. Dat we samen bij Koningin Máxima aan tafel hebben gezeten om te vertellen over ons onderzoek is een gebeurtenis die ik niet snel zal vergeten. Hetzelfde geldt voor de AMC teamuitjes, het jaarlijkse Sinterklaas gedicht waarin jij alle teamleden afzonderlijk in het zonnetje zet en de I-AM-PhD meetings bij ARQ. Ik ga ons maandelijkse overleg missen. Bedankt voor je aanmoediging, betrokkenheid en vertrouwen.

Mijn co-promotor, Hans te Brake. Ook jouw (digitale) deur stond altijd open. Je kritische vragen hielden mij scherp en brachten een duidelijke opbouw (de welbekende lijn of trechter) in de artikelen. Je bemoedigende woorden wanneer de moed mij soms in de schoenen zakte hebben mij zeer geholpen. Naast discussies over resultaten of beleidsimplicaties, waren de gesprekken over films, series of muziek een leuke afwisseling. Bedankt voor je enthousiasme tijdens discussies over de interpretatie van resultaten, betrokkenheid en begeleiding.

De beoordelingscommissie, Dr. Anne Bakker, prof. dr. Siri Thoresen, dr. Karen Nieuwenhuijsen, prof. dr. Carel Goslings, prof. dr. Paul Boelen en prof. dr. Hans Knoop. Hartelijk dank voor uw bereidheid mijn proefschrift te lezen en te beoordelen.

De Raad van Bestuur van ARQ Nationaal Psychotrauma Centrum, Jan-Wilke Reerds, Gerdy van Bellen en Ate Osinga. Bedankt dat jullie mij deze kans hebben gegeven en voor jullie vertrouwen in het promotietraject.

De directie van ARQ Kenniscentrum Impact van Rampen en Crises, Caroline Six en Remco Roos. De combinatie van een promotietraject met het werk als beleidsonderzoeker/adviseur heb ik als verrijkend ervaren. Dit hebben jullie weten te faciliteren. Bedankt voor jullie ondersteuning en interesse.

Alle respondenten die hebben deelgenomen aan de verschillende studies van dit proefschrift. Zonder jullie onmisbare deelname had ik het niet kunnen schrijven. Bedankt voor jullie openheid en tijd.

Alle coauteurs voor hun bijdrage aan de artikelen. Michel, bedankt voor de inspirerende brainstormsessies over twee hoofdstukken en de discussie, waarna ik vol goede moed weer verder ging. En natuurlijk de gezamenlijke karaoke optredens niet te vergeten! Manon, bedankt voor je scherpe blik en betrokkenheid bij het MIRROR paper. Niels, dankjewel voor je hulp bij een verscheidenheid aan statistiekvragen. Jorien, Janke, Dolf, Thijs en Tina, bedankt voor de prettige samenwerking op het thema kwaliteit van psychosociale ondersteuning. Renske, Marcel en David, bedankt voor jullie bijdrage en betrokkenheid bij de MMT studie.

Alle geweldige collega's bij ARQ Kenniscentrum Impact van Rampen en Crises. Wat een gezellige, bevlogen en behulpzame club mensen bij elkaar: Barbara, Hans, Michel, Mitzy, Renée, Wera, Charlie, George, Lieke, Fieke, Sam, Noortje, Joris, Melanie en Andrea. Een aantal collega's wil ik in het bijzonder bedanken. Barbara, jij bent voor mij de stabiele factor bij Impact. Je bent stevast bereid om je collega's te helpen en het is altijd gezellig om bij te kletsen met jou en ons weekend door te nemen. Je scherpe blik heeft menig spelfoutje uit beleidsrapporten gehaald. Charlie, wat ben jij een fijn mens. Ik ben blij dat wij elkaar ook buiten werk zien. Wera, we werken alweer vijf jaar samen. Ik bewonder je bevlogenheid en kijk ernaar uit om nu ook echt samen een project uit te gaan voeren. Mitzy en Juul, toen ik er doorheen zat met het schrijven van het discussiehoofdstuk hebben jullie me geholpen. Een uitstekend voorbeeld van collegiale steun! Renée en George, bedankt voor de fijne samenwerking en het sparren over uiteenlopende onderwerpen.

Alle fijne collega's bij ARQ IVP, dat zijn er te veel om hier op te noemen. Ook hier wil ik een aantal apart bedanken. Liesbeth en Ine, ik werk graag met jullie samen en waardeer onze uitermate efficiënte en tegelijkertijd ook gezellige manier van overleg. Het is leerzaam om jullie aan het werk te zien. Marjolaine, helaas zijn we geen collega's meer, met wie moet ik nou de snacks in de kantine beoordelen? Willeke, dankjewel dat de teamuitjes altijd bij jou mogen eindigen. Jelte, bedankt voor je vrolijke aanwezigheid op de 2<sup>e</sup> verdieping.

ARQ medepromovendi, Anke, Annemariëk, Bertine, Carlijn, Iris, Jeannette, Jetske, Jorinde, Jurriaan, Juul, Karlijn, Manik, Marieke van G., Marieke S., Merel, Nadine, Nora, Patricia, Rina, Saara, Suzan en Tijmen. Ik heb genoten van de schrijfweken, promovendi-overleggen, promovendi-uitjes, congressen en borrels. Eerst met zijn allen in de levendige kantoortuin en daarna vooral online. Bedankt voor de fijne sfeer, de constructieve feedback op artikelen en gezelligheid.

Psychotrauma team at Amsterdam UMC, Miranda, Mirjam v Z, Anne, Chris, Lotte, Yulan, Indira, Bernardette, Brinn, Jeanette, Ira, Laura, Bruno en Mirjam M. I enjoyed the

interesting weekly Monday lunch meetings and fun team outings. I have learned a lot from you about various research topics and methods. Thank you for making me feel part of the team even though I was not at the AMC that much.

Vrollega's, Marieke, Carlijn en Suzan. Dat een promotietraject ook nog een vriendenclubje op kan leveren had ik niet durven hopen. Ik ben heel blij met jullie in mijn leven. Ik vind het hoog tijd voor weer een escape room, daar zijn we namelijk mega goed in. Marieke, dankjewel voor alle fijne gesprekken en spelletjesavonden. Je bent de beste ARQ-schrijfweek roomie die ik mij kon wensen en het is heerlijk hoe onze humor op elkaar lijkt. Carlijn, erg fijn om teksten van elkaar mee te lezen, te lachen om gezamenlijke ongemakkelijke momenten en dilemma's bij elkaar te toetsen. Dankjewel dat je altijd met me mee wil denken, voor je steun en natuurlijk voor alle gezelligheid binnen en buiten werk.

Noordwijk meiden, Tessa, Natasja, Nikki, Linda en Lieke. Van beugelbekkies op de middelbare school en stappen in 't Zeepie, naar grote mensen met banen, huizen en kinderen. Samen opgroeien schept een band die gelukkig niet zo gauw meer te breken is. Fijn dat we elkaar nog steeds zien. Via de (vaak hilarische) groepsapp blijven we op de hoogte van elkaars drukke levens. Ik kijk uit naar ons jaarlijkse weekendje weg!

Utrecht vrienden, Julia, Sabine, Tirza, Raoul, Tycho, Floor, Guus, Jaap, Anouk, Jurriaan. Etentjes, festivals, wintersportvakantie, borrels en weekendjes weg hebben voor de nodige gezellige afleiding gezorgd de afgelopen jaren. Heel veel dank daarvoor! Joris, dankjewel voor onze fijne tijd samen en je steun. Marileen, we ontmoetten elkaar tijdens de introductie (FI-week) van sociologie. Het klikte meteen en dat is niet meer overgegaan. Ik kijk altijd uit naar onze jaarlijkse wijn-met-kaas-avond als je weer even in Nederland bent. Eva, ook jij woont helaas niet in Nederland maar gelukkig betekent uit het oog niet uit het hart. Tijdens de Corona lockdown was het fijn om elkaar zoveel te zien. Dankjewel voor je adviezen en alle fijne etentjes, borrels en feestjes. Tirza, onze vriendschap is begonnen tijdens geploeter in SPSS toen we de bachelorscriptie samen schreven. Ik waardeer je openheid, eerlijkheid en dat je altijd jezelf bent. Ook ben je mijn *go-to-person* voor (*guilty pleasure?*) series en films! Dankjewel voor je nuchtere adviezen en fijne aanwezigheid. Raoul, dankjewel voor al die jaren vriendschap, we kunnen over alles een goed gesprek voeren. Ik sta graag met jou ergens op een weiland naar soepele deuntjes te luisteren. Sabine, jij betekent voor mij het goede begin van de week. De maandagavond is onze vaste sportavond, het wekelijkse ritme van samen eten, sporten en cursussen waardeer ik heel erg. Daarnaast onze gezamenlijk hobby van nieuwe restaurants uitproberen waar we urenlang praten over van alles en nog wat. Dankjewel voor de hechte vriendschap.

Mijn fantastische paranimfen, Suzan en Julia. Wat ben ik blij dat jullie aan mijn zijde willen staan! Soes, zonder jou was dit promotietraject een stuk zwaarder en ongezelliger geweest. Ik ben heel blij dat we naast PhD-collega's ook goede vriendinnen zijn geworden. Dat begon toen we samen de ARQ schrijfweek en I-AM-PhD bijeenkomst organiseerden. Vol enthousiasme stortten we ons daar samen in. Ik bewonder je positieve instelling en dat je altijd voor iedereen klaar staat. Ik vond het heel fijn om tijdens Corona elke donderdag samen te werken, inclusief gezellige borrel. En natuurlijk de lockdown thuisfeestjes niet te vergeten. Dankjewel dat ik altijd bij je terecht kan en voor je relativeringsvermogen. Julia, we kennen elkaar alweer ruim 10 jaar. Vanaf het eerste moment klikte het tussen ons. Ik kijk met heel veel plezier terug op alle leuke dingen die we samen hebben gedaan, met name onze vakanties: in een studievrije week last-minute naar Malaga, Oud en Nieuw vieren in Berlijn, jij bij mij op bezoek in Boston, samen naar New York en Toronto, even naar de zon in Italië en yoga op Terschelling (ramabolo zit nog steeds in mijn hoofd). Ik vind het altijd leuk met jou en ben dankbaar voor onze band. Dankjewel dat je altijd eerlijk bent wanneer ik je om advies vraag en dat je altijd voor me klaar staat.

Oma, je bent een inspirerende vrouw. We kunnen over alles praten en dat vind ik bijzonder. Ik geniet van je scherpe analyses van hedendaagse of oude maatschappelijke problemen en onze discussies daarover. Dankjewel dat je me aanmoedigde om naar Boston te verhuizen en om dit promotietraject aan te gaan.

Arnoud en Laurens, broeders. Vroeger waren we niet altijd even lief tegen elkaar maar inmiddels hebben we door dat we toch behoorlijk op elkaar lijken en dat het verdomde gezellig is samen. Wielrennen in Frankrijk, naar een festival, of gewoon een beetje klieren. Ar, hoewel we elkaar niet zoveel zien als ik zou willen is het altijd fijn als dat wel zo is. Lau, we kunnen over alles praten. Bedankt voor je ontnuchterende (mag ik zeggen soms prettig botte?) adviezen. Gezellig dat je zo in de buurt woont. Serina, lieve schoonzus, wat ben jij een aanwinst voor de familie. Je hebt altijd aandacht voor de ander. En niet te vergeten mijn lieve nichtje Mila en neefje Noud voor nog meer leven in de brouwerij.

Lieve papa en mama, bedankt dat jullie altijd achter mij staan. Bij het aangaan van dit promotietraject, maar ook bij het kiezen van een studie, op kamers gaan wonen (inclusief klussen in menig studentenkamer in Utrecht) en naar het buitenland verhuizen (waar jullie dan op bezoek komen). Mama, je bent mijn klankbord en P, je bent mijn rustpunt. Ik heb geluk met ouders zoals jullie en ben dankbaar voor jullie als vangnet waar ik altijd op terug kan vallen.



Lieve Justin, als iemand mij bij de zware laatste loodjes van dit proefschrift heeft gesteund dan ben jij het wel. Dankjewel voor de nodige afleiding met (van soms twijfelachtige kwaliteit) horrorfilms en hiphop. Je reageert altijd lief op mijn gepieker of gestress en hebt daar geen last van. Ik ken niemand die zo enthousiast wordt van naar een concert gaan als jij en dat is een van mijn favoriete dingen om samen te doen. Ik word heel blij van jou.



**Merel van Herpen**

## **Context Matters**

**Understanding and Providing Psychosocial Support after  
Potentially Traumatic Events**

People can be exposed to a wide variety of Potentially Traumatic Events (PTEs), for example getting into a traffic accident or losing a loved one unexpectedly. Psychosocial support should be provided at an early stage. Evaluating psychosocial support instruments can help facilitate their implementation in practice.

The objective of this dissertation is to contribute to the understanding and provision of psychosocial support in different contexts. The findings are based on studies using both quantitative and qualitative research methods. Part one focuses on furthering our understanding of factors contributing to a resilient response after a PTE among Helicopter Emergency Medical Services personnel. Furthermore, it focuses on examining the differences and similarities in optimal psychosocial support between people exposed to a PTE and people with a chronic disease. The second part provides and evaluates three different psychosocial support instruments in practice, to both the general population and to railway emergency services employees specifically.

Overall, this dissertation shows that individuals have different responses to PTEs and have different needs when it comes to receiving psychosocial support. Each context requires that specific principles of psychosocial support receive attention. At the same time, central principles of psychosocial support can be identified across all contexts. Furthermore, the studies in this dissertation show the importance of including relevant stakeholders in providing psychosocial support. The perspective of both users and providers offers useful lessons that give direction to the implementation of psychosocial support in different contexts. We conclude that, when it comes to the understanding and provision of psychosocial support, context matters.

Merel van Herpen works as a researcher and policy adviser at ARQ Centre of Expertise for the Impact of Disasters and Crises.

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