

## Health and Disability

# Media experiences and associations with mental health among the bereaved of the MH17-disaster: A latent profile analysis

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Research has shown that the amount of media exposure is associated with post-event mental health problems. Whether bereaved individuals have negative experiences with media reports and whether they are associated with post-event mental health is unclear. This study evaluated these experiences and associations following the MH17-disaster. How media reports were experienced (nine topics, modified MAS), depression symptoms (QIDS-SR), functional problems (WSAS) and event-related coping-self-efficacy (CSE) were assessed about one year post-disaster (May–August 2015) among Dutch bereaved ( $N = 152$ ). A substantial minority reported negative experiences such as reports *made me angry* (30%) and *made me sad* (48%). Latent profile analysis with symptoms, problems and coping self-efficacy as indicators, identified four classes of post-disaster mental health: a Well-functioning<sup>(class 1)</sup>, 35.1%; a Mild-problems<sup>(class 2)</sup>, 30.4%; a Sub-clinical<sup>(class 3)</sup>, 27.0%; and a Clinical<sup>(class 4)</sup>, 7.4%. Differences in symptoms, problems and coping self-efficacy levels between classes were large according to Cohen's *ds*. Multivariate logistic regression (MLR) showed that the Clinical<sup>(class 4)</sup> compared to the Well-functioning<sup>(class 1)</sup>, more often that felt that reports strongly “embarrassed me,” “made me feel sad,” “filled me with fear” and “served as a magnifying glass.” Future research should assess opportunities and effects of limiting media consumption.

**Key words:** Media, disaster, depression, coping self-efficacy, functional problems, bereaved.

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## INTRODUCTION

During and after disasters, the media play a crucial role in informing the public about what is happening. The media coverage is substantial and the large majority of the victims and their relatives, as many others, is following the news extensively (Ahern, Galea, Resnick *et al.*, 2002; Bernstein, Ahern, Tracy, Boscarino, Vlahov & Galea, 2007; Pfefferbaum, Nixon, Tivis *et al.*, 2001). Since media exposure and use may function as (constant) reminders of the disaster or function as cues that symbolize or resemble elements of the disaster, we might expect it to be related to mental health problems and more specifically Posttraumatic Stress Disorder-symptomatology. In fact, in the subsequent versions of the Diagnostic and Statistical manual of Mental Disorders (DSM-III to DSM V) and ignoring differences in exact wording, intrusion and avoidance reactions at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event are key elements of PTSD.

What are the findings of empirical research on the relationship between media use or exposure and post-event mental health? Studies on this issue are almost exclusively focused on the predictive value of the *amount* of media exposure, such as hours of TV watching or frequency of viewing specific images, for post-disaster mental health problems. The majority of studies are focused on the 9/11 terrorists attacks and almost half were conducted among nationwide national samples or samples in other non-affected countries (Neria & Sullivan, 2011; Pfefferbaum, Newman, Nelson, Nitiéma, Pfefferbaum & Rahman, 2014;

Vasterman, Yzermans & Dirkzwager, 2005). Some of the studies show clear relationships between media exposure and use on the hand, and mental health problems on the other hand. For instance, in the longitudinal study of Bernstein and colleagues (2007) hours of TV watching of 9/11 anniversary coverage 6–9 months post-event was significantly, positive, independently and strongly associated with probable PTSD 6 months later among a cohort of New Yorkers without symptoms at 6–9 months post-event. For studies that assessed media exposure and media use a long time after the event, and thus sensitive to recall bias, results are more difficult to interpret. For example, Collimore, McCabe, Carleton and Asmundson (2008) conducted a cross sectional study 2.2–3.3 years after 9/11. Recalled hours of TV exposure related to 9/11 during the first week post-event was significantly, independently and positively associated with recalled re-experiencing and hyperarousal in the first week, but not with avoidance or PTSD symptom severity.

In one of the few prospective studies not related to terrorist attacks in the US, Ten Veen, Morren and Yzermans (2009), using electronic medical records covering the first four years post-disaster, showed that following a fireworks disaster in the Netherlands in 2000, local news reports concerning the cause of the disaster were associated with an increase of general practitioner (GP)-utilization in both victims and non-victims and health complaints presented to the GP, including medically unexplained physical symptoms, chronic diseases, and psychological problems. Interestingly, no differences were found between victims and non-victims. In a cross sectional study

18 months after a mass-shooting attack on Utøya Island, Norway in 2011 killing 69 people, Kristensen, Dyregrov, Dyregrov and Heir (2016) found that retrospectively assessed media exposure during the first months was associated with prolonged grief 18 months later: those with high exposure had higher levels of prolonged grief than those with low exposure. Another cross sectional study following this event among a sample of bereaved and comparison subjects showed that a centered average score of media use covering the past year, independently explained 3% of PTSD-symptomatology (Nævdal, Gravdal, Laberg & Dyregrov, 2016). The cross sectional study by Thoresen, Jensen and Dyb (2014) one year after this event showed that media and media participation were evaluated more positively than negatively by the terror victims. Thirteen percent of those who allowed an interview found the interview distressing and 11% regretted participating.

How media reports are experienced or evaluated has, up till now, received very little attention in disaster research, such as to what extent reports are experienced as (not) distressing, (not) supporting or (not) helpful in coping with the event or raise anger and sadness. Of the very few existing studies, most are not focused on the direct victims or bereaved. For instance, about 2–3 weeks after the Tsunami disaster Lau, Lau, Kim and Tsui (2006) assessed Hong Kong residents (13.3% relatives living the Tsunami affected area). They found that 56.5% to 64.7% felt severely or very severely disturbed by images, and 52.6% to 71.4% had these emotions because of the content of the news. Computed weighted image unrest scores and weighted content unrest scores were independently associated with mild or moderate/severe post-traumatic stress symptoms in this cross sectional study.

A longitudinal study by Maercker and Mehr (2006) among victims of crime is relevant too. This study showed that the sum of negative emotional reactions to media reports about the crime, such as “made me sad” (65.5%), “filled me with fear (48.3%)” and “made me angry (31.2%)” around 5 months post-event was significantly and moderately correlated with PTSD symptoms 6 months later. Interestingly, they found no significant differences in PTSD-symptom levels at 6 and 11 months between victims with and without reports on the crime. This suggests that the mere existence of a media reports does not influence PTSD symptom levels. However, it is unclear to what extent negative emotional reactions at 11 months were independently related to PTSD-symptoms 6 months later, that is, while controlling for PTSD-symptoms at 6 months. In a cross sectional study 4 months after a mass shooting at Jokela High School (Finland) killing 8 people, Haravuori, Suomalainen, Berg, Kiviruusu and Marttunen (2011) found that 33.2% of the affected adolescents felt worse when exposed to news coverage compared to non-affected youngsters (14.5%) and that 18.6% of the affected adolescents felt worse after being interviewed. A small proportion of the affected adolescents felt better when being interviewed (9.3%) or when exposed to news coverage (14.4%). Being interviewed instead of media exposure independently explained 3% of the variance of posttraumatic stress symptoms (personal communication Henna Haravuori, 2016), but did not explain general health scores (GHQ).

To summarize, current studies suggest that negative experiences or evaluations of media reports or coverage following

disasters are associated with higher post-disaster stress symptom levels and problems. However, empirical research on how are reports in the media are experienced or evaluated by the bereaved, and on the associations between media experiences and post-event mental health among bereaved is lacking. Moreover, current studies are primarily focused on one or more distinct mental health areas as separate (dependent) variables, such as PTSD, depression or their symptoms levels. They are not aimed at the associations between exposure or experiences at the one side, and (latent) classes of affected and bereaved people that share similar characteristics of post-event functioning at the other side, such as having similar profiles of symptom levels, functional problems and perceived coping abilities. However, by using such classes a more elaborated and detailed insight can be obtained on the relationship between media-experiences and post-disaster functioning, because separate variables such as mental health problems don't provide insight in possible different profiles of these symptoms, problems and coping abilities.

The aim of the present study is to fill this gap of knowledge. For this purpose we conducted a study following the MH17-airplane disaster (see below). The first and second research questions were: (1) how are reports in the media about the MH17 disaster experienced or evaluated by bereaved of the MH17 disaster in terms of for instance did the media reports embarrass bereaved, made them feel sad or angry?; and (2) which classes can be identified among the bereaved, with depressive symptoms, functional problems and coping self-efficacy as indicators of these classes? We used these three indicators, covering three important related but distinct dimensions of functioning, for the following reasons. Depressive symptoms following unexpected and violent loss of a loved one(s) or significant other(s) are well documented symptoms among bereaved and thus an important element of post-disaster functioning to include (Kristensen, Weisæth & Heir, 2012; Stroebe, Schut & Stroebe, 2005). Functional problems were used as the second indicator because they provide insight in the impairment of various concrete daily activities such as work and household chores due to experienced problems, beyond present symptom levels (cf. Hussain, Weisaeth & Heira, 2011). We finally used coping self-efficacy as an indicator for post-disaster functioning, because it provides information about the perceived ability to cope with the loss (Benight & Bandura, 2004; Bosmans, Komproe, van Loey, van der Knaap, Benight & van der Velden, 2017). The third research questions was: (3) to what extent do identified classes differ in how media reports on the MH17 disaster were experienced or evaluated, while controlling for relevant variables such as age, gender and number of persons lost.

## METHOD

### *Background MH17- disaster*

On July 17 2014 a Boeing of Malaysia Airlines flight MH17 was hit by a Buk surface-to-air missile with a warhead launched from Eastern Ukraine and crashed in the Eastern Ukraine near the Russian border killing all 298 persons aboard the plane. Of the deceased passengers, 193 were Dutch (of 90 families). This disaster (called the MH17-disaster) immediately caused enormous political tension. The Russian government blamed the Ukrainian

government for the disaster while the Ukrainian government stated that the missile was launched by Russian professionals and coordinated from Russia. Much of the ongoing attention was given in the Dutch media to the assumed perpetrators, described political tension and debates in the Dutch Parliament.

#### Participants and procedure

All adult bereaved fluent in Dutch were eligible to sign up for participation. Due to privacy regulations we could not contact the bereaved directly, but they were informed about and invited to participate in this study via: (1) the Foundation MH17-disaster (initiated and organized by those who lost relatives); (2) Victim Support Fund, the Netherlands (that provides victim support to all bereaved families; 100 out of 166 contact persons or spokesmen of the bereaved families could be personally contacted by Victim Support Fund, the Netherlands by telephone and/or by mail); (3) a dedicated internet site for the bereaved; (4) press releases and interviews in the media; (5) meetings with the bereaved; and (6) snowball-sampling (i.e., participants were asked to inform/invite others).

Data collection started at the beginning of May 2015. For the present study data were used of 152 respondents who participated in the period May–September 2015. It is unknown to what extent other family members or friends of the deceased were informed about the research project, or to what extent the 100 persons that were contacted by Victim Support really participated (due to privacy regulations). Therefore it is difficult to estimate the denominator to calculate the response. This study was conducted in cooperation with the University of Groningen and the study-protocol was approved by the Psychology Ethical Committee of this University. Web-based questionnaires were administered. Respondents without internet or who preferred a paper-and-pencil version of the questionnaire received a hardcopy. Respondents gave their online or written informed consent. Signed informed consent forms containing contact details were saved separately from the filled in questionnaires (provided with an irreducible ID number). Contact details were saved because of the longitudinal nature of this on-going study.

The mean age of the study sample was 52.3 years ( $SD = 15.4$ ) and 59.2% was female. About 70% had a high education level (higher vocational education or university), and 25.6% was confronted with one or more life-events since the disaster. In total, 31.8% lost one relative, 36.4% two relatives, 11.9% three relatives, 17.2% four relatives, 1.3% five relatives, and 1.3% lost six relatives, varying from own child(ren), parent(s) to nephew(s), child of close friends and partner of own child. Of the respondents, 48.0% participated in May, 15.8% in June, 27.0% in July, and 9.2% in August/September 2015.

#### Measures

Besides general questions on demographics and loss-related variables (age, number of relatives or significant others lost due the M17-disaster, etc.) and date of participation, for the present study the following topics were assessed.

Experiences with the media with respect to the MH17-disaster were examined with a slightly modified version of the Media

Attentiveness Scale (MAS; Maercker & Mehr, 2006). We added two items we believed were relevant and used five-point Likert scales (original 6-points), with the following instruction *The MH17-disaster received much attention in the media (press, radio, and TV). We would like to know the effects these media reports had on you. Below some statements are presented. Can you rate to what extent these statements apply to you? They are aimed at your opinions, thoughts, or feelings in the past months* (see Table 3; 1 = *not at all* to 5 = *very much*). For the present study all nine items were analyzed separately.

Depression symptoms during the past 7 days were examined using the sixteen-item Quick Inventory of Depression Symptomatology Self-Report (QIDS-SR; Rush, Trivedi, Ibrahim *et al.*, 2003; Trivedi, Rush, Ibrahim *et al.*, 2004) assessing the criterion symptom domains of major depression disorder according to DSM-IV. Respondents were asked to *check the one response to each item that best described you for the past seven days* but, in contrast to previous measures, all items have different four-point Likert scales depending on the specific item. For instance, with respect to *Feeling sad* answer categories vary from 0 = *I do not feel sad* to 3 = *I feel sad nearly all of the time*, while with respect to *Sleep during the night* categories vary from 0 = *I do not wake up at night* to 3 = *I awaken more than once a night and stay awake for 20 minutes or more, more than half the time*. We omitted the last answer category of item 12 about the thoughts about death and suicide (Multiple times a week, I think for several minutes about death or suicide) for ethical reasons. The reason for this decision is that we were unable to intervene immediately in case a respondent endorsed this answer category. We felt that decision was justified because via several information channels, bereaved were informed about existing and available care for bereaved who felt they needed it. The possible total scores therefore ranges from 0 to 26 instead on 0–27 (Cronbach's alpha is 0.81). The QIDS-SR (depression symptoms) norm tables consider the severity of depression scores of 0–5 as *not*, of 6–10 as *mild*, of 11–15 as *moderate*, of 16–20 as *severe* and of 21–27 as *very severe* (Rush *et al.*, 2003).

Functional problems were assessed with the five-item Work and Social Adjustment Scale (WSAS; Mundt, Marks, Shear & Geri, 2002) asking respondents to what extent present problems of respondents influence work, household chores (such as shopping, taking care of children), social leisure activities (what you do with others during parties, going out), private leisure activities (what you do when being alone such as reading, gardening, walking), families and relationships (maintain intimate relationships, relationships with significant others). Items were scored on a nine-point Likert scale (0 = *not at all* to 8 = *very severely*). The possible total scores ranges from 0 to 40; Cronbach's alpha is 0.85). Mundt and colleagues (2002) made a distinction between WSAS scores below 10 that appear not to be associated with (sub) clinical populations, WSAS scores of 10–20 that were associated with significant impairment but less severe clinical symptomatology, and WSAS scores above 20 that were associated with severe or worse psychopathology.

Current event-related (MH17) coping self-efficacy was evaluated by the sum score of the seven-item Coping Self-Efficacy Scale (CSE7, Bosmans *et al.*, 2017). The items were scored on a seven-point Likert scale (1 = *I'm not at all capable* to

7 = *I'm totally capable*). The possible sum score ranges from 7 to 49; Cronbach's alpha is 0.89). Data of bereaved extracted from a large population based study on trauma in the Netherlands (cf. van der Velden, Bosmans & Scherpenzeel, 2013) showed that 7–12 months post-loss ( $n = 299$ ) and 1–2 years post-loss ( $n = 496$ ) the mean CSE7 scores were almost equal:  $M^{7-12 \text{ month}} = 40.27$ , 95% CI [39.36, 41.18], and  $M^{1-2 \text{ years}} = 41.09$ , 95% CI [40.44, 41.75]. Mean scores of the CSE7 in first, second, third and fourth 25th percentile were:  $M^{\text{scores } 0-35} = 29.56$ , 95% CI [28.94, 30.18];  $M^{\text{scores } 36-41} = 38.82$ , 95% CI [38.55, 39.09];  $M^{\text{scores } 42-47} = 44.59$ , 95% CI [44.36, 44.82];  $M^{\text{scores } 48-49} = 48.81$ , 95% CI [48.77, 48.87]. Among a treatment-seeking sample with severe PTSD symptomatology the mean CSE7 score was 29.57, 95% CI [27.52, 31.62]; Bosmans, van der Knaap & van der Velden, 2016).

Life-events were assessed with a slightly modified version of the Life-event Scale consisting of 12 life-events such as death of partner, divorce, traffic accident and violence (van der Velden, van der Burg, Steinmetz & van den Bout, 1992), and one open answer category. Items were scored on a six-point Likert scale (1 = *not at all*, 2 = *5 to 10 years ago*, 3 = *2-5 years ago*, 4 = *in the period before the disaster, but no longer than 2 years ago*, 5 = *after MH17-disaster up to 6 months ago* and 6 = *in past 5 months*). In case a respondent experienced an event more than once, the respondent was asked to rate the most recent one. For the present study we focused on life-events after the disaster. Based on this information we counted the number of respondents had experienced any life-event (other than the MH-17 disaster) after the disaster (Yes/No)

#### Data analysis

In latent profile analysis (LPA; Lazarsfeld & Henry, 1968; Tein, Coxé & Cham, 2013), the observed variables – in this study depression symptoms, functional problems, and event-related coping self-efficacy – are considered to be indicators of an unobserved latent variable, with a limited number of mutually exclusive categories or classes (Magidson & Vermunt, 2002). For the present study, gender and age were entered as covariates in the LPA because gender and age are associated with depression symptoms, functional problems and coping self-efficacy. We compared models by assessing the relative fit based on reductions in the Bayesian information criterion (BIC) as well as bivariate residuals (BVR's) and outcomes of the Bootstrap Likelihood-Ratio Test (BLRT; Magidson & Vermunt, 2002; Nylund, Asparouhov & Muthén, 2007; Statistical Innovations, 2015; Tein *et al.*, 2013; Vermunt & Magidson, 2013). We choose the most parsimonious model with the lowest BIC, but also examined the BVRs of models that seemed to be parsimonious. BVRs larger than 3.84 indicate statistical significance at the 0.05 level meaning that the estimated model failed to account for the pairwise association of the specific indicators (or covariates). We looked at entropy values that are measures of the quality of classification (approaching one indicates clear delineation of classes; Celeux & Soromenho, 1996). Finally, the results of the BLRTs, that is, the assessment of the difference in model fit between subsequent models (current model and model with one class less) needed to be significant. LPA was conducted using LatentGold (version 5.1;

Vermunt & Magidson, 2013). Subsequently, class membership was added to respondents' data.

To assess the strength of differences in levels of depression symptoms, functional problems, and coping self-efficacy between the classes, Cohen's *ds* were computed. Because of the five-point Likert scales of the MAS and skewness of the data, bivariate and multivariate logistic regression analyses were conducted to assess the associations between classes and media experiences. The five-point Likert scales of the nine items of the modified MAS were dichotomized in relatively low scores (not at all-rather) and high scores (much-very much) and treated as dependent variables. We treated each item of the modified MAS as separate dependent variables to gain insight in specific experiences with the media of the identified classes. For this reason, we did not compute total scores of the MAS items. Class membership, gender, age in years, month of participation, and number of persons lost were entered as predictors. Because of the number of predictors given the numbers of respondents of each class, we entered education level as predictor in a second series of analyses eliminating one predictor that was not associated with media experiences using SPSS version 23 (IBM, Armonk, NY). All tables show the number of respondents in the analyses. We did not impute our data.

## RESULTS

### Experiences with the media

Experiences with the media (press, radio or TV) are presented in Table 1 (total group). Dichotomized findings show that a substantial minority reported that the media made them angry (30.5%) and feel sad in the past month (48.4%). A small minority (7.9%) reported that the media reports helped them to cope with the event. Almost two thirds (63.4%) expressed negative experiences on four or more of the nine items (endorsed much-very much on negative formulated items or endorsed not at all-little on positive formulated items).

### Latent classes

LPA identified four classes of post-disaster mental health. The BIC's of the two and three classes were almost equal (see Table 2). However, the BVRs of indicators of the 2-class solution were too high ( $\geq 4.49$ ) and the results of the BLRT showed that a 3-class solution improved the fit ( $-2LL$  difference = 45.92,  $p < 0.001$ ). The BVR's of three classes solution were much lower ( $\leq 2.01$ ), but the BLRT of the difference in model fit between the 3-class and 4-class solution was significant ( $-2LL$  difference = 28.19,  $p = 0.012$ ). The BVRs of the 4-class solution were low ( $\leq 0.35$ ). A new BLRT showed that a 5-class solution did not improve the fit ( $-2LL$  difference = 15.96,  $p = 0.382$ ). For these reasons we chose the 4-class solution with an entropy  $R$  of 0.91, also because Nylund *et al.* (2007) have shown that in studies using smaller sample sizes the BLRT performs better than the BIC (cf. Tein *et al.*, 2013).

The numbers of the identified classes are: Class 1,  $N = 52$  (35.1%); Class 2,  $N = 45$  (30.4%); Class 3,  $N = 40$  (27.0%); and Class 4,  $N = 11$  (7.4%).

Table 1. Experiences with the media following the MH17 disaster among bereaved

|                              | Not at all |      | Little |      | Rather |      | Much |      | Very much |      |
|------------------------------|------------|------|--------|------|--------|------|------|------|-----------|------|
|                              | N          | %    | N      | %    | N      | %    | N    | %    | N         | %    |
| Presented correct facts      | 12         | 8.0  | 39     | 26.0 | 65     | 43.3 | 29   | 19.3 | 5         | 3.3  |
| Embarrassed me               | 96         | 64.4 | 30     | 20.1 | 11     | 7.4  | 7    | 4.7  | 5         | 3.4  |
| Made me angry                | 25         | 16.6 | 47     | 31.1 | 33     | 21.9 | 29   | 19.2 | 17        | 11.3 |
| Made me sad                  | 14         | 9.3  | 34     | 22.5 | 30     | 19.9 | 40   | 26.5 | 33        | 21.9 |
| Filled me with fear          | 86         | 57.0 | 32     | 21.2 | 11     | 7.3  | 15   | 9.9  | 7         | 4.6  |
| Did not bother me            | 101        | 67.3 | 34     | 22.7 | 7      | 4.7  | 5    | 3.3  | 3         | 2.0  |
| Satisfied me                 | 70         | 46.4 | 49     | 32.5 | 22     | 14.6 | 9    | 6.0  | 1         | 0.7  |
| Helped me to cope with event | 72         | 47.7 | 52     | 34.4 | 15     | 9.9  | 8    | 5.3  | 4         | 2.6  |
| Served as magnifying glass   | 38         | 25.2 | 34     | 22.5 | 32     | 21.2 | 27   | 17.9 | 20        | 13.2 |

Table 2. Results latent profile analyses

|                          | LL              | BIC            | Npar      | B<br>p-value | Entropy<br>R |
|--------------------------|-----------------|----------------|-----------|--------------|--------------|
| Model 1 1 Class          | -1508.87        | 3047.72        | 6         | <0.0001      | 1            |
| Model 2 2 Classes        | -1429.02        | 2932.99        | 15        | <0.0001      | 0.89         |
| Model 3 3 Classes        | -1406.06        | 2932.04        | 24        | <0.0001      | 0.89         |
| <b>Model 4 4 Classes</b> | <b>-1391.97</b> | <b>2948.84</b> | <b>33</b> | <b>0.012</b> | <b>0.91</b>  |
| Model 5 5 Classes        | -1384.39        | 2978.66        | 42        | 0.382        | 0.88         |
| Model 6 6 Classes        | -1375.12        | 3005.10        | 51        | 0.288        | 0.91         |

Notes: The best fitting model is presented in bold. LL = log likelihood; Npar = number of estimated parameters. B = bootstrap. Indicators were entered as continuous variables. N = 148.

Table 3 provides the levels of depression symptoms (range 0–25), functional problems (range 0–40), and event-related coping self-efficacy (range 7–49) of the classes. The four groups differed significantly in depression symptoms, functional problems and event-related coping self-efficacy. Cohen’s *ds* were all ≥ 0.89 indicating that the identified classes differed to a large extent in depression symptoms, functional problems, and coping self-efficacy. The only exception was the difference in coping self-efficacy levels of Class 3 and 4 (Cohen’s *d* = 0.03).

Comparing QIDS-SR, WSAS and CSE7 scores of the four classes with the reference data of these instruments (see method section), Class 1 is considered to be a non-clinical *Well-functioning sample* (no depression, no functional problems, ‘normal’ coping self-efficacy levels), Class 2 as *Mild-problems sample* (mild depression, sub-clinical functional problems, low coping self-efficacy levels), Class 3 as a *Sub-Clinical sample*

(mild depression symptoms, worse functional problems, very low coping self-efficacy levels), and Class 4 as a *Clinical sample* (severe/very severe depression symptoms, worse functional problems, very low coping self-efficacy levels). The four classes did not differ in life-events, age, and number of persons lost. They differed significantly in gender ( $\chi(1)^2 = 13.51, p = 0.004$ ; Females: Class 1 = 42.3%; Class 2 = 66.7%; Class 3 = 75.0% and Class 4 = 36.5%) and education ( $\chi(1)^2 = 13.90, p = 0.003$ ; High: Class 1 = 86.5%; Class 2 = 64.4%; Class 3 = 65.0% and Class 4 = 36.4%).

*Class membership and experiences with the media*

The main results of the bivariate and multivariate logistic regression analyses on the associations between classes and media experiences are presented in Table 4 (full tables can be obtained from the corresponding author). We eliminated life-events from the list of predictors because they were not significantly ( $p < 0.05$ ) associated with class membership and with experiences with the media.

Findings of the multivariate analyses indicate that the Clinical<sup>(class 4)</sup> more often than the Well-functioning<sup>(class 1)</sup> stated that media reports *made me feel sad, filled me with fear, embarrassed me and served as a magnifying glass of what happened to me*. Because in the Clinical<sup>(class 4)</sup>, in contrast to the other classes, nobody reported *did satisfy me or helped me with coping with the loss* the odds ratios could not be computed. The Sub-clinical<sup>(class 3)</sup> also more often reported that the media reports *filled me with fear* than the Well-functioning<sup>(class 1)</sup>.

The proportions of respondents of the four Classes that expressed negative experiences with the media on four or more of

Table 3. Levels of depression, functional problems and coping self-efficacy of the identified classes

|         | N  | Depression symptoms <sup>1</sup> |      |                | Functional problems <sup>1</sup> |      |                | Coping self-efficacy <sup>2</sup> |      |                |
|---------|----|----------------------------------|------|----------------|----------------------------------|------|----------------|-----------------------------------|------|----------------|
|         |    | M                                | SD   | 95% CI         | M                                | SD   | 95% CI         | M                                 | SD   | 95% CI         |
| Class 1 | 52 | 3.35                             | 1.71 | [2.87, 3.82]   | 8.42                             | 5.74 | [6.82, 10.02]  | 39.25                             | 6.62 | [37.41, 41.09] |
| Class 2 | 45 | 8.07                             | 1.60 | [7.59, 8.55]   | 15.45                            | 5.48 | [13.80, 17.10] | 34.31                             | 4.26 | [33.03, 35.59] |
| Class 3 | 40 | 11.20                            | 2.50 | [10.40, 12.00] | 24.23                            | 6.28 | [22.22, 26.23] | 24.30                             | 3.87 | [23.07, 25.54] |
| Class 4 | 11 | 19.09                            | 2.47 | [17.43, 20.75] | 30.00                            | 6.02 | [25.96, 34.04] | 24.09                             | 9.98 | [17.38, 30.80] |

Notes: 95% CI = 95% confidence interval of mean. Class 1 = Well-functioning Class, Class 2 = Mild-problems Class, Class 3 = Sub-clinical Class, Class 4 = Clinical Class. <sup>1</sup>Higher scores reflect more symptoms/problems. <sup>2</sup>Lower scores reflect lower coping self-efficacy levels.

Table 4. Results of the bi-variate and multivariate logistic regression analyses on the associations between classes and experiences with media

|   | Neg. exp <sup>1</sup>   |          |      | Bivariate |               |          | Adjusted |                |          |
|---|-------------------------|----------|------|-----------|---------------|----------|----------|----------------|----------|
|   | <i>n</i> <sup>tot</sup> | <i>n</i> | %    | OR        | 95% CI        | <i>p</i> | OR       | 95% CI         | <i>p</i> |
| Reports in the media (TV, radio and newspapers):    |                         |          |      |           |               |          |          |                |          |
| Were correct regarding presented facts              |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 9        | 17.3 | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 44                      | 10       | 22.7 | 1.41      | [0.51, 3.85]  | 0.508    | 1.30     | [0.45, 3.84]   | 0.637    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 10       | 25.0 | 1.59      | [0.58, 4.39]  | 0.368    | 1.36     | [0.44, 4.04]   | 0.581    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 5        | 45.5 | 3.98      | [0.99, 15.94] | 0.051    | 3.46     | [0.83, 14.54]  | 0.090    |
| Embarrassed me                                      |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 2        | 3.8  | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 43                      | 2        | 4.7  | 1.22      | [0.16, 9.04]  | 0.846    | 1.24     | [0.16, 9.96]   | 0.839    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 5        | 12.5 | 3.57      | [0.66, 19.47] | 0.141    | 3.81     | [0.62, 23.35]  | 0.148    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 3        | 27.3 | 9.38      | [1.35, 65.15] | 0.024    | 8.25     | [1.05, 64.72]  | 0.045    |
| Made me angry                                       |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 15       | 28.8 | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 45                      | 13       | 28.9 | 1.00      | [0.42, 2.42]  | 0.996    | 0.90     | [0.35, 2.28]   | 0.821    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 12       | 30.0 | 1.06      | [0.43, 2.61]  | 0.904    | 0.87     | [0.33, 2.29]   | 0.769    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 6        | 54.5 | 2.96      | [0.78, 11.19] | 0.110    | 2.82     | [0.68, 11.61]  | 0.152    |
| Made me feel sad                                    |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 20       | 38.5 | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 45                      | 22       | 48.9 | 1.53      | [0.68, 3.44]  | 0.302    | 1.34     | [0.57, 3.13]   | 0.530    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 21       | 52.5 | 1.77      | [0.77, 4.08]  | 0.181    | 1.54     | [0.63, 3.75]   | 0.374    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 9        | 81.8 | 7.20      | [1.41, 36.78] | 0.018    | 8.53     | [1.60, 45.59]  | 0.012    |
| Filled me with fear                                 |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 2        | 3.8  | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 45                      | 5        | 11.1 | 3.12      | [0.58, 16.96] | 0.187    | 2.15     | [0.35, 13.37]  | 0.413    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 11       | 27.5 | 9.48      | [1.96, 45.79] | 0.005    | 7.91     | [1.41, 44.24]  | 0.018    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 4        | 36.4 | 14.29     | [2.20, 92.93] | 0.005    | 31.96    | [3.47, 294.44] | 0.002    |
| Did not bother me                                   |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 2        | 3.8  | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 44                      | 4        | 6.8  | 1.83      | [0.29, 11.47] | 0.519    | 2.18     | [0.32, 14.84]  | 0.426    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 3        | 5.0  | 1.32      | [0.18, 9.77]  | 0.788    | 1.81     | [0.22, 15.29]  | 0.585    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 1        | 9.1  | 2.50      | [0.21, 30.29] | 0.472    | 1.81     | [0.12, 27.10]  | 0.667    |
| Did satisfy me                                      |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 8        | 15.4 | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 45                      | 1        | 2.2  | 0.13      | [0.01, 1.04]  | 0.055    | 0.09     | [0.01, 0.87]   | 0.038    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 1        | 2.5  | 0.14      | [0.02, 1.18]  | 0.071    | 0.10     | [0.01, 1.02]   | 0.052    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 0        | 0.0  | N.c.      |               |          | N.c.     |                |          |
| Helped me with coping with the loss                 |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 6        | 13.5 | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 45                      | 4        | 4.4  | 0.30      | [0.06, 1.52]  | 0.146    | 0.26     | [0.04, 1.53]   | 0.136    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 2        | 7.5  | 0.52      | [0.13, 2.16]  | 0.369    | 0.37     | [0.07, 1.87]   | 0.230    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 0        | 0.0  | N.c.      |               |          | N.c.     |                |          |
| Served as a magnifying glass of what happened to me |                         |          |      |           |               |          |          |                |          |
| Well-Functioning <sup>(class 1)</sup> , Ref.        | 52                      | 12       | 23.1 | 1         |               |          | 1        |                |          |
| Mild-Problems <sup>(class 2)</sup>                  | 45                      | 13       | 28.9 | 1.35      | [0.54, 3.37]  | 0.515    | 1.60     | [0.61, 4.20]   | 0.342    |
| Sub-Clinical <sup>(class 3)</sup>                   | 40                      | 15       | 37.5 | 2.00      | [0.81, 4.96]  | 0.135    | 2.31     | [0.87, 6.14]   | 0.095    |
| Clinical <sup>(class 4)</sup>                       | 11                      | 7        | 63.6 | 5.83      | [1.46, 23.36] | 0.013    | 7.10     | [1.58, 31.93]  | 0.011    |

Notes: <sup>1</sup> Respondents endorsing much or very much on item. CSE = event-related coping self-efficacy. Ref. = reference group; OR = Odds ratio; 95% CI = 95% confidence interval; Adjusted OR = Odds Ratio multivariate logistic regression with, besides class, the variables gender, age, month of participation after start study, and number of persons lost (one or two or more) as predictors. Only the predictor "Class" is presented. N.c. = not computable because prevalence is 0%.

the nine items were 50.0%, 61.4%, 77.5% and 81.8% respectively. The Sub-clinical<sup>(class 3)</sup> and Clinical<sup>(class 4)</sup> more often reported four or more negative experiences than the Well-functioning<sup>(class 1)</sup> (Class 1 versus Class 3: Adj. OR = 3.41, *p* = 0.016, 95% CI [1.26, 9.23]; Class 1 versus Class 4: Adj. OR = 5.48, *p* = 0.047, 95% CI [1.02, 29.38]).

We repeated the multivariate analyses with education level as predictor but eliminated the number of relatives lost as predictor because this variable was not associated with experiences with the

media. Findings were similar to the previous analyses (data not shown).

## DISCUSSION

The present study was aimed at how reports in the media (press, radio and TV) about the MH17-disaster were experienced or perceived by the bereaved, which classes of post-event mental health could be identified, and to what extent the identified classes

differed in how media reports on the MH17-disaster were experienced. This is the first study using latent profile analysis to assess the association between mental health and experiences with the media.

Around one year post-event approximately half of the respondents (48%) reported that reports in the media made them feel sad, almost 31% reported that those reports made them angry and almost 15% reported that the reports filled them with fear. More than 60% expressed very negative experiences on four or more of the nine items. Although we used a slightly modified version of the MAS (e.g. a 5 instead of 6-point scale) findings show several similarities with the Maercker and Mehr study (2006). In their study, 66% of the victims reported that the reports made them feel sad and 31% that the reports made them feel angry. As in their study, a small minority reported that media reports did not bother respondents (10% versus 5%<sup>(much-very much)</sup>–10%<sup>(rather-very much)</sup>). Importantly, a small minority felt that the media reports helped or supported them (11% and 8%<sup>(much-very much)</sup>–18%<sup>(rather-very much)</sup>) like in the Haravuori *et al.* (2011) study. However, compared to the Maercker and Mehr (2006) study the bereaved less often felt fear or were frightened by media reports (48% versus 15%<sup>(much-very much)</sup>–21%<sup>(rather-very much)</sup>) perhaps due to lower perceived chance that the drastic event may happen again. In sum, reports in the media were more associated with negative than with positive experiences as was observed in other studies.

Latent profile analysis identified four classes of post-event mental health that differed to a large extent. A large minority of the bereaved in our study could be viewed as a sub-clinical or a clinical sample with mild-severe mental health problems about one year post-disaster, which is in line with previous studies (cf. Kristensen *et al.*, 2012; Neria *et al.*, 2007). Remarkably, the number of persons lost was not associated with class membership. Thus we found no support for what is called 'bereavement overload' (cf. Neimeyer & Holland, 2006). We have no explanation for this finding.

The Well-functioning<sup>(class 1)</sup>, the Mild-problems<sup>(class 2)</sup> and Sub-clinical<sup>(class 3)</sup> did not differ significantly in almost all distinguished media experiences about one year post-event, despite the fact the differences in depression symptoms, functional problems and coping self-efficacy scores were substantial considering the Cohen's *d* values and according to the reference data. Findings indicate that, compared to the Well-functioning<sup>(class 1)</sup>, the Clinical<sup>(class 4)</sup> much more often suffered from media reports. However, when counting the number of different negative media experiences, both Sub-clinical<sup>(class 3)</sup> and Clinical<sup>(class 4)</sup> had a higher number of negative experiences than the Well-functioning<sup>(class 1)</sup>. These findings, although we did not include a non-affected comparison group, are in line with the study of Haravuori *et al.* (2016), suggesting that psycho-education programs following disasters for bereaved should include or cover this topic and give advice to limit or how to handle media exposure to this sub group. As this sub group experienced the media reports as negative, this advice should be given to the general (affected) population (cf. Nævdal *et al.*, 2016). The fact that no respondent in the small Clinical<sup>(class 4)</sup> stated that media reports helped them to cope with the event, supports this suggestion.

Some characteristics and limitations need to be discussed. We conducted a cross-sectional study and a longitudinal study design would have enriched our data set and enabled assessments of the possible longitudinal interplay between classes and media experiences (cf. Cho, Boyle, Keum *et al.*, 2003). Future research is needed on how media-experiences are related to classes of trajectories of post-disaster mental health (Norris, Tracey & Galea, 2009). It is unknown to what extent identified classes differed in experiences at earlier stages after the disaster. A larger number of bereaved in general and specifically in the Clinical<sup>(class 4)</sup> would have improved the strength of the analyses of the assessed associations. We used well validated questionnaires to assess depression symptoms, functional problems and event-related coping self-efficacy. In contrast to other studies, we did not rely on retrospective data on experiences with the media since we focused on experiences in the past month (cf. Collimore *et al.*, 2008). We did not examine other possible relevant topics such as social support (Kaniasty & Norris, 2008), experience and perception of social media. It is difficult to estimate the non-response, because we do not know how many bereaved actually knew about the invitation to participate. The education level of our study sample is rather high, but seems, given the associations between education levels with families, in line with reports in the media about the background of deceased. Another aspect is that we did not examine PTSD although the co-morbidity between PTSD and depression is substantial (Rytwinski, Scur, Feeny & Youngstrom, 2013). We included the WSAS to gain insight in present functional problems. We did not examine the associations between classes and possible negative experiences with participation in media interviews (Thoresen *et al.*, 2014). Although it was not the aim of the present study to assess possible differences in problems between bereaved of the MH17-disaster and other bereaved, coping-self efficacy levels among our sample appeared to be (much) lower than "normal." Finally, we cannot rule out the possibility that limiting media consumption may have adverse effects because it may infer with activities to reduce uncertainties about what has happened or search for answers for other important questions. Therefore, future research on this topic is needed to assess possible positive or negative effects of limiting media consumption or exposure among bereaved with severe problems on the short, medium and long term.

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