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Individual differences in peace of mind reflect adaptive emotion regulation☆

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ABSTRACT

Well-being consists of several different dimensions, such as hedonic and eudaimonic well-being. However, peace of mind (PoM)—an aspect of well-being characterized by internal peace and harmony—has only recently begun to receive attention. It has been shown that PoM predicts important outcomes, such as depression and anxiety. An open question is what underlies individual differences in PoM. One important factor may be emotion regulation. However, to date, no studies have been conducted on PoM and emotion regulation. Here, we investigated the relationship between individual differences in PoM and trait emotion regulation. In two studies, participants from Finland (Study 1, $N = 417$) and the US (Study 2, $N = 303$) completed measures of PoM, trait emotion regulation, and other aspects of well-being and ill-being. Results showed that people with higher levels of PoM displayed a greater tendency to use cognitive reappraisal and a lesser tendency to use expressive suppression. Our findings suggest that adaptive emotion regulation may play an important role in explaining PoM and may serve as a promising target for interventions designed to enhance PoM.

1. Introduction

Our understanding of mental well-being has developed rapidly over the past decades. It is now generally agreed that well-being is a multidimensional construct, consisting of at least two different dimensions: hedonic well-being and eudaimonic well-being (Martela & Sheldon, 2019; Ryan & Deci, 2001). Hedonic well-being (or subjective well-being) refers to the presence of positive affect, absence of negative affect, and being satisfied with one's life (Diener, 1984, 2013). In contrast, eudaimonic well-being refers to personal growth, mastery, and having meaning and purpose in life (Huta & Waterman, 2014; Vittersø, 2016). Whereas there is a large body of philosophical (e.g., Pawelski, 2013), psychological (e.g., Vittersø, 2013), and neuroscientific (e.g., Berridge & Kringelbach, 2011) literature on hedonic and eudaimonic well-being, aspects related to inner peace and harmony have only recently attracted attention.

1.1. Peace of mind

Inner peace and harmony are typically associated with Eastern perspectives on well-being (Joshanloo, 2014; Lee, Lin, Huang, & Fredrickson, 2013; Lomas, 2021). However, when lay people in Western cultures define happiness in their own words, they frequently mention such things as peace of mind, contentment, emotional stability, detachment, tranquility, serenity, quietness, inner balance, inner harmony, acceptance of life, being attuned with the universe, and being at ease (Delle Fave et al., 2016; Delle Fave, Brdar, Freire, Vella-Brodrick, & Wissing, 2011; Synard & Gazzola, 2017). Therefore, it has recently been argued that concepts related to inner peace and harmony not only complement existing conceptualizations of well-being (Lambert et al., 2020) but lie *at the heart of well-being* (Lomas, 2021). However, efforts at integrating these aspects into theoretical (Haybron, 2008) and empirical well-being research (Dambrun et al., 2012; Joshanloo, 2022; Kjell, Daukantaitė, Hefferon, & Sikström, 2016; Lee et al., 2013; Lomas et al., 2022) have only recently begun in earnest.

One major contribution was the development by Lee et al. (2013) of

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the construct and measurement of peace of mind (PoM), conceptualized as a form of well-being characterized by internal peace and harmony. It has been operationalized via the Peace of Mind Scale (PoMS) as the presence of the feelings of peace, stability, contentment, and comfort, having peace and harmony in one's mind, and as the absence of anxiety and uneasiness. Lee et al. (2013) demonstrated that, in a Chinese sample, PoM was positively correlated with life satisfaction and positive affect, and negatively correlated with negative affect, depression, and anxiety. Similar results have been obtained in Western samples (Sikka, Pesonen, & Revonsuo, 2018; Vandepitte, Sara, Jellen, & Lieven, 2022). Sikka et al. (2018) additionally reported a positive correlation between PoM and eudaimonic well-being. Importantly, Lee et al. (2013) showed that PoM predicted measures of mental ill-being (i.e., anxiety, depression) above and beyond the measures of hedonic well-being, including low-arousal positive affect. This led the authors to argue that PoM is distinct from and reflects "a more complex and balanced state of mind" (p. 587) than just the existence of low-arousal positive affect.

Relatedly, items tapping into peace (referred to as *peace with life*) and harmony (referred to as *balance*) were, for the first time, included in the latest Gallup World Poll and reported in the 2022 World Happiness Report (Helliwell, Layard, Sachs, & De Neve, 2022). Results showed that, among the Western countries, peace and harmony/balance predicted life satisfaction to a greater extent than income, friend support, or health (Lomas et al., 2022). Moreover, in a large international study (with >120,000 participants), it was recently demonstrated that items tapping into peace, calm, and balance (referred to as *mental balance*) capture aspects of well-being not captured with existing measures of well-being (Joshanloo, 2022).

In sum, existing studies show that PoM (or items tapping into inner peace and harmony) is an aspect of well-being predicting important outcomes. This raises the question as to why some individuals have more PoM than others, that is, what underlies individual differences in PoM. Although many different psychological processes may be involved, we know from decades of research that one important factor explaining different aspects of well-being and ill-being is emotion regulation (e.g., Gross & John, 2003; Sheppes, Suri, & Gross, 2015).

1.2. The role of emotion regulation in peace of mind

Emotion regulation refers to attempts to influence which emotions a person has, and how these emotions are experienced and expressed (Gross, 1998). Emotion regulation may involve the up- or down-regulation of negative or positive emotions (Gross, 2015). Adaptive and efficient emotion regulation is of central importance for mental and physical health, academic and work performance, as well as relationship satisfaction, whereas problems in emotion regulation contribute to negative outcomes in each of these areas (Koole, 2009; Suri & Gross, 2016).

Studies often investigate individual differences in the use of various emotion regulation strategies (or trait emotion regulation). Based on abundant research findings over the past several decades, the use of certain emotion regulation strategies, such as cognitive reappraisal (i.e., reinterpreting the situation that triggers the emotion), is now considered generally adaptive, whereas the use of other strategies, such as expressive suppression (i.e., the inhibition of emotion expression), is now considered generally less adaptive (McRae & Gross, 2020). Findings show that, while the trait-like use of cognitive reappraisal is associated with higher levels of positive affect, lower levels of negative affect, higher life satisfaction, and enhanced eudaimonic well-being, expressive suppression is related to the opposite pattern of outcomes (e.g., Gross & John, 2003; Haga, Kraft, & Corby, 2009; Jiang et al., 2021), although results regarding expressive suppression are less consistent (e.g., McRae, Jacobs, Ray, John, & Gross, 2012; St-Louis, Rapaport, Chénard-Poirier, Vallerand, & Dandeneau, 2021). Additionally, cognitive reappraisal has been shown to be linked with higher levels of trait mindfulness as well as lower frequency of rumination and lower levels of non-acceptance (e.g., Brockman, Ciarrochi, Parker, & Kashdan, 2017; Desrosiers, Vine, Klemanski, & Nolen-Hoeksema, 2013).

It has been suggested that inner peace and harmony can be achieved by accepting and balancing between both positive and negative experiences (Dambrun et al., 2012; Lee et al., 2013; Sikka et al., 2018). To this end, individuals need to exert cognitive control over their mental states (Joshanloo, 2014; Lee et al., 2013; Lee & Chao, 2012), and, specifically, to regulate their affective states (Lomas, 2021). In line with this, it has been demonstrated that individuals with higher capacity for active inhibitory control report more PoM (Lee & Chao, 2012). Moreover, engagement in certain mental practices, such as mindfulness meditation, the goal of which is to train emotion regulation skills (Teper, Segal, & Inzlicht, 2013), has been demonstrated to enhance PoM (Pandya, 2020). Based on these findings, it has been proposed that PoM may reflect adaptive emotion regulation (Sikka et al., 2018). However, to date, no studies have been conducted on PoM and emotion regulation. Given the role of emotion regulation in psychological and physical well-being and the implications this may have for PoM, it is important to understand whether (and how) PoM and emotion regulation are related. In addition, because prior studies on PoM or emotion regulation have rarely included a comprehensive set of measures of well-being and ill-being, it remains to be determined what proportion of variance in trait emotion regulation PoM explains compared to other aspects of well-being and ill-being.

1.3. The present research

The primary aim of the present research was to examine the link between PoM and trait emotion regulation, specifically the habitual use of generally adaptive (i.e., cognitive reappraisal) and generally less adaptive (i.e., expressive suppression) emotion regulation strategies. We expected that people with higher levels of PoM would display a greater tendency to use adaptive (i.e., cognitive reappraisal) emotion regulation strategies and a lesser tendency to use less adaptive (i.e., expressive suppression) emotion regulation strategies. We carried out two studies using a comprehensive set of measures targeting different aspects of well-being (hedonic well-being: life satisfaction, positive affect; eudaimonic well-being; PoM) and ill-being (negative affect, symptoms of anxiety and depression). Study 1 on a Finnish sample provided initial support for our hypotheses. Because Finland has been shown to differ from other Western countries in well-being in general, and in peace with life and calmness in particular (Helliwell et al., 2022; Joshanloo, 2022; Lomas et al., 2022), it is important to estimate the degree to which the findings generalize across different countries in the Western cultural context. Therefore, we carried out Study 2 on a US sample. In secondary analyses, we examined the relative importance of all the different aspects of well-being and ill-being, especially PoM, in trait emotion regulation across the Finnish and US samples.

2. Study 1: peace of mind and emotion regulation in the Finnish sample

2.1. Materials and methods

2.1.1. Participants and procedure

In Study 1, 417 Finnish-speaking participants ($M_{age} = 31.63$, $SD_{age} = 11.93$, 18–67 years; 354 women, 49 men, 14 "other") were recruited via advertisements sent to the student and staff email lists of various universities across Finland as well as shared via social media (Facebook groups). Participants did not receive any reimbursement. See Supplementary Table S1 for more information regarding participant demographics.

Participants filled in an online questionnaire (administered via Webropol) that contained demographic questions and previously validated scales measuring PoM, emotion regulation, as well as other aspects of well-being and ill-being (see Measures). To fill in the

questionnaire, participants had to first give informed consent. The study was approved by the Ethics Committee for Human Sciences at the University of Turku (Finland). All measures were administered in Finnish. Scales that were not available in Finnish were translated into Finnish using the back-translation method.

2.1.2. Measures

2.1.2.1. Peace of Mind. PoMS (Lee et al., 2013) was used to measure individual differences in PoM. The scale consists of seven items (e.g., "I have peace and harmony in my mind") of which two items are reverse-coded (e.g., "It is difficult for me to feel settled"). Participants rated each item on the scale from 1 ("not at all") to 5 ("all of the time"). We translated the scale into the Finnish language using the back-translation method (for the questionnaire in Finnish, see Supplementary Table S2). Whereas the average score of the 7 items has been used in studies including samples from Eastern cultures, in Lee et al. (2013) and in Sikka et al. (2018) the mean of the five items was used for participants from Western cultures (US and Sweden, respectively) because in these samples the two reverse-coded items loaded on a separate factor. In the current study, based on confirmatory factor analysis (see Section 2.1.3 Analyses), we used the 5-item PoMS (PoMS5) for the main analyses but additionally repeated all the analyses using the 7-item PoMS (PoMS7). Higher scores indicate higher levels of PoM in everyday life. Both scales had good internal consistency (McDonald's omega) in our sample (see Table 1 for McDonald's omega of these and other measures).

2.1.2.2. Emotion regulation. The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003; for the Finnish version, see Vuorela & Nummenmaa, 2004) was used to measure trait emotion regulation. The scale consists of ten items, of which six items measure the habitual use of cognitive reappraisal (e.g., "When I want to feel less negative emotion, I change the way I'm thinking about the situation") and four the habitual use of expressive suppression (e.g., "I control my emotions by not expressing them"). Participants rated each item on a scale from 1 ("strongly disagree") to 7 ("strongly agree"). Mean scores of the two subscales—cognitive reappraisal (ERQ-CR) and expressive suppression (ERQ-ES)—were calculated. Higher scores reflect the more frequent habitual use of the respective emotion regulation strategies.

2.1.2.3. Life satisfaction. The Satisfaction With Life Scale (SWLS; Diener, 1984; for the Finnish version, see Korhonen, 2012) was used to measure overall life satisfaction. The scale consists of five items (e.g., "I am satisfied with my life") that are rated on a scale from 1 ("strongly disagree") to 7 ("strongly agree"). The total score was obtained by summing up all the items.

2.1.2.4. Positive and negative affect. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was used to measure positive and negative affect. The scale consists of 20 items, 10 of which measure positive affect (e.g., interested, excited) and 10 negative affect (e.g., nervous, afraid). Because PANAS contains only high-arousal (or high-activation) affective states, four low-arousal positive affect items (calm, tranquil, serene, relaxed) and four low-arousal negative affect items (bored, tired, sleepy, sluggish) used in Lee et al. (2013) were also included. Participants were asked to rate to what extent they *generally* experience each of the 28 feelings on a scale from 1 ("very slightly or not at all") to 5 ("extremely"). We translated the PANAS, as well as the low-arousal positive and negative affect items, into Finnish using the back-translation method (for all the items in Finnish, see Supplementary Table S2). Mean scores of the 10 high-arousal positive affect items (PA) and 10 high-arousal negative affect items (NA) as well as of the 4 low-arousal positive affect items (LPA) and 4 low-arousal negative affect items (LNA) were calculated.

2.1.2.5. Eudaimonic Well-being. The 18-item version of Ryff's Scales of Psychological Well-Being (PWB; Ryff & Keyes, 1995; for the Finnish version, see Kokko, Tolvanen, & Pulkkinen, 2013) was used to measure eudaimonic well-being. The scale consists of six subscales with 3 items each: self-acceptance ("I like most parts of my personality"), environmental mastery ("In general, I feel I am in charge of the situation in which I live"), positive relations ("People would describe me as a giving person, willing to share my time with others"), purpose in life ("Some people wander aimlessly through life, but I am not one of them"), personal growth ("For me, life has been a continuous process of learning, changing, and growth"), autonomy (e.g., "I have confidence in my own

Table 1
Descriptive statistics of Studies 1 and 2.

Aspect well-being or ill-being	Measure	McDonald's ω		*M*		Observed range (min – max)		Theoretical range (min – max)
		Study 1 (Fin)	Study 2 (US)	Study 1 (Fin)	Study 2 (US)	Study 1 (Fin)	Study 2 (US)	
Peace of Mind (5 items)	PoMS5	0.94	0.93	2.73 (0.91)	2.87 (0.90)	1–5	1.20–5	1–5
Peace of Mind (7 items)	PoMS7	0.96	0.95	2.96 (0.91)	3.00 (0.84)	1–5	1.29–5	1–5
Emotion Regulation – Cognitive Reappraisal	ERQ-CR	0.82	0.90	4.85 (0.87)	4.73 (1.06)	2.17–7	2–7	1–7
Emotion Regulation – Expressive Suppression	ERQ-ES	0.86	0.84	3.34 (1.32)	3.68 (1.40)	1–6.75	1–7	1–7
Satisfaction with Life	SWLS	0.89	0.90	23.95 (5.68)	25.16 (6.41)	5–35	5–35	5–35
Positive Affect (PANAS)	PA	0.91	0.90	3.45 (0.66)	3.40 (0.67)	1.40–5	1.50–5	1–5
Low-Arousal Positive Affect	LPA	0.90	0.90	3.09 (0.82)	2.93 (0.87)	1–5	1–5	1–5
Negative Affect (PANAS)	NA	0.92	0.90	2.37 (0.79)	2.15 (0.69)	1–4.40	1–4	1–5
Low-Arousal Negative Affect	LNA	0.77	0.84	2.82 (0.80)	3.03 (0.83)	1–5	1–4.75	1–5
Eudaimonic Well-being	PWB	0.82	0.86	54.26 (7.26)	92.93 (14.30)	35–69	56–123	7–126
Anxiety	GAD7	0.91	0.92	5.27 (4.80)	5.65 (4.91)	0–21	0–21	0–21
Depression	PHQ9	0.89	0.89	7.42 (5.58)	6.46 (5.37)	0–25	0–27	0–27

Note. Fin = Finland sample. US = US sample.
ERQ-CR = the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. ERQ-ES = the expressive suppression subscale of the Emotion Regulation Questionnaire. GAD7 = the Generalized Anxiety Disorder Scale (i.e., symptoms of anxiety). LNA = low-arousal negative affect (mean of 4 items). LPA = low-arousal positive affect (mean of 4 items). NA = negative affect subscale of the Positive and Negative Affect Schedule. PA = positive affect subscale of the Positive and Negative Affect Schedule. PHQ9 = The depression module of the Patient Health Questionnaire (i.e., symptoms of depression). PANAS = Positive and Negative Affect Schedule. PoMS5 = 5-item Peace of Mind Scale.). PoMS7 = 7-item Peace of Mind Scale. PWB = Ryff's Scales of Psychological Well-being (i.e., eudaimonic well-being). SWLS = Satisfaction With Life Scale.

opinions, even if they are different from the way most other people think"). Participants rated each item on a scale from 1 ("strongly disagree") to 7 ("strongly agree"). All items were summed to obtain an overall score of eudaimonic well-being.

2.1.2.6. Depression. The depression module of the Patient Health Questionnaire (PHQ-9; Spitzer, Kroenke, & Williams, 1999; for the Finnish version, see https://www.phqscreeners.com/select-screener) was used to measure symptoms of depression. This scale consists of 9 items that are based on the diagnostic criteria from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association). Participants rated how often, over the past two weeks, each of the symptoms (e.g., "Little interest or pleasure in doing things") had bothered them on a scale from 0 ("not at all") to 3 ("nearly every day"). All items were summed to obtain the total score. The cut-off scores of 5, 10, 15, and 20 represent mild, moderate, moderately severe, and severe depression, respectively.

2.1.2.7. Anxiety. The Generalized Anxiety Disorder Scale (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006; for the Finnish version, see https://www.phqscreeners.com/select-screener) was used to measure symptoms of anxiety. The scale consists of 7 items that are based on the diagnostic criteria A, B, and C for generalized anxiety disorder from the DSM-5. Participants rated how often, over the past two weeks, each of the symptoms (e.g., "Worrying too much about different things") had bothered them on a scale from 0 ("not at all") to 3 ("nearly every day"). All items were summed to obtain the total score and the cut-off scores 5, 10, and 15 represent mild, moderate, and severe anxiety, respectively.

2.1.3. Analyses

All analyses were performed using IBM SPSS Statistics (v. 20) and R (v. 4.0.2,(R Core Team, 2020). We first performed confirmatory factor analysis, using the *lavaan* package in R (Rosseel, 2012), to test whether a one-factor (7 items) or a two-factor (5 non-reversed items and 2 reverse-scored items) PoMS would best fit the data. We used the goodness of fit indicators to determine the fit of each model: CFI and TLI $\geq$ 0.95 (or 0.90), RMSEA <0.08 (or 0.06), and SRMR <0.08 (Hu & Bentler, 1999). The two-factor model ($\chi^2 < 0.001$, CFI = 0.970, TLI = 0.951, RMSEA = 0.112, SRMR = 0.030, AIC = 6560.857) had a slightly better fit than the one-factor model solution ($\chi^2 < 0.001$, CFI = 0.952, TLI = 0.927, RMSEA = 0.137, SRMR = 0.038, AIC = 6600.737), $\chi^2(1) = 41.881$, $p < .001$. Therefore, as in Lee and Chao (2012) and Sikka et al. (2018), we used the 5-item PoMS for the main analyses (and repeated analyses using the 7-item PoMS). Reliability (McDonald's omega) was tested using the *omega* function from the *psych* (Revelle, 2022) package.

Next, hierarchical multiple regression analysis was performed to examine whether trait emotion regulation (i.e., habitual emotion regulation strategy use) predicted PoM. In the first step, demographic variables were entered into the regression model to control for their potential effects. These demographic variables included age (continuous) and gender (discrete variable, dummy-coded as 0 = man, 1 = woman, 2 = other, 3 = not reported). In the second step, ERQ scale scores (ERQ-CR and ERQ-ES) were entered as predictors. Continuous predictors were standardized and grand-mean centered. As such, the estimated coefficients reflect the magnitude of change in PoM associated with an increase of one standard deviation in the predictor variable.

In case of outliers, we repeated the analyses employing robust regression, using the *rlm* function from the *MASS* package in R (Venables & Ripley, 2002). Multicollinearity was evaluated using the variance inflation factor (VIF) by employing the *vif* function in the *usdm* package (Naimi, Hamm, Groen, Skidmore, & Toxopeus, 2014). VIF remained well below 5 for all predictors and, as such, multicollinearity did not pose any issues (Field, Miles, & Field, 2012).

2.2. Results and discussion

2.2.1. Preliminary analyses

Table 1 presents the descriptive statistics for all measures. Gender differences in all the included measures are presented in the Supplementary Table S3.

2.2.2. Relationship between peace of mind and trait emotion regulation

Pearson zero-order correlations between all the measures are presented in Table 2. Results showed that PoMS5 was positively correlated with ERQ-CR, but negatively correlated with ERQ-ES.

Results of hierarchical multiple regression (see Table 3) further demonstrated that demographic variables alone accounted for 5.6 % of the variance in PoMS5. Adding ERQ scores accounted for an additional 8.1 % variance in PoMS5 (model: $F[6410] = 10.87$, $p < .001$). When controlling for ERQ-ES, ERQ-CR was positively associated with PoMS5. When controlling for ERQ-CR, ERQ-ES was negatively associated with PoMS5. Also, age and gender were significant predictors of PoMS5: increasing age was associated with higher PoMS5 scores, whereas women and those selecting the "other" gender category displayed lower PoMS5 scores than men. Due to the existence of outliers, we repeated the analyses using robust regression, which confirmed these findings (see Supplementary Table S4). We also repeated the analyses using the 7-item PoMS, which yielded essentially the same results (model: $F[6410] = 12.64$, $p < .001$, $R^2 = 0.156$, adjusted $R^2 = 0.144$; see Supplementary Table S5 for full results).

As expected, then, ERQ-CR and ERQ-ES explained a small but significant portion of variance in PoMS. Individuals with higher levels of PoM reported more frequent use of more adaptive (i.e., cognitive reappraisal), and less frequent use of less adaptive (i.e., expressive suppression) emotion regulation strategies.

ERQ-CR was also positively correlated with other aspects of well-being (life satisfaction, positive affect, eudaimonic well-being) and negatively correlated with aspects of ill-being (symptoms of anxiety and depression). The opposite pattern of results was evident for the ERQ-ES. The habitual use of emotion regulation strategies was more strongly correlated with measures of well-being than ill-being, although all correlations were of small to moderate magnitude. It bears noting that in this sample (as in many prior studies; see Gross & John, 2003) ERQ-CR and ERQ-ES were not correlated.

3. Study 2: peace of mind and emotion regulation in the US sample

Study 1 provided support for the hypothesized link between PoM and adaptive emotion regulation. To estimate the degree to which the findings generalize across different countries in the Western cultural context, the aim of Study 2 was to replicate Study 1 on a US sample.

3.1. Materials and methods

3.1.1. Participants and procedure

In Study 2, 303 participants were recruited via the Stanford University student pool who received credit for participation. As in Study 1, participants were required to be at least 18 years old. After removing participants who marked that they were younger than 18 ($N = 1$) and missing responses on the scales measuring PoM and trait emotion regulation ($N = 5$), 297 participants ($M_{age} = 19.58$, $SD_{age} = 1.26$, 18–26 years; 135 women, 155 men, 7 "other") remained. Data were collected using an online questionnaire (administered via Qualtrics) which included informed consent. The study was approved by the Institutional Review Board at Stanford University (US).

3.1.2. Measures

We used the same measures as in Study 1, except that the scales were administered in the English language.

Table 2
Zero-order correlations between measures in Study 1 for the Finnish sample.

	PoMS5	ERQ-CR	ERQ-ES	SWLS	PWB	PA	LPA	NA	LNA	GAD7	PHQ9
PoMS5											
ERQ-CR	0.23***										
ERQ-ES	−0.18***	0.06									
SWLS	0.70***	0.26***	−0.21***								
PWB	0.66***	0.21**	−0.33***	0.67***							
PA	0.58***	0.24***	−0.26***	0.61***	0.68***						
LPA	0.73***	0.22***	−0.03	0.48***	0.44***	0.45***					
NA	−0.70***	−0.23***	0.16**	−0.56***	−0.59***	−0.45***	−0.62***				
LNA	−0.60***	−0.18***	0.18**	−0.52***	−0.56**	−0.53***	−0.46***	0.64***			
GAD7	−0.65***	−0.16**	0.13**	−0.52***	−0.50***	−0.40***	−0.65***	0.75***	0.51***		
PHQ9	−0.70***	−0.12**	0.23***	−0.61***	−0.60***	−0.54***	−0.58***	0.70***	0.66***	0.72***	
Age	0.18***	0.03	−0.07	0.06	0.08	0.10*	0.14**	−0.22***	−0.19***	−0.24***	−0.16**

Note. Pearson correlations between variables using unstandardized mean or sum scores.
ERQ-CR = the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. ERQ-ES = the expressive suppression subscale of the Emotion Regulation Questionnaire. GAD7 = the Generalized Anxiety Disorder Scale (i.e., symptoms of anxiety). LNA = low-arousal negative affect (mean of 4 items). LPA = low-arousal positive affect (mean of 4 items). NA = negative affect subscale of the Positive and Negative Affect Schedule. PA = positive affect subscale of the Positive and Negative Affect Schedule. PHQ9 = The depression module of the Patient Health Questionnaire (i.e., symptoms of depression). PoMS5 = 5-item Peace of Mind Scale. PWB = Ryff's Scales of Psychological Well-being (i.e., eudaimonic well-being). SWLS = Satisfaction With Life Scale.
*** $p < .001$ **$p < .01$ * $p < .05$.

Table 3
Hierarchical Multiple Regression Models predicting peace of mind from trait emotion regulation in Study 1 for the Finnish sample.

	R2	Adjusted *R2*	*ẽ*	95 % CI [LL; UL]	*SE*	*t*	*p*
Step 1	0.056	0.046					
Age			0.154	0.067; 0.240	0.044	3.487	< 0.001
Gender (female)			−0.098	−0.367; 0.170	0.137	−0.720	0.472
Gender (other)			−0.811	−1.379; −0.243	0.289	−2.806	0.005
Gender (not reported)			−1.004	−2.271; 0.264	0.645	−1.557	0.120
Step 2	0.137	0.125					
Age			0.129	0.046; 0.213	0.042	3.051	0.002
Gender (female)			−0.269	−0.533; −0.006	0.134	−2.009	0.045
Gender (other)			−0.909	−1.455; −0.363	0.278	−3.273	0.001
Gender (not reported)			−0.708	−1.927; 0.511	0.620	−1.142	0.254
ERQ-CR			0.218	0.133; 0.302	0.043	5.051	< 0.001
ERQ-ES			−0.174	−0.258; −0.090	0.043	−4.076	< 0.001

Note. ERQ-CR = the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. ERQ-ES = the expressive suppression subscale of the Emotion Regulation Questionnaire.

3.1.3. Analyses

We used the same statistical software programs and analysis strategy as for Study 1 with the following exception. The demographic variable gender (discrete variable) had three levels (dummy-coded as 0 = man, 1 = woman, 2 = other), since there were no missing answers. First, we performed confirmatory factor analysis, using the *lavaan* package in R, to test whether a one-factor (7 items) or a two-factor (5 non-reversed items and 2 reverse-scored items) PoMS would best fit the data. The two-factor model ($\chi^2 = 0.001$, CFI = 0.983, TLI = 0.972, RMSEA = 0.077, SRMR = 0.025, AIC = 4818.210) had a better fit than the one-

Table 4
Zero-order correlations between measures in Study 2 for the US sample.

	PoMS5	ERQ-CR	ERQ-ES	SWLS	PWB	PA	LPA	NA	LNA	GAD7	PHQ9
PoMS5											
ERQ-CR	0.26***										
ERQ-ES	−0.16***	0.03									
SWLS	0.54***	0.20**	−0.22***								
PWB	0.52***	0.30***	−0.30***	0.61***							
PA	0.50***	0.22***	−0.09	0.47***	0.54***						
LPA	0.64***	0.15*	−0.02	0.29***	0.33***	0.45***					
NA	−0.44***	−0.19**	0.13*	−0.36***	−0.55***	−0.18**	−0.27***				
LNA	−0.38***	−0.14*	0.07	−0.36***	−0.44**	−0.40***	−0.19***	0.53***			
GAD7	−0.46***	−0.13*	0.09	−0.30***	−0.44***	−0.22***	−0.39***	0.65***	0.42***		
PHQ9	−0.47***	−0.15*	0.11*	−0.40***	−0.55***	−0.42***	−0.28***	0.45***	0.55***	0.60***	
Age	0.20	−0.07	−0.07	−0.04	0.00	−0.01	−0.02	0.07	0.06	0.02	0.10

Note. Pearson correlations between variables using unstandardized mean or sum scores.
ERQ-CR = the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. ERQ-ES = the expressive suppression subscale of the Emotion Regulation Questionnaire. GAD7 = the Generalized Anxiety Disorder Scale (i.e., symptoms of anxiety). LNA = low-arousal negative affect (mean of 4 items). LPA = low-arousal positive affect (mean of 4 items). NA = negative affect subscale of the Positive and Negative Affect Schedule. PA = positive affect subscale of the Positive and Negative Affect Schedule. PHQ9 = The depression module of the Patient Health Questionnaire (i.e., symptoms of depression). PoMS5 = 5-item Peace of Mind Scale. PWB = Ryff's Scales of Psychological Well-being (i.e., eudaimonic well-being). SWLS = Satisfaction With Life Scale.
*** $p < .001$ **$p < .01$ * $p < .05$.

factor model solution ($\chi^2 < 0.001$, CFI = 0.916, TLI = 0.874, RMSEA = 0.164, SRMR = 0.070, AIC = 4905.291, $\chi^2(1) = 89.081$, $p < .001$. Therefore, as in Study 1, we used the 5-item PoMS for the main analyses. However, we also repeated all the analyses using the 7-item PoMS.

3.2. Results and discussion

3.2.1. Preliminary analyses

Descriptive statistics for all measures can be seen in Table 1. For gender differences in all the included measures, see Supplementary Table S2.

3.2.2. Relationship between peace of mind and trait emotion regulation

Pearson zero-order correlations showed that PoMS5 was positively correlated with ERQ-CR, but negatively correlated with ERQ-ES (see Table 4) and these correlations remained significant even when controlling for demographic variables and the other subscale of ERQ (see Table 5). Additionally, hierarchical multiple regression analyses demonstrated that demographic variables accounted for only 0.4 % of the variance in PoM. Adding ERQ scores explained an additional 9.7 % of the variance (model: $F[5291] = 6.492, p < .001$). Age and gender were not significant predictors of PoMS5.

Due to the existence of outliers, we repeated the analyses using robust regression, which confirmed these findings (see Supplementary Table S4). We also repeated the analyses using the 7-item PoMS, which yielded essentially the same results (model: $F[6410] = 12.64$, $p < .001$, $R^2 = 0.156$, adjusted $R^2 = 0.144$; see Supplementary Table S5 for full results).

Thus, Study 2 replicated the results of Study 1, demonstrating that the findings obtained in Study 1 on a Finnish sample are generalizable to the US sample.

As in Study 1, ERQ-CR was positively correlated with other aspects of well-being and negatively correlated with other aspects of ill-being, with the magnitude of correlations being of similar size in the two studies. ERQ-ES was negatively correlated only with life satisfaction and eudaimonic well-being and positively correlated only with negative affect and symptoms of depression. This suggests that adaptive emotion regulation strategies (i.e., cognitive appraisal) are associated with a broader set of well-being indicators than less adaptive strategies (i.e., expressive suppression). As in Study 1, ERQ-CR and ERQ-ES were not correlated.

4. Measurement invariance of the Peace of Mind Scale across the two countries

To explore whether the PoMS measures the same constructs in the two samples, we estimated whether the two-factor model of PoMS was measurement invariant across the two countries (Finland, US). We assessed the configural, metric, scalar, and strict invariance. First, we estimated a baseline (configural) model. Then, we estimated models in which (a) loadings were constrained to be equal (metric invariance), (b) both the loadings and intercepts were constrained to be equal (scalar invariance), and (c) the loadings, intercepts, and residual errors were constrained to be equal (strict invariance). Measurement was considered invariant if the CFI and RMSEA values indicated a good model fit, and the decrease for CFI did not exceed 0.01 and for RMSEA did not exceed 0.015 (Chen, 2007; Putnick & Bornstein, 2016). We used the *SEMTools* (Jorgensen, Pornprasertmanit, Schoemann, & Rosseel, 2022) and *lavaan* packages for multi-group CFA.

Results demonstrated full strict invariance, indicating that item loadings, intercepts, and residuals were equal across the Finnish and US samples (see Table 6).

5. Relative importance of peace of mind in explaining trait emotion regulation

When attempting to test the relative importance of different aspects of well-being and ill-being, including PoM, in trait emotion regulation, the high correlations between PoMS and other well-being scales raised two concerns: whether PoM really is distinct from other aspects of well-being and multicollinearity.

To address the first concern, we performed confirmatory factor analyses, using the *lavaan* package in R. We tested a number of different models in which items of PoMS5 were specified either as a separate factor or as part of the common factor with items measuring other aspects of well-being. Results showed that, across all the different solutions tested, models in which PoMS5 was a separate factor had better fit (see Supplementary Table S6 for full results). This suggests that, despite the high correlations with other well-being variables, PoMS measures aspects of well-being not captured with other well-being scales. This implies that studying the relative importance of PoM as a distinct aspect of well-being in trait emotion regulation is justified.

To address multicollinearity between the variables, we performed

Table 5
Hierarchical Multiple Regression Models predicting peace of mind from trait emotion regulation in Study 2 for the US sample.

	R2	Adjusted *R2*	*ϕ*	95 % CI [LL; UL]	*SE*	*t*	*p*
Step 1	0.004	−0.006					
Age			−0.086	−0.098; 0.115	0.054	0.158	0.874
Gender (female)			−0.084	−0.290; 0.132	0.109	−0.764	0.446
Gender (other)			−0.260	−0.948; 0.428	0.350	−0.743	0.458
Step 2	0.100	0.085					
Age			0.002	−0.100; 0.105	0.052	0.046	0.964
Gender (female)			−0.175	−0.387; 0.037	0.108	−1.628	0.105
Gender (other)			−0.336	−0.994; 0.322	0.334	−1.004	0.316
ERQ-CR			0.232	0.133; 0.331	0.050	4.617	< 0.001
ERQ-ES			−0.156	−0.259; −0.055	0.052	−3.018	0.003

Note. ERQ-CR = the cognitive reappraisal subscale of the Emotion Regulation Questionnaire. ERQ-ES = the expressive suppression subscale of the Emotion Regulation Questionnaire.

Table 6
Fit indices for multi-group confirmatory factor analyses for the Peace of Mind Scale across Finland and US.

CFA	χ^2 (df)	CFI	RMSEA [95 % CI LL; UL]	SRMR	ΔCFI	ΔRMSEA
Configural invariance	117.15 (26)	0.974	0.099 [0.081; 0.118]	0.025	N/A	N/A
Metric invariance	123.62 (31)	0.974	0.091 [0.075; 0.109]	0.032	0.000	0.008
Scalar invariance	141.93 (36)	0.970	0.091 [0.075; 0.107]	0.036	0.004	0.001
Strict invariance	181.34 (43)	0.961	0.095 [0.081; 0.109]	0.043	0.009	0.004

Note. ΔCFI = CFI difference between the current and previous (simpler) model. ΔRMSEA = RMSEA difference between the current and previous (simpler) model.

relative weight analyses (RWA; Tonidandel & LeBreton, 2015), which enable estimation of the relative importance of several predictor variables, while accounting for their multicollinearity. Specifically, in relative weight analysis, the total variance predicted in a regression model (R^2) is decomposed into weights that reflect the importance of each predictor relative to other predictors in the model (i.e., what proportion each predictor contributes to R^2). This is achieved by transforming the predictors into new predictors that are uncorrelated with each other but maximally correlated with the original predictor. The outcome variable can then be regressed onto the new uncorrelated predictors to approximate the relative weights of the original variables (Johnson, 2000). We used the RWA-Web application (https://www.scotttonidandel.com/rwa-web) to perform the analyses. All the scales measuring different aspects of well-being and ill-being (i.e., PoMS5, SWLS, PWB, PA, LPA, NA, LNA, PHQ9, GAD7) were entered as predictor variables and the trait emotion regulation subscales (ERQ-CR and ERQ-ES) were entered in separate regression models as independent criterion (or outcome) variables. Listwise deletion was used to handle missing data, and the recommended 10,000 bootstrap replications were applied to test for statistical significance at an alpha level of 0.05. Additionally, we tested whether the relative weights differed across the two countries (i.e., Finland and Sweden). Table 7 presents the raw and rescaled weights that correspond to the proportion of variance in trait emotion regulation (ERQ-CR and ERQ-ES) explained by each predictor and the relative importance of each predictor (as reflected in the percentage of predicted variance accounted by each predictor), respectively.

Results showed that the weighted combination of well-being and ill-being variables explained 8.83 % of the variance in trait cognitive reappraisal. A closer examination of the relative weights demonstrated that all variables, except for eudaimonic well-being (i.e., PWB), symptoms of depression and anxiety, explained a statistically significant amount of variance in cognitive reappraisal, with the most important variables being trait positive affect (25 % of model R^2), satisfaction with life (18 % of model R^2), and PoM (16 % of model R^2) (see Fig. 1). There were no statistically significant differences as a function of country.

Regarding trait expressive suppression, the weighted combination of the predictors explained 6.96 % of the variance in trait expressive suppression. Four of the nine variables explained a statistically significant amount of variance in expressive suppression: trait positive affect (25 % of model R^2), satisfaction with life (23 % of model R^2), PoM (12 % of model R^2), and symptoms of depression (12 % of model R^2) (see Fig. 1). Only trait positive affect differed as a function of country, with the relative weight of the predictor being higher in the Finnish sample (raw relative weight = 0.025, rescaled relative weight 17.33 %) as compared to the US sample (raw relative weight = 0.005, rescaled relative weight 4.41 %).

Table 7
Relative weight analyses evaluating the relationship between aspects of well-being, ill-being and trait emotion regulation.

Predictor	Raw relative weight 95 % CI [LL, UL]	Rescaled relative weight (%)
Criterion (outcome): trait cognitive reappraisal (ERQ-CR)		
PoMS5	0.014 [0.005, 0.028]	15.76*
SWLS	0.016 [0.005, 0.033]	18.09*
PWB	0.001 [0.0004, 0.002]	1.42
PA	0.022 [0.008, 0.043]	24.67*
LPA	0.009 [0.002, 0.023]	10.10*
NA	0.012 [0.003, 0.027]	13.81*
LNA	0.007 [0.002, 0.018]	7.38*
PHQ9	0.004 [0.001, 0.005]	3.99
GAD7	0.004 [0.005, 0.033]	4.80
Criterion (outcome): trait expressive suppression (ERQ-ES)		
PoMS5	0.009 [0.003, 0.019]	12.30*
SWLS	0.016 [0.004, 0.034]	22.45*
PWB	0.002 [0.001, 0.008]	2.87
PA	0.017 [0.005, 0.036]	24.88*
LPA	0.006 [0.002, 0.017]	8.46
NA	0.004 [0.001, 0.012]	6.27
LNA	0.004 [0.002, 0.013]	6.21
PHQ9	0.008 [0.002, 0.020]	12.04*
GAD7	0.003 [0.001, 0.007]	4.52

Note. * Statistically significant weight based on 95 % confidence interval tests for significance (i.e., lower to upper bounds do not include zero).

6. General discussion

We investigated the relationship between individual differences in PoM and trait emotion regulation using a comprehensive set of well-being and ill-being measures. The two studies carried out on Western samples (Finnish, US) showed that, as expected, people with higher (versus lower) levels of PoM display a greater tendency to use cognitive reappraisal and a lesser tendency to use expressive suppression. These results provide the first empirical evidence in support of the proposal that PoM may reflect adaptive emotion regulation (Sikka et al., 2018).

6.1. Peace of mind and adaptive emotion regulation

The findings of the current study corroborate previous studies that have reported small-to-medium-sized correlations between trait-like use of emotion regulation strategies (i.e., cognitive reappraisal and expressive suppression) and well-being, including life satisfaction, positive affect, as well as eudaimonic well-being (as measured with PWB) (e.g., Cabello, Salguero, Fernández-Berrocal, & Gross, 2013; Chin & Rickard, 2014; Gross & John, 2003; Haga et al., 2009; Jiang et al., 2021; Pauw et al., 2020). The fact that the magnitude of correlations between cognitive reappraisal and PoM was comparable to the correlations between cognitive reappraisal and other aspects of well-being indicates that adaptive emotion regulation, specifically cognitive reappraisal, may constitute a more general mechanism leading to enhanced well-being, although it is important to be mindful of the correlational nature of the current data.

According to the process model of emotion regulation (Gross, 1998, 2015), cognitive reappraisal is an antecedent-focused emotion regulation strategy, targeting cognitions (or appraisals of situations) that give rise to an affective response. It involves controlling one's emotions before they arise by changing the way a person thinks about the situation. It may also entail distancing from the situation. Expressive suppression, on the other hand, is a response-focused strategy, meaning that it targets the affective response that has already been generated. It entails controlling one's emotions by trying to not express what one is already feeling. The findings of the current study suggest that PoM is associated with emotion regulation strategies targeting both earlier and later stages in the emotion-generative sequence, although the correlations were somewhat higher for the former. These results imply that, if emotion regulation plays an important mechanism in PoM, learning how to flexibly use adaptive strategies, such as cognitive reappraisal, may be one key to enhancing PoM.

Another central aspect to achieving PoM entails acceptance of both positive and negative experiences (Joshanloo, 2014; Lee et al., 2013). In line with this, there is evidence that mindfulness is positively associated with PoM (Xu, Rodriquez, Zhang, & Liu, 2015) and that mindfulness meditation can increase PoM (Pandya, 2020) and inner peace (Liu et al., 2015). As such, those with higher levels of PoM should also be less inclined to suppress their affective experiences, or the expression of these. The present findings offer support for this claim. Future research examining different aspects of suppression (experiential vs expressive) would help clarify the role of this emotion regulation strategy in PoM. Moreover, although expressive suppression is generally considered a less adaptive form of emotion regulation and associated with a range of clinical conditions (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010; Dryman & Heimberg, 2018), it has also been pointed out that the adaptiveness of this strategy is context-dependent (Butler & Gross, 2004; Kalokerinos, Greenaway, Pedder, & Margetts, 2014). Daily diary and

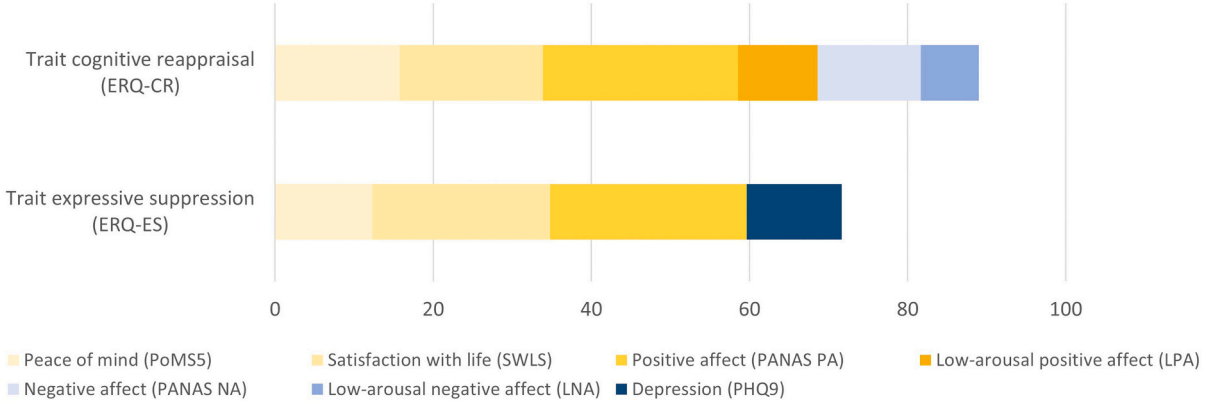

Fig. 1. Proportion of the Predicted Variance (% of R^2) Accounted for by Each of the Predictors
Note. The total (R^2) does not sum to 100 % because predictors that did not explain a statistically significant amount of variance in trait emotion regulation (i.e., 95 % CIs for the tests of significance contained zero) are not displayed.

experience sampling studies investigating how individual differences in PoM are associated with the use of expressive suppression (and other regulation strategies) in various daily life situations would help shed light on the more nuanced relationship between PoM and the adaptiveness of various emotion regulation strategies.

6.2. *Relative importance of peace of mind with respect to other aspects of well-being and ill-being in trait emotion regulation*

Relative weight analyses provided evidence that PoM explained important variance in trait emotion regulation, even when controlling for other aspects of well-being and ill-being. Although trait positive affect and satisfaction with life had the largest contribution to the total variance in trait cognitive reappraisal and expressive suppression, PoM still explained a meaningful amount of variance in these emotion regulation traits. It is noteworthy that trait low-arousal positive affect explained less variance in cognitive reappraisal than PoM and did not significantly explain variance in expressive suppression, when controlling for other aspects of well-being and ill-being. This, together with the results of the confirmatory factor analyses, is in line with the suggestion by Lee et al. (2013) that PoM is more than just low-arousal positive affect and demonstrates that PoM seems to reflect aspects of well-being not fully captured by other measures of well-being.

6.3. *Cultural differences in peace of mind and emotion regulation*

Interestingly, the correlations of PoM with other aspects of well-being were higher in the Finnish sample than in the US sample (above $r = 0.70$ for satisfaction with life and low-arousal positive affect). This suggests lesser discriminant validity in the Finnish cultural context. At the same time, the scale measuring PoM demonstrated measurement invariance across the two samples. Furthermore, confirmatory factor analyses provided evidence that PoM is distinct from other aspects of well-being in the Finnish sample, and relative weight analyses suggested a lack of differences between the countries when predicting trait emotion regulation. More work is needed to understand the possible cultural differences in PoM and its association with other aspects of well-being and ill-being.

The finding that PoM was positively associated with age in the Finnish but not US sample is likely due to the fact that the Finnish sample included a wider age range (18–67), whereas the US sample was restricted to the student population. Higher levels of PoM in older individuals corroborates the latest findings from a large study across 116 countries reporting increased levels of mental balance (including items tapping into peace, calm, and balance) with increasing age (Joshanloo, 2022). One reason for this may be that the meaning of well-being shifts across the years: for younger individuals well-being is associated with feelings of excitement, whereas for older individuals it is associated with peacefulness (Mogilner, Kamvas, & Aaker, 2011). This, in turn, may be due to increased acceptance in older individuals (Mahlo & Windsor, 2021), which may explain the bulk of empirical evidence demonstrating enhanced emotional well-being in older age (Carstensen et al., 2011).

6.4. *Limitations and future directions*

In the present study, we investigated two widely used and theoretically important emotion regulation strategies (i.e., cognitive reappraisal and expressive suppression). Future studies should examine a wider range of adaptive and less adaptive emotion regulation strategies, such as acceptance and rumination. Furthermore, in addition to studying how individual differences in PoM relate to trait emotion regulation, it is important to investigate whether manipulating or training emotion regulation skills would enhance PoM. This would enable to test the causal role of adaptive emotion regulation in PoM.

In the two samples studied (i.e., Finnish, US), the scale measuring PoM loaded on two different factors (with the reverse-scored items loading on a separate factor) and demonstrated measurement invariance across these samples. This suggests that the scale performs similarly in these two Western cultures. However, in the Chinese sample, the seven items of the scale loaded on a single factor (Lee et al., 2013). This seems to suggest that the scale, and the underlying construct it measures, may be understood differently in Western vs Eastern cultural contexts. This calls for the need for broader cross-cultural studies on a more general population investigating PoM and its association with emotion regulation.

In summary, our findings show that people with higher (versus lower) levels of PoM tend to use more adaptive emotion regulation strategies and that this relationship generalizes across two different Western cultural contexts. These results suggest that adaptive emotion regulation may have important implications for explaining PoM and may possibly serve as a promising target for interventions designed to enhance PoM.

CRediT authorship contribution statement

Pilleriin Sikka: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Funding acquisition. **Antti Revonsuo:** Conceptualization, Writing – review & editing. **James J. Gross:** Conceptualization, Writing – review & editing.

Declaration of competing interest

None.

Data availability

The data that support the findings of this study will be openly available in a public repository (https://osf.io/2f5zr/) upon publication of the manuscript.

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Appendix A. Supplementary data

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