

Adaptive performance in refugees after trauma: How relevant are post-traumatic stress and post-traumatic growth?

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Abstract

Wars can lead to massive migration waves, e.g., the Syrian Civil War that began in 2011 led to the European refugee crisis. Discussions about labour integration often accompany huge spikes in asylum applications. Since many refugees experience traumatic events, such as torture, health problems must be considered in the work context. Unfortunately, the relevance of the post-traumatic experiences of refugees to specific job performance facets has mainly been ignored. To close the research gap, a study with refugees living in Germany was conducted to examine to what extent trauma-related variables are relevant to performance variables. The relationship between post-traumatic stress (PTS), posttraumatic growth (PTG), and adaptive performance (social and task-oriented adaptive performance) was examined as, nowadays, many activities require dealing with changes (e.g., new colleagues, new technologies). 69 people met the inclusion criteria (e.g., refugee status, traumatic experiences) and completed the survey. Data were analysed using the Bayesian approach. Bayesian analyses revealed that PTG might promote both social and task-oriented adaptive performance. In contrast, PTS was negatively related to task-oriented adaptive performance. Furthermore, there was no substantial evidence that PTG moderates the relationship between PTS and adaptive performance. Furthermore, there is preliminary evidence that refugees do not differ substantially from the general population with respect to social adaptive performance. Present study demonstrates for the first time the relevance of post-traumatic experiences to the adaptive performance of refugees.

Keywords: Post-traumatic stress; post-traumatic growth; trauma; adaptive performance; refugees

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Since the beginning of the Syrian Civil War in 2011, several million people have applied for asylum in the European Union, with a peak of ca. 1.3 million first-time applications in 2015 (Eurostat, 2021). Discussions often revolved around the integration of refugees (Alencar, 2018; Moris & Kousoulis, 2017). Hitherto multiple studies have been conducted (Donato & Ferris, 2020) that examine social integration (e.g., political participation) and economic integration of refugees (e.g., employment) across continents. While labour integration may be hindered by traumatic experiences of refugees (e.g., torture), some people experience positive transformative change after traumatic events, which could promote labour integration. Unfortunately, the relevance of post-traumatic growth to specific performance dimensions was neglected in the past (Maitlis, 2012, 2020). To help close the research gap, both post-traumatic stress and post-traumatic growth and their relationship with performance will be examined in the present study.

The current study was conducted with refugees living in Germany, where approximately 50% of the 2.5 million first-time EU asylum applications were made during the peak (2015-2016) of the European refugee crisis (Eurostat, 2021). However, the present study is not only relevant to European countries. After all, due to persisting and new conflicts, spikes in asylum applications can also be observed on other continents. To illustrate, in 2020 (UNHCR, 2021) many refugees were hosted in Asia (e.g., Pakistan), Africa (e.g., Uganda) and America (e.g., Colombia). Because refugees are a minority that faces particular challenges in the work context, an overview of research devoted to labour integration of refugees is provided in the next section before describing the present study.

Refugees and labour integration

Refugees are (Lee et al., 2020) “individuals, regardless of their legal status, who have fled their home country to seek protection and security in another country and cannot safely return due to a well-founded fear of the prevailing circumstances in their country of origin” (p. 195). Many refugees experience traumatic events before or during migration, such as torture, sexual assault or loss of relatives (Frank et al., 2017), which can result in mental health problems. This, in turn, can impede integration into the labour market (Lee et al., 2020). To illustrate, in one German study, approximately 75% of surveyed refugees reported experiencing or witnessing traumatic events (Georgiadou et al., 2018). Thus, it is not surprising that the prevalence of mental health disorders, including depression or post-traumatic stress disorder, often oscillates around 30 to 40% for refugees, which is substantially more than in the general population (Hoell et al., 2021; Lindert et al., 2009; Naja et al., 2016; Slewa-Younan et al., 2015). Some prevalence estimates for refugees are even greater (Morina et al., 2018).

Finding a job can be challenging for refugees due to health problems, language problems, regulations and discrimination (Colic-Peisker & Walker, 2003; Lee et al., 2020; Newman et al., 2018). Furthermore, job descriptions and requirements can change rapidly due to technological advances or globalisation. Adaptability in the workplace is regarded as an important criterion in personnel selection (Ryan & Ployhart, 2014). After all, adaptive behaviours can be helpful when dealing with typical challenges and also during an organisational crisis (Marques-Quinteiro et al., 2019). Accordingly, it should be considered in discussions and interventions centred around integrating refugees into the labour market. However, there is a lack of research on the relationship between health and adaptive performance in refugees with traumatic experiences. The present study aims at addressing this research gap. The following paragraphs provide a short description of adaptive performance, followed by the hypotheses linking post-traumatic stress and post-traumatic growth to adaptive performance.

Adaptive performance

Adaptive performance refers (Pulakos et al., 2000) to “altering behavior to meet the demands of a new situation, event, or set of circumstances” (p. 615). Because many work-related activities require adaptive performance, such as dealing with new software and establishing relationships with new co-workers or clients, adaptability is currently viewed as one important criterion in personnel selection (Ryan & Ployhart, 2014). Thus, it is one of the aspects that need to be considered when addressing the labour integration of refugees.

Initially, eight dimensions of adaptive performance have been proposed (Pulakos et al., 2000): (1) solving problems creatively, (2) dealing with uncertain or unpredictable work situations, (3) learning new tasks, technologies, and procedures, (4) demonstrating interpersonal adaptability, (5) demonstrating cultural adaptability, (6) demonstrating physically oriented adaptability, (7) handling work stress, and (8) handling emergencies or crisis situations. However, in further studies, fewer dimensions have been proposed (Charbonnier-Voirin & Roussel, 2012; Griffin & Hesketh, 2003). The present study distinguishes between social adaptive performance and task-oriented adaptive performance, which can be regarded as two clusters based on the framework proposed by Pulakos and colleagues. Specifically, social adaptive performance refers to interpersonal and intercultural adaptive performance (corresponding to original dimensions 4 and 5), which entails behaviours like helping new colleagues and respecting foreign traditions of colleagues and clients. The second form of adaptive performance, task-oriented adaptive performance, refers to behaviours that require problem-solving, dealing with stress and uncertain situations, and learning new procedures (dimensions 1-3, 7-8). Distinguishing between different forms of adaptive performance rather than attempting to capture a single dimension (Stokes et al., 2010) allows a more thorough examination, i.e. to what extent are traumatic experiences relevant to different performance domains.

Hitherto, researchers have meta-analytically examined several predictors of adaptive performance in the general population: Big 5 or similar personality traits (Huang et al., 2014;

Woo et al., 2014), goal orientation (Stasielowicz, 2019b), and cognitive ability (Stasielowicz, 2020). Considering that refugees typically face some additional challenges, it is possible that other personality aspects need to be considered when one is interested in promoting the successful integration of refugees into the labour market. Refugees often experience traumatic events (Georgiadou et al., 2018) and suffer from post-traumatic stress disorder (Slewa-Younan et al., 2015). It could be argued that such factors should be considered in the context of labour integration. Therefore, two predictors of adaptive performance that will be examined in the present study are post-traumatic stress and post-traumatic growth. Theoretical links and relevant empirical findings are described in the following sections.

Post-traumatic stress and adaptive performance

The World Health Organisation (2022) defines trauma, in the 11th revision of the International Classification of Diseases (ICD-11), as “Exposure to an event or situation (either short- or long-lasting) of an extremely threatening or horrific nature. Such events include, but are not limited to, directly experiencing natural or human-made disasters, combat, serious accidents, torture, sexual violence, terrorism, assault or acute life-threatening illness (e.g., a heart attack); witnessing the threatened or actual injury or death of others in a sudden, unexpected, or violent manner; and learning about the sudden, unexpected or violent death of a loved one.” Another classification system, the Diagnostic and Statistical Manual of Mental Disorders (DSM), contains a similar definition: “exposure to actual or threatened death, serious injury, or sexual violence” (American Psychiatric Association, 2013, p. 271). DSM also includes the possibility that trauma can develop through direct experiences, witnessing or learning that significant others experienced traumatic events.

People with post-traumatic stress disorder (PTSD) can experience different symptoms that impair labour integration. According to the ICD-11, there are three symptom clusters in PTSD (Brewin et al., 2017; Cloitre et al., 2018): (1) re-experiencing traumatic events in the here and now (e.g., flashbacks or nightmares), (2) avoidance of traumatic reminders (e.g.,

feelings or situations) and (3) heightened sense of threat. DSM also includes symptoms like concentration or memory problems (Bryant, 2019). Post-traumatic stress is also linked to short sleep duration and worse sleep quality (Dietch et al., 2019). Mentioned symptoms could be detrimental during job interviews (e.g., flashbacks) and job activities (e.g., lower quality of services due to concentration problems or irritated clients due to avoidance of specific meeting settings). Indeed, people with PTSD often show more productivity impairment than people with other disorders (Lim et al., 2000). Furthermore, work-loss days, interpersonal problems (e.g., outbursts), impaired time management and productivity have been documented in people with traumatic experiences (Brenner et al., 2019; Strauser, 2008; Wald & Taylor, 2009). Although these findings indicate that post-traumatic stress can impact various aspects of work functioning, in their review, Wald and Taylor (2009) decry the scarcity of empirical research devoted to work performance. The present study aims to help close this research gap by examining the relationship between post-traumatic stress and adaptive performance; a specific job dimension.

Based on the mentioned stress symptoms, it is plausible to assume that post-traumatic stress could have a negative impact on the adaptive performance of refugees. Both social and task-oriented adaptive performance could be affected. To illustrate, outbursts at the workplace could be detrimental when establishing relationships with new colleagues or clients. Clients or co-workers witnessing problems with maintaining personal appearance (Strauser, 2008) could feel offended if they interpret problematic behaviour as intentionally disrespectful. Stress symptoms could also impair task-oriented adaptive performance. Concentration problems could preclude identifying changes when confronted with new difficult or complex problems, procedures or technologies, resulting in poor performance and monetary loss for the organisation. Getting distracted during emergencies could even be fatal in specific contexts (e.g., firefighters). Thus, higher post-traumatic stress is expected to correspond to worse adaptive performance.

Hypothesis 1: There is a negative linear relationship between post-traumatic stress and social adaptive performance.

Hypothesis 2: There is a negative linear relationship between post-traumatic stress and task-oriented adaptive performance.

Post-traumatic growth and adaptive performance

Some people, including refugees (Wen et al., 2020), report transformative positive personal change following traumatic events (Park et al., 1996; Tedeschi & Calhoun, 1996). It can be attributed to sense-making processes such as understanding and coping with traumatic experiences (Maitlis, 2020). Post-traumatic growth is not simply a recovery process but rather a process that results in increased functioning compared to before trauma. Post-traumatic growth can occur in various domains (Park et al., 1996; Tedeschi & Calhoun, 1996) such as interpersonal relationships (e.g., a greater sense of belonging), self-perception (e.g., increased self-confidence), and philosophy of life (e.g., noticing new possibilities). Although such changes could benefit the workplace, the relationship between post-traumatic growth and different job performance dimensions has been long neglected in organisational research (Maitlis, 2012, 2020). Nevertheless, there is some evidence that post-traumatic growth is relevant in the occupational context. To illustrate, in one study (Semeijn et al., 2019) post-traumatic growth has been linked to better work engagement (vigour and dedication). Furthermore, researchers (Vogel & Bolino, 2020) have argued that post-traumatic growth can result in improved leadership qualities, for example, showing compassion to subordinates.

Adaptive performance could also benefit from post-traumatic growth. Individuals, who experience post-traumatic growth, learn to help others and show compassion (Tedeschi & Calhoun, 1996; Vogel & Bolino, 2020) which could positively impact social adaptive performance, for example, establishing relationships with new colleagues or clients.

Furthermore, increased self-confidence resulting from post-traumatic growth (Vogel &

Bolino, 2020) could be adaptive in stressful situations, e.g., reducing anxiety in colleagues. People experiencing growth are also less likely to give up when confronted with problems and are more open to new ideas (Park et al., 1996), which is important in dynamic environments, such as learning new procedures and handling emergencies. Post-traumatic growth has been linked to creativity growth (Forgeard, 2013), which could promote adaptive performance. After all, solving problems creatively is regarded as an adaptive characteristic (Pulakos et al., 2000). Thus, based on empirical findings from other research fields and theoretical links between growth in certain areas and adaptive qualities, post-traumatic growth could promote social and task-oriented adaptive performance.

Hypothesis 3: There is a positive linear relationship between post-traumatic growth and social adaptive performance.

Hypothesis 4: There is a positive linear relationship between post-traumatic growth and task-oriented adaptive performance.

Finally, it is also possible that post-traumatic growth moderates the relationship between post-traumatic stress and adaptive performance. Post-traumatic growth could attenuate the assumed negative relationship between post-traumatic stress and adaptive performance. Interestingly, evidence of interaction between post-traumatic stress and post-traumatic growth was previously observed for variables like quality of life and depression (Morrill et al., 2008). Specifically, weaker relationships between post-traumatic stress and quality of life (or depression) were reported for people with greater post-traumatic growth. A similar pattern is plausible in the performance context. Increased functioning in various domains (e.g., interpersonal relationships, noticing new possibilities) that accompanies post-traumatic growth could alleviate the effects of post-traumatic stress on performance.

Hypothesis 5: Post-traumatic growth moderates the relationship between post-traumatic stress and social adaptive performance. The negative linear relationship is weaker in people experiencing more post-traumatic growth.

Hypothesis 6: Post-traumatic growth moderates the relationship between post-traumatic stress and task-oriented adaptive performance. The negative linear relationship is weaker in people experiencing more post-traumatic growth.

Methods

To test the hypotheses, a study was conducted with refugees living in Germany. Only participants that met the following criteria were asked to complete the survey. Participants had to (1) identify as refugees, (2) have traumatic experiences (self-report: no/yes), (3) speak Arabic or German, (4) be in a context requiring performance in the last 12 months, such as job or apprenticeship training, and (5) be at least 18 years old. The study has been approved by the ethics committee (4/71043.5).

Procedure

The study was conducted during a COVID-19 lockdown. Due to general restrictions, only online data collection was feasible. Therefore, people involved in refugee aid in Northern Germany were asked to forward the survey link to refugees. In addition, a survey link was published in Germany-based Facebook groups for refugees. In general, it took less than 15 minutes to complete the survey (*Mdn* = 12).

Participants could choose between two versions of the survey: Arabic or German. After a short introduction, demographic data were collected. Only people that met inclusion criteria received the main questionnaires: post-traumatic stress, post-traumatic growth and adaptive performance. A single attention item followed (i.e., instructions to click “next” rather than answer questions that appeared on the screen) to identify possible problems with data quality (e.g., response styles, fast responses). Next, individuals could participate in a draw to

win one of four 20 € vouchers. Finally, participants received further information about the study. The utilised instruments are described in the next section.

Measures

German versions were available for all three questionnaires (post-traumatic stress, post-traumatic growth and adaptive performance). Arabic versions were created by translating the German items by native speakers. Subsequently, back-translation was used to identify any inconsistencies. The reliability estimates of the scales reported in the present study are McDonald's omega total values (ω_t). McDonald's omega is often a more accurate reliability estimate than Cronbach's alpha (Dunn et al., 2014; Trizano-Hermosilla & Alvarado, 2016). Analogously to Cronbach's alpha, larger reliability values are better. A value of $\omega_t = 1$ would imply no measurement error. In other words, all the observed variance can be attributed to true variance rather than error variance.

Post-traumatic stress. The German version of the International Trauma Questionnaire (Cloitre et al., 2018), which is provided by the International Trauma Consortium at www.traumameasuresglobal.com/itq, was used to assess three symptoms clusters of PTSD: (1) re-experiencing in the here and now, (2) avoidance and (3) sense of threat. Each cluster is assessed by two items, yielding six items in total. The participants are asked to rate the extent to which they experienced stress symptoms in the last month, for example, "Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now". The ratings were made on a five-point scale (1 = Not at all; 5 = Extremely). Reliability was good in the present sample, as indicated by the McDonald's omega total of $\omega_t = .89$.

Post-traumatic growth. The Short German version (Maercker & Langner, 2001) of the Stress-related growth scale (Park et al., 1996) was utilised in the present study to measure post-traumatic growth. The questionnaire consists of 15 items that assess positive changes in various areas, such as interpersonal relationships, following the traumatic event, for example,

“I learned how to reach out and help others”. Participants can provide answers using a three-point scale (1 = Not at all; 3 = A great deal). In the current study, the reliability was good ($\omega_t = .88$)

Adaptive performance. The questionnaire developed by Kröger and Staufienbiel (2012) was used to gauge social and task-oriented adaptive performance in the current study. It contains six social adaptive performance items, for example, “I quickly establish contacts with strangers (e.g., new colleagues, clients)”. Task-oriented adaptive performance is assessed by 12 items, for example, “I make well-thought-out and goal-oriented decisions in emergencies”. Performance is rated on a seven-point scale (1 = I don’t agree at all, 7 = I agree completely). The reliability was good in the present study for both social ($\omega_t = .86$) and task-oriented adaptive performance ($\omega_t = .87$).

Statistical analyses

Primary analyses were conducted using the R package brms (2.14.4) for Bayesian modelling. Bayesian estimation enables incorporating prior knowledge about a plausible range of results (Kruschke & Liddell, 2018); one can allocate less prior probability to impossible or implausible values such as negative variances or very large effect sizes. Furthermore, this approach often enables a more intuitive interpretation of the findings than standard confidence intervals. In contrast to confidence intervals, the values within Bayesian credibility intervals can be simply interpreted as the most plausible values (Morey et al., 2016).

During the Bayesian estimation, prior knowledge (priors) is combined with data of the participants (likelihood) to estimate the effects (posterior). Since it is often not possible to derive the posterior distribution mathematically, samples from the posterior distribution are drawn instead, using Markov Chain Monte Carlo (MCMC). In short, candidate values for parameters of interest (e.g., regression coefficients) are evaluated using priors and likelihood; the candidate values are either accepted or rejected. The accepted values form a chain of values. To increase the trustworthiness of the results, running several independent chains is

recommended. Usually, the first chain values are discarded (warm-up); the starting value of the chain is often chosen at random and it may take some time until the algorithm begins exploring plausible values. The remaining values of the chain are used to summarise the posterior distribution – the most plausible values based on the assumptions (priors) and available data.

In the present study, weakly informative priors were chosen, allocating more prior probability to smaller rather than larger bivariate correlations or regression coefficients. After all, effect sizes reported in the organisational literature are seldom large (Bosco et al., 2015). For each analysis, four Markov chains with 2000 post-warm-up iterations were used, which yielded 8000 posterior samples. For moderator analyses, predictor variables were centred around their means to enable sensible interpretation of the intercepts. All prior specifications, prior predictive checks, posterior predictive checks, utilised packages, R code and output, are available at <https://osf.io/9gyjz/>.

Results

Participants

In total, 81 people met the inclusion criteria. 10 people terminated the survey prematurely (without completing the main questionnaires). Due to an unforeseen technical error of the survey software, one participant had to be excluded (impossible values were registered). One further person had to be excluded because she indicated that caring for her daughter was her sole occupation, rendering many adaptive performance items meaningless. Thus, data from 69 people were available to examine the research questions.

More men than women participated in the study (44 vs 25), and participants' age varied between 19 and 60 ($M = 30.12$, $SD = 7.50$). 64 of the 69 participants completed at least secondary education. Most of the participants fled from the Syrian Arab Republic (62), followed by Afghanistan (3) and other countries (Eritrea/Sudan; Iraq; Senegal; one person did not specify the country - "war"), which mirrors the pattern of asylum applications recorded

during the peak of the European refugee crisis (Frank et al., 2017). More than half of the sample (55%) arrived in Germany during the peak of the European refugee crisis in 2015, and only 15 people indicated that they underwent psychological treatment (e.g., psychotherapy).

Bivariate correlations, mean values and standard deviations of the main variables are reported in Table I. Participants generally reported moderate stress levels and high levels of post-traumatic growth. They also reported better social adaptive performance than task-oriented adaptive performance.

Table I. Descriptive statistics and bivariate correlations

	<i>M</i>	<i>SD</i>	ω_t	<i>r</i> [CR 95%]		
				PTS	PTG	sAP
Post-traumatic stress	2.89	0.84	.89			
Post-traumatic growth	2.45	0.36	.88	-.12 [-.35, .11]		
Social AP	5.88	0.87	.86	-.19 [-.40, .04]	.39 [.18, .57]	
Task-oriented AP	4.52	0.94	.87	-.34 [-.53, -.13]	.53 [.35, .68]	.51 [.33, .67]

Notes: $N = 69$; PTS = Post-traumatic stress (1 = Not at all; 5 = Extremely); PTG = Post-traumatic growth (1 = Not at all; 3 = A great deal); sAP = Social adaptive performance (1 = I don't agree at all, 7 = I agree completely); tAP = Task-oriented adaptive performance (1 = I don't agree at all, 7 = I agree completely); ω_t = Reliability (McDonald's omega total); r = mean correlation; CR = credibility interval limits (95%).

A negative relationship between post-traumatic stress and social adaptive performance was expected (Hypothesis 1). Although most of the values in the posterior distribution were negative, the 95% credibility interval was relatively broad and included some small positive values, $r = -.19 [-.40, .04]$. Thus, it is not certain whether increased post-traumatic stress corresponds to worse social adaptive performance. However, as expected (Hypothesis 2), post-traumatic stress was negatively related to task-oriented adaptive performance $r = -.34 [-.53, -.13]$, which means that greater post-traumatic stress corresponds to worse task-oriented adaptive performance. Furthermore, as expected (Hypothesis 3 and 4), post-traumatic growth was positively related to both social ($r = .39 [.18, .57]$) and task-oriented adaptive

performance ($r = .53$ [.35, .68]). Thus, greater post-traumatic growth corresponds to better adaptive performance.

Post-traumatic growth was also expected to moderate the relationship between post-traumatic stress and adaptive performance (Hypothesis 5 and 6). Although considerable proportion of variance could be explained for both social ($R^2 = .21$ [.07, .35]) and task-oriented adaptive performance ($R^2 = .40$ [.24, .52]), it was largely due to post-traumatic growth and not the interaction. Crucially, the credibility interval of the interaction term was very wide and included both negative and positive values. Thus, no substantial evidence for moderation was found. Table II contains the results of the regression models.

Table II. Results of two Bayesian multiple regression models testing the moderator hypothesis

Criterion	$B+97_0$	b_{PTS}	b_{PTG}	$b_{PTS \times PTG}$	R^2
Social AP	5.87 [5.68, 6.06]	-0.17 [-0.39, 0.06]	0.92 [0.38, 1.45]	-0.03 [-0.54, 0.49]	.21 [.07, .35]
Task-oriented AP	4.52 [4.34, 4.69]	-0.34 [-0.56, -0.12]	1.28 [0.78, 1.78]	0.06 [-0.43, 0.55]	.40 [.24, .52]

Notes: $N = 69$; AP = Adaptive performance; PTS = Post-traumatic stress (variable centered around the mean); PTG = Post-traumatic growth (variable centered around the mean); R^2 = Proportion of variance explained by the model; Values in brackets correspond to credibility interval limits (95%).

Discussion

The goal of the present study was to help close the research gap concerning the relationship between health and performance in refugees. Specifically, the relationship between post-traumatic stress, post-traumatic growth and adaptive performance was examined in the current study. In general, post-traumatic growth seems to promote both social and task-oriented adaptive performance. In contrast, post-traumatic stress was negatively related to task-oriented adaptive performance, and there was some uncertainty with regard to the relationship with social adaptive performance. Furthermore, post-traumatic growth did not moderate the

relationship between post-traumatic stress and adaptive performance. In the remaining paragraphs, the contributions of the present study to the research devoted to labour integration of refugees and the relevance of post-traumatic growth in the performance context (e.g., workplace) are summarised. Furthermore, implications and limitations are discussed.

Post-traumatic stress

One contribution of the present study is establishing that post-traumatic stress is negatively related to task-oriented adaptive performance (Hypothesis 2). Thus, task-oriented adaptive performance can be added to the list of work-related variables negatively associated with post-traumatic stress (Strauser, 2008; Wald & Taylor, 2009). There is more uncertainty with regard to social adaptive performance. According to the credible interval, a negative relationship with post-traumatic stress is more plausible than a positive relationship but the width of the interval implies that the evidence is relatively weak. Thus, further studies are needed to confirm the hypothesised relationship (Hypothesis 1).

It is worth noting that the relationships of task-oriented and social adaptive performance with post-traumatic stress appear to be weaker than the respective relationships with post-traumatic growth. It could be because, in the present study, post-traumatic stress refers to symptoms experienced in the last month. In contrast, post-traumatic growth also includes earlier experiences. Considering that all participants arrived in Germany no later than 2019, it is possible that current stress levels are not as relevant to current performance as stress experienced directly or a few weeks after the traumatic event. In many research fields, the magnitude and sign of the effects depend on the time interval between measurements. To illustrate, Guthier and colleagues (2020) reported in their meta-analysis that the largest effects of job stress on burnout are expected after approximately three to four years. For short time intervals, minuscule effects are expected. A similar pattern could apply to the effects of post-traumatic stress on adaptive performance. Furthermore, in the current study, the mean stress level was close to the scale mid-point, indicating that individual stress levels were, on

average, not particularly elevated. Therefore, future studies could investigate the role of temporal proximity of traumatic events and examine whether post-traumatic stress measured closer to the traumatic event is more strongly related to adaptive performance. In addition, one could also test the stability of the relationship between post-traumatic stress and adaptive performance by assessing all variables on several occasions across several months.

Post-traumatic growth

A significant contribution of the present study is that it hints at post-traumatic growth as a factor promoting adaptive performance. Hitherto, empirical relationships between post-traumatic growth and specific job performance facets were largely neglected (Maitlis, 2012, 2020). However, one recent study has shown that post-traumatic growth may promote vigour and dedication at work (Semeijn et al., 2019). The current study provides evidence that adaptive performance can be another outcome that may benefit from post-traumatic growth. Post-traumatic growth was positively related to social (e.g., dealing with new colleagues or foreign cultures) and task-oriented adaptive performance (e.g., learning new procedures, dealing with stressful situations). Thus, evidence for both Hypothesis 3 and 4 was found. It is consistent with the assertion that post-traumatic growth can lead to visible changes in several domains (Park et al., 1996; Tedeschi & Calhoun, 1996).

Post-traumatic stress and post-traumatic growth

Importantly, when post-traumatic stress and post-traumatic growth were simultaneously included as predictors of adaptive performance the pattern of results mirrored bivariate findings. Specifically, post-traumatic growth was positively related to both social and task-oriented adaptive performance, and post-traumatic stress was negatively related to task-oriented adaptive performance. This shows that post-traumatic stress and post-traumatic growth do not simply cancel each other out. Indeed, post-traumatic stress can be regarded as a pre-requisite for post-traumatic growth (Maitlis, 2020). Accordingly, a small positive

correlation between the two constructs was reported in one meta-analysis (Liu et al., 2017). However, the findings were heterogeneous as negative or negligible correlations were also reported in the article. Therefore, the correlation estimated for the present sample is not surprising ($r = -.12 [-.35, .11]$). The low strength of the relationship confirms that post-traumatic stress and post-traumatic growth are not redundant. Lack of redundancy was important in the present study as it is a prerequisite for testing interactions.

However, contrary to expectations, post-traumatic growth did not moderate the relationship between post-traumatic stress and social adaptive performance or task-oriented adaptive performance (Hypothesis 5 and 6). One explanation of this finding is that most participants reported elevated levels of post-traumatic growth. Thus, it is possible that too few participants who experienced only small post-traumatic growth were available in the sample (i.e. range restriction), which precluded identifying interactions. Considering that post-traumatic growth has been found to moderate the relationship between post-traumatic stress and other variables (Morrill et al., 2008), including depression, it could be argued that additional studies examining the interaction concerning adaptive performance are needed. Conducting larger studies could increase the probability that people who experienced post-traumatic growth to a small extent would be included in the sample.

Adaptive performance in refugees

Because the present study was conducted with refugees, it provides relevant evidence in the context of labour integration. To what extent are the levels of adaptive performance of refugees comparable to the general population? Are the reported levels good enough from the organisational perspective, or is it necessary to offer adaptive performance training (Joung et al., 2006) that improves skills required for work in dynamic environments? In the present study, the reported social and task-oriented adaptive performance levels were well above the scale midpoint, indicating good adaptive performance. However, is the level of social adaptive performance ($M = 5.88, SD = 0.87$) and task-oriented adaptive performance ($M =$

4.52, $SD = 0.94$) of refugees similar to that of the general population? One could look at previous studies that utilised the same adaptive performance questionnaire to address this question. The authors who developed the questionnaire (Kröger & Staufenbiel, 2012) reported similar levels of social adaptive performance for a sample of 225 employed individuals in Germany ($M = 5.86$, $SD = 0.77$). Although the original sample reported on average better task-oriented adaptive performance ($M = 5.26$, $SD = 0.72$) than refugees, there was also less variability in the original sample.

One further study utilised the same questionnaire (Stasielowicz, 2019a). Although mean values are not reported in the article, raw data are available, enabling direct comparisons using pooled data. Therefore, data of the refugees were merged with the mentioned sample of 139 individuals (see <https://osf.io/9gyjz/> for full R code and output of the exploratory analysis). Again, there was no substantial difference with regard to social adaptive performance (Diff = -0.12, CR 95% [-0.35, 0.11]). However, refugees reported slightly worse task-oriented adaptive performance than other people (Diff = -0.33, CR 95% [-0.59, -0.07]). Thus, based on comparisons with both previous studies, one could conclude that refugees with traumatic experiences and the general population report similar levels of social adaptive performance (e.g., new interpersonal or intercultural relationships). At the same time, the average level of task-oriented adaptive performance appears to be somewhat worse in refugees than in the general population.

Limitations

When interpreting the present findings underrepresentation of refugees with low qualifications needs to be considered. Over 90% of the participants (64 refugees) completed at least secondary education, and approximately 50% (35) indicated very good German language skills (C1). Thus, only a few refugees with low qualifications participated in the present study. Considering that education, language skills and mental health (e.g., post-traumatic stress) are

regarded as essential factors in the context of labour integration (Lee et al., 2020), it is crucial to examine in future studies to what extent present findings apply to refugees with other characteristics, such as less traumatised and less educated individuals.

Another aspect that needs to be addressed when discussing current results is that the central variables (post-traumatic stress, post-traumatic growth, and adaptive performance) are based on self-reports. Due to COVID-19 restrictions, conducting the study in a laboratory and using additional or more objective measures (e.g., confronting participants with a task to measure objective adaptive performance) was not feasible. Nevertheless, in future studies, one could use additional or alternative measures to increase the strength of the evidence. To illustrate, considering that assessing post-traumatic growth objectively is challenging (Maitlis, 2020), one could ask multiple raters (e.g., family members, social workers) to provide their ratings. Similar procedures could be utilised to gauge post-traumatic stress and adaptive performance. However, it is important to note that every operationalisation has some limitations. To illustrate, although one could ask the supervisors of employed refugees to provide ratings of adaptive performance, it is possible that the ratings would be affected by the supervisors' attitudes towards immigration. Furthermore, while it may seem intuitive that objective measures of adaptive performance would be superior to supervisor ratings or standard self-reports, it is not necessarily the case. Assessing objective adaptive performance often involves long simulations that capture only particular aspects, for example, specific dimensions of task-oriented rather than social adaptive performance (Stasielowicz, 2020). Furthermore, good adaptive performance in a single task does not necessarily imply good performance on other tasks. Although comprehensive multi-method longitudinal studies would be ideal for reducing uncertainty, such studies would require massive resources (e.g., compensation for burdensome long-term tracking of participants, providing translations) and are probably unrealistic without state-level support.

Unfortunately, no data about official PTSD diagnoses of the refugees were available in the present study. Complementing self-reported post-traumatic stress data with clinical data about official PTSD diagnosis will benefit future research. Although some participants had to be excluded from the current study because they reported that they did not have traumatic experiences, it is possible that some of them underestimated their own violent experiences. Conversely, some of the included refugees did not necessarily meet the official criteria for a PTSD diagnosis. Therefore, post-traumatic stress in the present study should not be conflated with an official PTSD diagnosis.

Finally, it has to be noted that the plausibility of causal explanations varies across analyses. In the present study, a causal relationship between post-traumatic growth and adaptive performance is more plausible than a causal relationship between post-traumatic stress and adaptive performance. It is because post-traumatic stress refers to the symptoms experienced in the last month and adaptive performance items do not refer to a shorter time frame, so it is hard to argue that post-traumatic stress precedes adaptive performance. In contrast, post-traumatic growth refers to processes experienced after the traumatic event, which means that temporal precedence is very likely. Considering that all participants arrived in Germany in 2019 or earlier, the temporal overlap between post-traumatic growth and adaptive performance is less likely than in the case of post-traumatic stress. Nevertheless, longitudinal studies assessing relevant variables across several months or years could increase the plausibility of assumed causal mechanisms. Alternatively, one could modify the time frame referenced in the questionnaires to ensure that predictors precede the adaptive performance.

Implications and future research directions

Due to the mentioned reasons, the generalisability of potential practical recommendations is limited. Nonetheless, current results, in combination with previous findings, could stimulate discussions within organisations, humanitarian institutions, governments, and society.

Practice and society. The present findings indicate that refugees with traumatic experiences report good adaptive performance, particularly social adaptive performance, which could be used as an argument for employing refugees in dynamic contexts. Because prolonged unemployment in refugees has been linked to worse mental health (Hajak et al., 2021), facilitating workforce integration could also benefit affected individuals.

Since the proportion of old people is increasing in many European countries (Cristea et al., 2020), society and governments could benefit from facilitating the labour integration of refugees. After all, denied work permits or high waiting times can increase welfare costs, such as social care or health insurance (Marbach et al., 2018). Nonetheless, some people provide arguments against facilitating the labour integration of refugees. The concerns include the lack of qualifications (Bauer et al., 2021) and increased job insecurity among citizens (Marbach et al., 2018). However, with respect to qualifications, the present study shows that refugees and the general population report similar levels of social adaptive performance. Furthermore, since the European population is ageing, job insecurity will be less likely in many areas than workforce shortages. To illustrate, many Europeans will require long-term care in the future and workforce shortages are expected in this area (Sowa-Kofta et al., 2019). Since such jobs often require social adaptive performance (i.e., interpersonal or intercultural adaptability), it could be fruitful to enable refugees to work in those areas.

The finding that refugees do not differ much from the general population with respect to levels of adaptive performance is also relevant to employers. After all, adapting to changing situations is important in the modern workplace (Ryan & Ployhart, 2014). Thus, organisations affected by workforce shortages could benefit from offering jobs to refugees. Furthermore, lower turnover rates have been reported for refugees than for others across several industry sectors (Kallick & Roldan, 2018). Lower turnover rates reduce the need for finding and training the replacement, thereby leading to monetary savings. Thus, arguments

for the employment of refugees are not restricted to ethical arguments such as corporate social responsibility.

The present study is also relevant to humanitarian institutions and non-governmental organisations. The evidence concerning similar levels of adaptive performance in refugees and the general population could be used to advocate for changing asylum and work-related laws and propose programs encouraging employers to counter workforce shortages by offering jobs to refugees. Hitherto, specific performance dimensions were not studied extensively in refugees. Although the limitations of the present study need to be acknowledged (e.g., self-reports), the findings indicate, at the very least, that funding future research in this area could be fruitful; it would stimulate evidence-based discussions.

The magnitude of the negative correlation between post-traumatic stress and task-oriented adaptive performance is certainly non-negligible, which could have practical implications. Accordingly, it could be recommended to follow suggestions highlighted by Strauser (2008) that aim to reduce the negative impact of post-traumatic stress in the work context. Developing task-specific checklists could increase the probability that tasks will be completed. While preparing specific checklists for all possible emergencies is not feasible, some general rules could improve dealing with unexpected changes and lead to better adaptive performance. Other work-related recommendations of Strauser include more frequent breaks and providing private space. Such interventions could reduce cognitive load and enable affected individuals to concentrate on the task. These steps could supplement professional trauma-focused psychotherapy, which requires affected individuals to engage with trauma and has been established as an effective treatment for post-traumatic stress disorder (Bryant, 2019).

Findings concerning post-traumatic growth could also be relevant to organisations. The strength of the relationship between post-traumatic growth and adaptive performance was considerably greater than in the case of adaptive performance predictors that were examined

meta-analytically in the past, including Big Five personality traits, cognitive ability and goal orientation (Huang et al., 2014; Stasielowicz, 2019b, 2020; Woo et al., 2014). While further studies are needed to confirm that the relationship holds for different groups, such as refugees in other host countries or non-refugees who experienced trauma, current and previous findings could be used to stimulate interventions at work. After all, promoting post-traumatic growth in the occupational context could benefit individuals (e.g., increased self-confidence) and organisations (e.g., better performance). Maitlis (2020) has already proposed specific practices that could be conducive, including paying attention to suffering employees, listening to them and even offering professional support. Furthermore, improving trust and psychological safety could be beneficial too. Interestingly, the impact of several interventions on post-traumatic growth has been tested meta-analytically in recent years. A small meta-analysis found positive effects of cognitive behavioural therapy and other interventions on post-traumatic growth (Roepke, 2015). A more recent meta-analysis compared several interventions. According to the results, applying mindfulness therapy or relaxation training and cognitive behavioural therapy can increase post-traumatic growth (Li et al., 2020). Thus, offering such services at work could be fruitful. However, as Roepke (2015) notes, post-traumatic growth is usually not assessed objectively (e.g., self-reported change vs objectively registered behavioural change), which needs to be considered when adopting potentially expensive interventions. Nevertheless, even low-cost interventions suggested by Maitlis (2020) such as showing compassion and being supportive may be worth trying.

Research. Although the present study provides initial evidence that post-traumatic stress and post-traumatic growth are relevant to adaptive performance, further research is needed to increase the evidence strength. While presented patterns are theoretically plausible, it is important to note that larger samples (both refugees and non-refugees) and de-biasing techniques (e.g., post-stratification accounting for age and gender) are needed to quantify effects or differences more precisely. Furthermore, studies using clinical ratings for PTSD

diagnoses are required. Researchers could also consider conducting longitudinal studies and testing the relevance of the time interval between the traumatic event and outcome variables (e.g., adaptive performance). Similarly to job stress (Guthier et al.,2020), one could examine when the negative impact of post-traumatic stress is the largest (e.g., after a few weeks, after several months or after several years).

Due to the COVID-19-related restrictions and potential psychological burden for the participants, an in-depth and in-person examination of refugees' traumatic experiences was deliberately avoided in the present study. However, examining the type of traumatic events (e.g., torture vs sexual violence) and the degree of proximity (e.g., victim vs witness) in future studies could help identify differential effects on adaptive performance. A qualitative examination of job-related difficulties and the role of tenure or job experience could also help identify goals for future interventions tailored to the specific job type.

Furthermore, the identified relationships between post-traumatic stress, post-traumatic growth and adaptive performance hint at possible interventions to increase adaptive performance. Therefore, interventions aimed at reducing post-traumatic stress and increasing post-traumatic growth need to be evaluated with respect to potential benefits to adaptive performance and other performance variables. Since all refugees included in the present study indicated that they had experienced trauma, the reported performance levels are probably affected by traumatic experiences. However, it is possible that one could increase adaptive performance through interventions which are described in previous sections. Thus, further studies and cost-benefit analyses comparing such interventions with direct adaptive performance training are needed to provide specific recommendations to practitioners interested in increasing the task-oriented adaptive performance of refugees. Regarding social adaptive performance, no systematic interventions seem necessary as there is no convincing evidence that refugees differ substantially from others.

Conclusion

The present study elucidates the relationship between health and performance in refugees. It identifies post-traumatic growth as a factor promoting social and task-oriented adaptive performance, which is important considering that research linking post-traumatic growth to job performance facets was missing (Maitlis, 2012, 2020). Furthermore, the strength of the relationship substantially exceeds the magnitude of correlations involving antecedents of adaptive performance that were meta-analytically examined in the past (Huang et al., 2014; Stasielowicz, 2019b, 2020; Woo et al., 2014). Besides, a negative relationship between post-traumatic stress and task-oriented adaptive performance was found in the current study. Present findings have implications for practitioners and other stakeholders, including humanitarian institutions and government, as they hint at routes that could increase the employability of refugees (e.g., by promoting adaptive performance through stimulation of post-traumatic growth). However, multi-method longitudinal studies involving less traumatised and less educated refugees are needed to confirm generalizability to groups underrepresented in the present study.

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