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Is trait resilience characterized by specific patterns of attentional bias to emotional stimuli and attentional control?



Judith Schäfer^{a,*}, Hans-Ulrich Wittchen^{b,1}, Michael Höfler^{b,2}, Anke Heinrich^{b,3}, Peter Zimmermann^{c,4}, Stefan Siegel^{c,5}, Sabine Schönfeld^{a,6}

^a Technische Universität Dresden, Institute of Clinical Psychology and Psychotherapy, Chemnitzer Str. 46, D-01187 Dresden, Germany

^b Technische Universität Dresden, Institute of Clinical Psychology and Psychotherapy, Center of Epidemiology and Longitudinal Studies (CELOS), Chemnitzer Str. 46, D-01187 Dresden, Germany

^c German Armed Forces Center of Military Mental Health, Scharnhorststraße 13, D-10115 Berlin, Germany

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ABSTRACT

Background and objectives: Attentional processes have been suggested to play a crucial role in resilience defined as positive adaptation facing adversity. However, research is lacking on associations between attentional biases to positive and threat-related stimuli, attentional control and trait resilience.

Methods: Data stem from the follow-up assessment of a longitudinal study investigating mental health and related factors among German soldiers. Trait resilience was assessed with the Connor-Davidson Resilience Scale and attentional control with the Attentional Control Scale. A subset of $n = 198$ soldiers also completed a dot probe task with happy, neutral and threatening faces.

Results: Attentional control was positively related to trait resilience. Results revealed no associations between both attentional biases and trait resilience. However, there was a negative association between attentional bias to threat and trait resilience when attentional control was low and a positive association between attentional bias to threat and trait resilience when attentional control was high. No such associations were found for attentional bias to positive stimuli.

Limitations: Generalizability to other populations may be limited since we exclusively focused on male soldiers. Also, the cross-sectional design does not allow for causal conclusions.

Conclusions: Findings suggest that attentional processing may promote trait resilience. Future research on preventive interventions should consider these findings.

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1. Introduction

Trait resilience is defined as a stress coping ability, which enables individuals to successfully adapt facing adversity (Connor & Davidson, 2003). Empirical evidence has shown that lower levels

of trait resilience are associated with an increased risk of developing mental disorders after stressful life events, e.g. PTSD (Lee, Ahn, Jeong, Chae, & Choi, 2014) as well as other anxiety (e.g. Scali et al., 2012), depressive (e.g. Edward, 2005; Kukihara, Yamawaki, Uchiyama, Arai, & Horikawa, 2014), and substance use disorders (Wingo, Ressler, & Bradley, 2014). Furthermore, trait resilience has been shown to predict treatment response in subjects with depression and PTSD (Davidson et al., 2012; Min, Lee, Lee, Lee, & Chae, 2012). Even though previous evidence suggests that trait resilience might protect from maladaptive outcomes and might help to recover from stressful life events little is known about cognitive characteristics and underlying mechanisms of trait resilience. This may be of pivotal importance regarding the development of empirical based interventions for promoting resilience.

Theoretical accounts postulate that attentional processing may play a crucial role in trait resilience. Schwager and Rothermund (2013) proposed that attention is the core of cognition and affect,

* Corresponding author. Tel.: +49 351 463 42233; fax: +49 351 463 36984.

E-mail addresses: judith.schaefer@tu-dresden.de (J. Schäfer), hans-ulrich.wittchen@tu-dresden.de (H.-U. Wittchen), hoefler@psychologie.tu-dresden.de (M. Höfler), Anke.Heinrich@tu-dresden.de (A. Heinrich), peter1zimmermann@bundeswehr.org (P. Zimmermann), siegel@ptzbw.de (S. Siegel), schoenfeld@psychologie.tu-dresden.de (S. Schönfeld).

¹ Tel.: +49 351 463 36983; fax: +49 351 463 36984.

² Tel.: +49 351 463 36921; fax: +49 351 463 36984.

³ Tel.: +49 351 463 42232; fax: +49 351 463 36984.

⁴ Tel.: +49 30 28411600; fax: +49 30 28411603.

⁵ Tel.: +49 160 92542971; fax: +49 30 28411603.

⁶ Tel.: +49 351 463 36958; fax: +49 351 463 36984.

which is responsible for adaptation in stressful situations. Theories of attention postulate two systems (e.g. Corbetta & Shulman, 2002) which can be related to the concepts of attentional control and attentional bias. Accordingly, attentional bias can be seen as a bottom-up, stimulus-driven attentional process, responsible for the detection and attentional holding of relevant stimuli. Attentional control is described as a top-down process, supposed to be responsible for preparation, regulation and application of goal-directed selective attention.

Even though theoretical accounts suggest that attentional biases to positive and negative stimuli may encourage trait resilience (e.g. Schwager & Rothermund, 2013), little effort has been made to directly investigate these associations. However, indirect evidence comes from research investigating associations with variations in the serotonin transporter gene. Serotonin is an important neurotransmitter involved in different psychological processes. The 5-HTTLPR polymorphism of serotonin transporter has been found to be associated with different mental disorders (e.g. Karg, Burmeister, Shedden, & Sen, 2011; Kenna et al., 2012). Therefore, one might assume that it is also involved in trait resilience. Accordingly, Stein, Campbell-Sills, and Gelernter (2009) found a negative association between the number of s-alleles of 5-HTTLPR and trait resilience. Additionally, Perez-Edgar et al. (2010) and Fox, Ridgewell, and Ashwin (2009) found that attentional bias for angry faces was positively associated with the number of long alleles of 5-HTTLPR and the reverse pattern was evident for attentional bias to happy faces. These findings suggest that trait resilience might be positively associated with attentional bias toward positive stimuli and negatively associated with attentional bias toward negative stimuli. However, to our best knowledge no study so far directly examined associations of trait resilience with attentional biases.

Moreover, a better ability to control attention may enable individuals to decide which internal and external stimuli they attend to and thus promote adaptive emotion regulation (Troy & Mauss, 2011). This may support coping with adverse situations. Consistent with this proposition Eisenberg et al. (2004) found that effortful control, a superordinate construct including AC, predicted trait resilience in a longitudinal study in children. Furthermore, Bardeen, Fergus, and Orcutt (2014) found that higher attentional control predicted lower symptoms of PTSD in traumatized individuals compared to non-traumatized individuals. However, to our knowledge research is lacking on examining the relations between attentional control and trait resilience directly.

According to theories about attentional processing attentional control and attentional biases are distinct systems but supposed to interact with each other (e.g. Corbetta & Shulman, 2002; Petersen & Posner, 2012). In line with this, Verwoerd, Wessel, de Jong and Nieuwenhuis (2009) found in a laboratory study that attentional bias and attentional control were related in the prediction of intrusions after watching a trauma film. Furthermore, Bardeen and Orcutt (2011) and Schoorl, Putman, Van Der Werff, and Van Der Does (2014) found that the interaction of attentional control and symptoms of PTSD was associated with attentional bias to threat. Results of the study of Bardeen and Orcutt (2011) using general threat stimuli (whereas Schoorl et al. (2014) used trauma-related stimuli) indicated that participants with strong AC and strong symptoms of PTSD showed attentional avoidance of threat whereas participants with poor AC and strong symptoms of PTSD showed an attentional bias towards threat.

In summary, it can be proposed that attentional control may be associated with a differential association between attentional biases to threat and positive stimuli and trait resilience. Attentional control may allow individuals to cope with stress and regulate negative emotions by attending to positive stimuli and disengaging

the attention from threat-related, negative information (e.g. Gross, 2002; Troy & Mauss, 2011).

1.1. Present study

This study aims at investigating the basic cognitive mechanisms of trait resilience, concentrating on attentional processing. We examined whether resilient individuals are characterized by attentional biases to emotional stimuli, i.e. avoiding threat and turning to positive stimuli relative to neutral stimuli, indicating that resilient individuals use emotional stimuli for adaptive emotional responses (e.g. Gross, 2002; Troy & Mauss, 2011). This may be related to the ability to voluntarily control attention. Therefore, we examined the relationships between attentional biases, attentional control and trait resilience in German soldiers – a sample at increased risk of experiencing stressful life events. We expect a) a positive association between attentional bias to positive stimuli and trait resilience and a negative association between attentional bias to threat and trait resilience, b) a positive association between attentional control and trait resilience and c) that a higher attentional control is associated with heightened attentional bias to positive stimuli and more trait resilience and d) that a higher attentional control is associated with diminished attentional bias to threat and more trait resilience. Since attentional bias to threat, attentional control and trait resilience are associated with symptoms of anxiety disorders, respectively (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007; Reinholdt-Dunne, Mogg, & Bradley, 2013; Scali et al., 2012), we tested these associations also by adjusting for these symptoms. Accordingly, since attentional bias to positive stimuli, attentional control and trait resilience are associated with symptoms of depression, respectively, (Armstrong & Olatunji, 2012; Edward, 2005; Reinholdt-Dunne et al., 2013) we tested these associations also by adjusting for these symptoms. Thereby, we tested whether the associations are only due to these specific symptoms but not to trait resilience.

2. Method

Data were collected during the follow-up measurement of the longitudinal component of the study “Prevalence, incidence and determinants of PTSD and other mental disorders” (PID-PTSD+³). A detailed description of the study's methods, design and findings has been published previously (Trautmann et al., 2014; Wittchen et al., 2012).

2.1. Participants

Participants were recruited from the follow-up sample ($n = 383$). $N = 198$ participants provided complete data sets with all of the measurements used for this study purpose (see below). Six participants had to be excluded because they had answered less than 80% of the trials in the dot probe task correctly. Additionally, we excluded the only female soldier because of empirical evidence suggesting gender differences in attentional biases (Tran, Lamplmayr, Pintzinger, & Pfabigan, 2013) and lack of power. This resulted in a final sample of $n = 191$ participants. Demographic and clinical characteristics of the sample are displayed in Table 1.

2.2. Self-reported measures

Number of combat-related experiences and traumatic events. Potentially traumatic events according to DSM-IV A1-criterion (American Psychological Association, 2000) were assessed using a list from the military version of the fully standardized diagnostic interview of DIA-X/M-CIDI (Wittchen & Pfister, 1997; Wittchen,

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