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The association between depressive symptoms and emotion recognition is moderated by emotion regulation

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ABSTRACT

In this study, we examined the associations between depression and aspects of emotional functioning, namely emotion recognition, affectivity and interpersonal problems. Particularly, the moderating role of emotion regulation in these interrelations was tested in a sample of 85 women, who exhibited a wide range of depressive symptoms (Composite International Diagnostic Interview (CIDI), Beck Depression Inventory (BDI)). Emotion recognition was assessed with a paradigm displaying a widely used set of photographs of the six basic emotions in graded intensities. Further, participants were examined regarding emotion regulation (Emotion Regulation Questionnaire (ERQ)), interpersonal problems (Inventory of Interpersonal Problems-Circumplex (IIP-C)) and affectivity (Affect Intensity Measure (AIM), Positive and Negative Affect Schedule (PANAS)). Besides correlation analyses, Johnson–Neyman technique for probing interactions in linear regression models was applied to test for possible moderating effects. Depressive symptoms were positively correlated with error rates in anger recognition, but not with the other basic emotions. This association was moderated by suppression in that regard that more severely depressed women who more frequently used suppression showed superior recognition of angry faces than those with lower suppression values. Further, suppression was associated with an affective imbalance and interpersonal problems in women with current depressive disorder. In sum, our results emphasize the importance of differentiating subtypes of depression depending on emotion regulation capabilities for research on or treatment of emotional functioning in depression.

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1. Introduction

Difficulties in emotional functioning are key characteristics in depressive disorders (Rude and McCarthy, 2003; Fisher et al., 2010). Especially skills in emotion recognition and emotion regulation were found to be impaired in individuals with major depressive disorder (MDD; Leppanen, 2006; Barnow, 2012).

In everyday life, it is important to understand the motifs and feelings of others and, as a consequence, to act adequately (Hess et al., 1988). Therefore, the recognition of emotions in interaction partners, especially of facial expressions of emotions (FEE), is essential. This ability seems to be biased in depressive individuals (for review see Bourke et al., 2010). For instance, Asthana et al.

(1998) found participants with MDD to show inferior emotion recognition independent of displayed emotion compared to healthy controls. This is in line with other studies, which reported a general recognition deficit in depressive persons (Rubinow and Post, 1992; Persad and Polivy, 1993).

On the other hand, there is evidence for a specific negative bias in emotion recognition of depressed individuals (Hale 3rd, 1998; Suslow et al., 2001; Yoon et al., 2009). This is in line with Bower's (1981) mood-congruity hypothesis which states "that stimuli whose affective significance matches the person's emotional state will provoke greater attention, faster perception and more elaborate processing [...] than neutral or mood-incongruent materials." Matching this assumption, in the study of Joormann and Gotlib (2006), depressive participants required higher intensities to identify happy FEE and lower intensities for sad expressions than control groups. Further, Leppanen et al. (2004) found individuals with MDD to rate neutral faces as sad more frequently than healthy controls. In a recent study of Anderson et al. (2011) both forms of recognition biases were found, depending on depression state:

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whereas currently depressed participants showed a general recognition deficit compared to healthy controls, the formerly depressed group identified negative FEE more correctly, illustrating a mood-congruent negative recognition bias.

To summarize, literature is inconsistent as to whether people with MDD are generally impaired in the recognition of FEE or whether there is a specific negative bias. It must be noted that differences in emotion recognition are mostly examined categorically between groups of people with MDD and healthy controls or individuals with other psychiatric disorders (Persad and Polivy, 1993; Joormann and Gotlib, 2006; Yoon et al., 2009; Bourke et al., 2010). When depression was (additionally) considered dimensionally in a number of studies (Surguladze et al., 2004; Gollan et al., 2010), results were also contradictory. For instance, Frewen and Dozois (2005) did not find correlations between depressive symptoms and reaction time or accuracy of recognition, whereas Leppanen et al. (2004) reported a positive association between depressiveness and false identification of neutral faces as sad.

Another skill which is often impaired in depression is emotion regulation (Aldao and Nolen-Hoeksema, 2010; Joormann and D'Avanzato, 2010). According to the review of Davidson et al. (2002), differences in experiencing and regulating emotions (possibly accompanied or caused by differences in brain abnormalities) may illustrate subtypes of depression with different developmental pathways and consequences. To the best of our knowledge, there is no previous study testing the influence of such an interaction between depression and emotion regulation on emotion recognition. In fact, there is only one study simultaneously examining both aspects of emotional functioning in depression at all: Raes et al. (2006) examined the association between recognition of FEE and rumination, a regulation strategy marked by repetitive thoughts and frequently found in depression (Gilbert et al., 2005; Nolen-Hoeksema et al., 2007; Aldao and Nolen-Hoeksema, 2010). They found rumination to be positively correlated with a negative bias in the judgement of FEE in depressed patients (Raes et al., 2006).

Another regulation strategy that plays an important role in depressive disorders is expressive suppression (Ehring et al., 2010; Joormann and Gotlib, 2010). According to Gross's process model of emotion regulation (Gross and John, 2003), suppression is a form of response-focused emotion regulation that involves inhibiting ongoing expressions of emotions. Individuals who often suppress their negative emotions were found to experience even more negative emotions and less positive ones. Furthermore, the authors report less social support with suppressors than with people who use more functional regulation strategies, like reappraisal, which can be described as cognitive change to modify the emotional impact of a situation and was found to occur less frequently in depression (Betts et al., 2009). Additionally, there is literature to suggest that suppression requires cognitive resources and therefore negatively influences performances in other areas (Baumeister et al., 1998; Dillon et al., 2007). For instance, Egloff et al. (2006) investigated spontaneous emotion regulation and found that participants, who reported having used expressive suppression during a speech, have less memory of this speech and greater physiological responding, compared to individuals who reappraised.

Besides emotion recognition, emotion regulation deficits in depression could also influence other areas of emotional functioning as affectivity which is mainly disturbed in depression (Thompson et al., 2011). As mentioned above, suppressive emotion regulation led to even more negative affect instead of decreasing it (Gross and John, 2003). On the contrary, Liverant et al. (2008) found suppression to reduce sadness for a short time whereas this strategy was no longer helpful when participants were anxious about being sad.

Likewise, interpersonal problems are central characteristics of depression (Segrin and Abramson, 1994; Zlotnick et al., 2000) and

a possible consequence of impaired emotional regulation (Lam et al., 2003). For instance, Lopes et al. (2005) reported a positive association between emotion regulation skills and self- as well as peer-reported interpersonal sensitivity in a college student sample. In addition, Gross and John (2003) found evidence that reappraisal is associated with better, whereas suppression is associated with worse interpersonal functioning.

Taking the above mentioned findings into consideration, in the first step of this study we examined whether dimensionally measured depressive symptoms are correlated with error or false alarm rates in the recognition of FEE, either in terms of a general recognition deficit or in terms of a mood-congruent negative bias. We particularly expected that the association would be moderated by emotion regulation strategies such as expressive suppression and cognitive reappraisal. In the second step, we wanted to test whether differences in emotion regulation strategies would also have an impact on emotion recognition and other aspects of emotional functioning, namely affectivity and interpersonal problems on the diagnostic level of MDD.

2. Methods

2.1. Subjects

To ensure a sample which displays a wide range of depressive symptoms, we investigated individuals with either current ($n=42$; mean age 26.07 years, $S.D.=7.38$) or past depressive disorders ($n=15$; mean age 28.13 years, $S.D.=7.57$) as well as with no history of psychiatric disorder ($n=28$; mean age 24.86 years, $S.D.=3.95$) according to a diagnostic interview in our study. As there is evidence that emotion regulation and recognition patterns in other mental disorders differ from those in depression (Domes et al., 2009; Aldao and Nolen-Hoeksema, 2010), individuals with comorbid bipolar disorder, cyclothymia, psychosis, substance use disorder or cluster B personality disorder were excluded. Due to gender differences in emotion recognition (Mufson and Nowicki, 1991; Bouhuys et al., 1999) we examined female participants only, aged 18–40. The mean age of the whole sample ($n=85$) was 26.04 years ($S.D.=6.51$). Participants were informed and invited to take part via postings and telephone calls. Written informed consent was obtained from all participants and the study was approved by the local ethics committee of the Ruprecht-Karls-University Heidelberg.

2.2. Measures

We assessed Axis I psychiatric disorders with the lifetime version of the fully standardized Munich-Composite International Diagnostic Interview (DIA-X/M-CIDI; Wittchen and Pfister, 1997; Wittchen et al., 1998), an updated German version of the World Health Organization Composite International Diagnostic Interview (CIDI; Wittchen and Semmler, 1990). According to the authors, inter-rater reliability is high ($\kappa=0.81-1.0$). Comparisons with clinical consensus diagnoses showed satisfying validities ($\kappa=0.39-0.82$) depending on interview section. The test-retest reliability of the interview is satisfying with κ ranging from 0.49 to 0.83.

The structured clinical interview for DSM-IV Axis II disorders (SCID-II; Fydrich et al., 1997) served as an instrument to examine personality disorders. Reliabilities reported for the German version are good to very good (Fydrich et al., 1996).

To gain dimensional information on depression, Beck's depression inventory (BDI; Beck et al., 1961) was used. This is a 21-item self-report questionnaire examining the severity level of depressive symptoms. Hautzinger et al. (1994) reported good reliabilities and validities for the German version of the BDI.

In addition, we assessed suppression and reappraisal using the German version of the emotion regulation questionnaire (ERQ; Gross and John, 2003; Abler and Kessler, 2009). The ERQ consists of ten items, which are rated on a seven-point likert-type scale. Higher scores indicate more frequent use of the strategy. According to the authors, the reliability is 0.69 for suppression as well as reappraisal and comparable to the German version (Gross and John, 2003).

As there is literature reporting possible confounding effects of working memory deficits on emotion recognition (Buitelaar et al., 1999; Gray and Tickle-Degnen, 2010) and as cognitive impairment is frequently found in depression (Austin et al., 2001), we also gathered information regarding memory span using the corresponding subtest of the KAI-N (Lehrl and Blaha, 2000). In this test, participants repeat different series of numbers and letters after the study assistant read them out aloud. According to Lehrl et al. (1992), the retest reliability for the subtest is $r=0.76$.

Further, affectivity was assessed using the affect intensity measure (AIM; Larsen, 1984). The AIM is a 40-item questionnaire that collects information about

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