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Brief report

Autistic traits and empathy in chronic vs. episodic depression

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ABSTRACT

Objectives: Difficulties in social interaction are characteristic for depressive disorders and one of the cardinal symptoms of Autism Spectrum Disorders (ASD). It has been proposed that chronically depressed persons have profoundly impaired empathic abilities in comparison to episodically depressed persons, and that specifically they exhibit a deficit in cognitive empathy, but not in affective empathy, a pattern also reported in ASD. This study aimed to explore autistic traits and empathy deficits in chronic depression, and identify specific differences to episodic depression.
Method: Autistic traits and multimodal empathy were assessed in chronically depressed patients ($n=59$), episodically depressed patients ($n=40$), and a healthy control group ($n=55$) using standardized questionnaires.
Results: Regardless of the disorder's chronicity, depressed patients exhibited higher levels of autistic traits and lower levels of perspective-taking than healthy controls. Chronically depressed patients reported significantly higher impairment in social skills and higher levels of personal distress in social interactions than episodic patients.
Discussion: Our results suggest that patients with chronic depression share two distinct characteristics, namely lower levels of social skills and higher levels of distress in tense social situations than patients with episodic depression. Future studies will need to determine whether the elevated autistic traits in chronic depression are specific to chronic depression, or represent the general tendency to withdraw from social situations. We conclude that chronically depressed patients are not specifically impaired in understanding another person's state of mind, but are unable to deal with another person's suffering or negative affective state.

1. Introduction

Symptoms of depression are considered chronic if they persist for longer than two years without remission phases lasting more than two months. About 25% of all depression incidents become chronic (Rubio et al., 2011). Compared to episodically depressed patients, the chronically depressed tend to be affected more severely: they have made more suicide attempts, been hospitalized more often, and have higher levels of comorbidities and functional impairment (Angst et al., 2009; Brown et al., 2008). Based on clinical observations, James McCullough argued for differences between chronic and episodic depression in terms of specific deficits in social cognition (2003, 1984). According to McCullough (2003) chronic depression is characterized by a deficit in cognitive empathy, while affective empathic abilities are intact. Cognitive empathy and the related concept of theory of mind (ToM) have been defined as the capacity to understand other people's feelings, intentions and beliefs on an intellectual level, while affective empathy describes the emotional response to another person's affective state or feelings (Davis, 1983; Singer, 2006).

Autism spectrum disorders (ASD) belong to the cluster of pervasive developmental disorders with severe deficits in social interaction and communication, and a pattern of restrictive, repetitive behaviors (DSM-5; American Psychiatric Association, 2013). *Autistic traits* are the subclinical manifestation of autistic symptoms and are widespread throughout the general population (Constantino et al., 2004). Twin and family studies revealed that autistic traits and ASD are etiologically linked (Lundström et al., 2012; Robinson et al., 2011), and differ from each other only “in means of severity and/or degrees of functional impairment” (Lundström et al., 2012, p. 51). ASD has been characterized by impairments in cognitive empathy, resulting in misunderstandings of the mental states and intentions of interaction partners (Rogers

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et al., 2007), while affective empathy is intact. Thus, the social cognitive deficits in chronic depression seem to mimic the social cognitive difficulties in ASD.

Notably, there is remarkable comorbidity between ASD and depression: 52% of persons with high-functioning ASD display depressive symptoms (Hofvander et al., 2009). Furthermore, severe autistic traits increase the risk for depression (Lundström et al., 2011).

Taken together, the similarities between chronic depression and ASD in terms of impaired empathy and social detachment, high comorbidity rates and psychosocial impairments suggest high levels of autistic traits in chronic depression. There is no explicit investigation of autistic traits in chronic depression in the current literature. However, some researchers studied empathy deficits in chronic depression, but yielded inconsistent results. In two studies, chronically depressed patients revealed impaired ToM abilities compared to healthy controls using picture stories of social interactions (Zobel et al., 2010). Mattern et al. (2015) recently reported deficits in understanding the feelings of others (affective ToM) in patients with chronic depression. Wilbertz et al. (2010) could not replicate these results via a movie-based ToM task or by self-reported empathy. Van Randenborgh et al. (2012) compared groups of patients with chronic and episodic depression but detected no differences in behavioral or self-reported empathic abilities either.

Given the lack of studies explicitly comparing patients with chronic versus episodic depression, the present study was undertaken to explore autistic traits and dispositional empathy using well-established self-report questionnaires. Based on the theoretical assumptions and the preliminary empirical evidence summarized above, we hypothesized that patients with chronic depression would display higher autistic traits than those with episodic depression. Furthermore, we expected the chronically depressed patients to report lower empathic abilities than episodic depressive patients, especially in cognitive empathy.

2. Methods

2.1. Participants

A group of patients with chronic depression (CHR-D; n=59) was compared to a group with an episodic depression according to DSM-5 (EPI-D; n=40), and a healthy control group (HC; n=55). Patients were recruited from the in- and outpatient units of the Department of Psychiatry, University Hospital Freiburg. The CHR-D patients met the criteria for persistent depression (F34.1) or chronic major depression (F32.0, 32.1, 32.2) lasting over two years according to DSM-5. The EPI-D group fulfilled the criteria for a current major depression lasting less than two years. The following comorbidities were excluded: (a) bipolar disorder, (b) psychotic disorder, (c) mental retardation, (d) anxiety disorder, and (e) personality disorders. HC were screened for psychiatric disorders according to the DSM-5 and fulfilled none of those diagnostic criteria during the previous 12 months. Moreover, participants who scored above the cut-off for ASD on autistic traits (Autism Quotient $\geq$ 32; Baron-Cohen, 2001) were excluded to ensure that no individuals with comorbid ASD were included. Written informed consent was obtained from all participants prior to participation.

2.2. Measures

Participants completed standardized questionnaires on demographic and clinical characteristics, autistic traits, dispositional empathy, and depression severity.

The *Autism Quotient* (AQ) measures autistic traits with 50 items on a 4-Point Likert scale covering five areas: social skills, attention switching, attention to detail, communication, and imagination (Baron-Cohen et al., 2001). A high AQ score indicates a high autistic load.

The *Interpersonal Reactivity Index* (IRI; Davis, 1983) measures dispositional empathic traits on four seven-item subscales (5-point Likert scale): The “perspective taking” subscale measures the tendency to adopt someone else's the point of view of another person, the “fantasy” scale assesses the individual's tendency to identify with a fictional character, the “empathic concern” scale measures the tendency to experience feelings of compassion or sympathy for others, and the “personal distress” scale measures the extent of the individual's negative self-focused response to others' suffering, i.e. anxiety and discomfort. A total IRI score is calculated by adding up the subscales except for the "personal distress", because it correlates negatively with the other subscales (Derntl et al., 2012).

The *Beck Depression Inventory-II* (Hautzinger et al., 2006) comprises 21 items scoring the severity of the depressive symptoms. A score $\geq$ 14 is considered the cut-off for mild depression (Hautzinger et al., 2006).

2.3. Analysis

Clinical and demographic sample characteristics were compared using χ^2-tests or analysis of variance (ANOVA). For total scores of the AQ and the IRI, ANOVAs were calculated. To compare the subscale profiles of the AQ and IRI between groups, we conducted separate multivariate analyses of variance (MANOVA), followed by univariate ANOVAs to further explore effects on the specific subscales. Variance analyses were followed up with post hoc Tukey Wallis tests to test for specific group differences. In case of non-homogeneity of the variance-covariance-matrices (MANOVA) or variances (ANOVA), corrected Welch's F-ratios were used, and the Games-Howell test was applied for post hoc comparisons. Furthermore, we tested linear associations between depressive symptoms and outcome variables using Pearson's correlation. Statistical tests were performed using SPSS for Windows Version 22. For all tests, the significance level was set to $p < .05$.

3. Results

Groups did not differ in sex distribution and age, but did in their level of education. As we expected, the depressed groups obtained similar BDI-II scores, but higher BDI-II scores compared to HC. Descriptive data are given in Table 1.

With regard to *autistic traits*, groups differed significantly as indicated by a significant effect on the AQ total score ($p < .001$), and a significant global difference in the MANOVA ($p < .001$) (see Table 2). Subsequent univariate testing revealed significant differences in all AQ subscales except the “attention to details” (see Table 2, upper panel, last column). Post-hoc single comparisons showed that CHR-D and the EPI-D scored significantly higher than HC on the AQ total score, while the difference between CHR-D and EPI-D was not statistically significant (for details see Table 2).

CHR-D scored higher on the AQ subscales “attention switching”, “communication”, and “imagination” compared to HC, indicating more severe/greater difficulties in those domains. The only significant difference in the CHR-D and EPI-D groups was revealed in the AQ “social skills” subscale-the CHR-D group reported lower abilities, expressed through a higher score (see Table 2, upper panel, last column).

With regard to *dispositional empathy*, groups also exhibited overall differences in empathic abilities, as indicated by a

Table 1
Demographic and clinical characteristics.

	CHR-D $n=59$ *M (sd)*	EPI-D $n=40$ *M (sd)*	HC $n=55$ *M (sd)*	Statistical test	
				χ^2, *F*, *p*	Post hoc single comparisons
Sex (female/male in %)	64.4/35.6	38.5/61.5	41.8/58.2	$\chi^2(2)=4.66$, $p=.792$	–
Age (years)	47.79 (10.95)	46.21 (13.40)	45.84 (11.16)	$F(2,150)=1.209$, $p=.301$	–
Education (years)	11.49 (1.46)	11.39 (1.96)	12.44 (1.20)	$F(2,148)=7.268$, $p=.001$	CHR-D=EPI-D < HC
BDI-II Scores	30.75 (10.66)	28.05 (9.76)	2.85 (2.72)	$F(2,152)=180.353$, $p<.001$	CHR-D=EPI-D > HC

Note. CHR-D=chronically depressed patients. EPI-D=episodically depressed patients. HC=healthy control group. BDI-II=Beck Depression Inventory II.

Table 2
Group differences in autistic traits (Autism Quotient, AQ) and empathy (Interpersonal Reactivity Index, IRI).

	CHR-D $n=59$ *M (sd)*	EPI-D $n=40$ *M (sd)*	HC $n=56$ *M (sd)*	*MANOVA/ANOVA*	
				F, *p*, η^2	Post hoc single comparisons
AQ total score	22.65 (6.83)	20.78 (5.41)	14.18 (5.48)	*F(2,149)=29.703, p<.001,* $\eta^2=.209$ *MANOVA* $F(10, 286)=7.491$, $p<.001$, $\eta^2=.208$	CHR-D=EPI-D > HC
Social skills	5.53 (2.19)	4.03 (2.41)	2.22 (1.87)	$F(2,149)=33.596$, $p<.001$, $\eta^2=.315$	CHR-D > EPI-D > HC
Attention switching	5.63 (2.11)	5.30 (1.87)	3.15 (1.97)	$F(2,149)=24.366$, $p<.001$, $\eta^2=.250$	CHR-D=EPI-D > HC
Attention to details	3.39 (1.93)	4.05 (1.63)	4.11 (1.98)	$F(2,98)=.561$, $p=.572$, $\eta^2=.009$[a]	–
Communication	3.39 (1.93)	3.27 (1.88)	1.58 (1.51)	$F(2,149)=17.070$, $p<.001$, $\eta^2=.190$	CHR-D=EPI-D > HC
Imagination	4.42 (2.02)	4.14 (2.03)	3.13 (1.78)	$F(2,149)=6.714$, $p=.002$, $\eta^2=.084$	CHR-D=EPI-D > HC
IRI empathy score[b]	45.42 (11.77)	49.42 (8.64)	51.20 (9.47)	$F(2,152)=4.808$, $p=.009$, $\eta^2=0.289$ *MANOVA* $F(8,296)=9.103$, $p<.001$, $\eta^2=.197$	CHR-D < HC=EPI-D
Perspective	14.20 (5.01)	15.13 (3.51)	18.07 (4.34)	$F(2,152)=11.523$, $p<.001$, $\eta^2=.133$	CHR-D=EPI-D < HC
Fantasy	12.51 (4.73)	13.77 (4.77)	14.40 (4.32)	$F(2,152)=2.152$, $p=.086$, $\eta^2=.032$	–[c]
Empathic concern	18.71 (4.92)	20.72 (3.82)	18.73 (3.77)	$F(2,152)=2.152$, $p=.044$, $\eta^2=.041$	–
Personal distress	13.92 (5.12)	11.38 (4.43)	7.44 (3.40)	$F(2,89)=25.240$, $p<.001$, $\eta^2=.290$[a]	CHR-D > EPI-D > HC[d]

Note. CHR-D: chronically depressed patients. EPI-D=episodically depressed patients. HC=healthy control group. MANOVA=multivariate analysis of variance. ANOVA=analysis of variance. AQ=Autism Quotient. IRI=Interpersonal Reactivity Index.

[a] Corrected Welch's F.
[b] Sum of the IRI subscales except personal distress subscale.
[c] while the ANOVA showed a significant difference post hoc Tukey tasks showed no significant differences between diagnostic groups.
[d] Games-Howell used for post hoc procedure.

significant effect on the IRI total empathy score ($p=.009$) and a significant global difference in the MANOVA ($p<.001$) (see Table 2). Single comparison revealed a significant difference between CHR-D and HC for the IRI total score. Exploring subscale group differences, the univariate testing demonstrated significant group differences on IRI "perspective taking" and IRI "personal distress", with the CHR-D group showing impaired perspective taking compared to HC. The CHR-D group's only significant difference from the EPI-D group was found in the IRI "personal distress" subscale, with the CHR-D reporting higher levels (see Table 2, lower panel, last column).

Statistical trend analyses revealed linear trends from CHR-D over EPI-D to HC for the following variables: IRI subscales "perspective taking" ($F(1,150)=22.98$, $p<.001$), "fantasy" ($F(1,150)=4.57$, $p=.034$) and "personal distress" ($F(1,150)=63.89$, $p<.001$), AQ total score ($F(1,146)=56.88$, $p<.001$) and the AQ subscales "social skills" ($F(1,148)=66.19$, $p<.001$), "attentional switching" ($F(1,148)=48.71$, $p<.001$), "communication" ($F(1,148)=34.20$, $p<.001$) and "imagination" ($F(1,148)=12.15$, $p<.001$).

In the CHR-D group, the AQ "social skills" and BDI-II score demonstrated a small but significant linear association ($r=.27$, $p=.040$), while those variables did not correlate significantly in the EPI-D and HC groups (EPI-D: $r=.31$, $p=.062$; HC: $r=-.21$, $p=.134$). We observed a significant association between the "personal distress" IRI subscale and depressive symptoms in CHR-D ($r=.44$, $p<.001$) and HC ($r=.29$, $p=.031$), however, the EPI-D group revealed no significant association ($r=.02$, $p=.906$).

4. Discussion

Patients with chronic and episodic depression reported higher levels of autistic traits than healthy controls. Elevated autistic traits in chronic compared to episodic depression became apparent exclusively in the AQ subscale measuring impairments in social skills. However, the extent to which the elevated social skills deficit indicates an ASD-specific characteristic or just depicts a shared need to withdraw from social life must still be determined. Closer examination of the social skills subscale reveals that these items explore the affinity towards social interaction and social functioning – therefore, a pronounced social skills impairment might simply reflect the higher functional impairments in chronic compared to episodic depression, as indicated in preliminary studies (Angst et al., 2009; Gilmer et al., 2005). In addition, for most of the autistic traits and empathy subscales, linear trend analyses in the present study suggest an association of empathy impairments and autistic traits with illness duration.

Contrary to our expectations, there were no differences between chronic and episodic depression in cognitive empathy. This might be due to the fact that patients with episodic depression also reported impairments in social skills compared to healthy controls. The IRI might not be sensitive enough to capture subtle differences and/or that the depression-specific negative cognitive bias hampers the self-reporting of ToM abilities. The higher levels of personal distress in social situations found in chronic compared to episodic depression are in line with the concept of impaired social-cognitive functioning in chronic depression (McCullough, 1984, 2003). Batson (1987, 2009) stated that high levels of self-

focus lead to personal distress and enhance the tendency to withdraw from social situations, while low levels of self-focus lead to empathic concern and prosocial behavior. The *preoperational developmental* stage proposed by McCullough in chronic depression is associated with high levels of self-focusing. Thus, according to Batson's (2009) model, patients with chronic depression would display higher levels of personal distress, as this study revealed. Taken together, our study findings suggest that patients with chronic depression are not specifically impaired in inferring another person's mental and affective states, but they do appear to be less able to handle another person's suffering or negative affective state.

It should be noted that the present data does not enable us to conclude whether impaired social skills and high levels of personal distress in social situations are the cause or consequence of depressive illness. Although there is evidence that high autistic traits in children increase the risk for developing depression and other psychiatric disorders in later life (Lundström et al., 2011), longitudinal studies are needed to trace both the development of these personality traits and the occurrence of mental disorders over the life course, and directly test for the proposed association. In addition, self-reported autistic traits and empathic abilities might be state-dependent. Hence, it seems possible that in the present study, chronically depressed patients tended to report higher levels of autistic traits and empathy impairments because of their lower mood or current dysphoria, although comparable BDI-II scores in the present study do not support this hypothesis. Future studies should therefore control for emotional state while assessing trait measures via self-reporting.

In conclusion, the present study reveals a distinct pattern of autistic and empathic traits in patients with chronic as compared to episodic depression: chronic depression is associated with lower levels of social skills and higher levels of distress in tense social situations. Both aspects are highly relevant for developing specific social skills training for patients with chronic depression, and might guide the focus of therapy in personalized treatment.

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