Mentalizing and emotion regulation. Evidence from a non-clinical sample.

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Abstract

Theoretical conceptualizations of mentalizing postulate a close relationship between the ability to mentalize and the regulation of emotional states. The former is viewed as a key process to modulate the latter with the origins for the link between the two established in early attachment relationships. However, there is a lack of research testing this association empirically. In the present cross-sectional study, the hypothesis of a positive relationship between the two constructs was tested based on data collected on more than 500 non-clinical adult participants. Various self-assessments and an experimentally derived instrument of mentalizing were employed to this end. Correlational analyses confirmed the expected associations between emotion regulation and mentalizing. In addition, regression models showed that adaptive as well as maladaptive emotion regulation, independent of age, gender and native language, could be predicted only by self-focused mentalizing.

Theoretical background

A large body of theoretical work focuses on associations between mentalizing and emotion regulation (e.g. Fonagy, Gergely, Jurist & Target, 2015; Allen, Fonagy, & Bateman, 2011). Empirical research confirms those associations, mainly referring to data from clinical studies (e.g. Sharp et al., 2011; Euler et al., 2019). A current shift in mentalizing theory focuses on non-clinical populations, conceptualizing mentalizing as a health-promoting resource. It is hypothesized, that mentalizing could influence coping behavior, well-being or helpful reappraisal in the face of adverse stimuli (e.g. Fonagy, Luyten, Allison & Campbell, 2017; Luyten, Campbell, Allison & Fonagy, 2020) indicating the need for both cross-sectional and longitudinal research focusing on healthy populations. In particular, the question arises as to whether mentalizing serves as a prerequisite for adaptive emotion regulation in non-clinical populations. This is important, because the capacity for emotion regulation is an important aspect of mental health in general (e.g. Beauchaine & Cicchetti, 2019; Beauchaine & Crowell, 2019).

Mentalizing

The concept of mentalizing integrates theoretical contributions from various disciplines such as (relational) psychoanalysis, social cognition, attachment theory, emotional awareness and theory of mind (Taubner, 2015). Mentalizing is defined as the imaginative capacity to perceive and interpret one's own and others' behaviors in terms of intentionally motivated mental states, such as feelings, wishes, desires, thoughts, and beliefs (Allen et al., 2011). Critically, the process of mentalizing allows behavior to become predictable and to be perceived as meaningful if it can be viewed as underpinned by mental states (Taubner, 2015). It is important to note that mentalizing is an umbrella concept, that integrates different dimensions such as emotional awareness and cognitive perspective-taking or self-focus and other-focus (Luyten et al., 2020). The self-reflective ("What do I feel and how does it affect my behavior?") and interpersonal ("What does my counterpart feel and how does this affect

his/her behavior?") capacity is (1) important for organizing social interactions and (2) closely linked to the development of second-order representations of self- and feeling states (Fonagy & Target, 2011; Fonagy et al., 2015). Second-order representations are conscious intrapsychic concepts that allow the identification and modification of these mental states, while first-order representations reflect the unconscious intrapsychic and embodied experiences of mental states (Taubner, 2015). Mentalizing is seen, like language acquisition, as a developmental achievement and is accompanied by an increasing awareness of the importance of mental states for both interpersonal and intrapsychic processes (Fonagy et al., 2015; Fonagy & Allison, 2014).

A large number of studies suggest that impaired mentalizing is an important factor in the development and maintenance of psychopathology. A growing body of research has linked compromised mentalizing with, for instance, borderline personality disorder (e.g. Fonagy et al., 1996, Németh et al., 2018) , antisocial personality disorder (e.g. Newbury-Helps, Feigenbaum & Fonagy, 2017), and depressive disorders (e.g. Fischer-Kern et al., 2013). Moreover, treatment of patients with borderline personality disorder using mentalization-based therapy (MBT) (Bateman & Fonagy 2014) was found to be more effective in randomized-controlled trials than treatment as usual (e.g. Bateman & Fonagy 1999, 2008, 2009; Bales et al., 2015, Rossouw & Fonagy, 2012; Jørgensen et al., 2013). In addition, mentalizing may be implicated in the process of change within different psychotherapeutic treatments (Levy et al., 2006) and corresponds with a decrease in the severity of psychological symptoms during psychotherapy (De Meulemeester, Vansteelandt, Luyten & Lowyck, 2017). In summary, impaired mentalizing seems to be a characteristic of mental illness.

In addition to the clinical relevance, a current shift in mentalizing theory can be identified, focusing on mentalizing as a health-promoting capacity in non-clinical populations

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(e.g. Stein, 2013; Fonagy et al., 2017; Schwarzer, 2019; Luyten et al., 2020). It is

hypothesized that mentalizing capacity can protect individuals from stress-affected emotional

arousal (Taubner, 2015) through the mentalizing-facilitated development of an integrated

view of the self. Several authors argue that a mentalizing view of the self subsequently allows

the adaptive and regulated processing of stress-related affective arousal (e.g. Nolte, Bolling,

Hudac, Fonagy, Mayes, & Pelphrey, 2013; Ballespi et al., 2019). In summary, it is assumed

that mentalizing may exert its generic salutogenic effects via the improvement of emotion

regulation, which, in turn, is thought to lead to an improvement in mental health issues.

Emotion regulation

Emotion regulation is defined as the result of a number of internal and external

processes that consciously and unconsciously take effect in modulating, assessing, and

expressing emotional responses in terms of their intensity, their maintenance, and their ending

(Gross & Thompson, 2007). Regulating emotions therefore includes all processes that allow a

mental processing of emotional states (Steinfurth, Wendt & Hamm, 2013) as well as the

modification of their expression, their progress, and their evaluation and appraisal (In-Albon,

2013). A significant body of research was recently summarized in two reviews (Beauchaine &

Ciccheetti, 2019; Beauchaine & Crowell, 2019). The authors collate extensive evidence for

the strong associations between psychopathology and emotion dysregulation (Aldao, Gee, De

Los, Reyes & Seager, 2016; Beauchaine, 2015; Cline et al., 2015; Cole, Hall & Hajal, 2017;

Silk, Steinberg & Morris, 2003). Difficulties with emotion regulation have been consistently

described in relation to many diagnosed conditions: substance abuse (Weiss, Williams &

Connolly, 2015), eating disorder (Seidel et al., 2018; Svaldi, Griepenstroh, Tuschen-Caffier &

Ehring, 2012), depression (Lopez, Luby, Belden & Barch, 2018), anxiety (Kircanski et al.,

2018), post-traumatic stress disorder (Fitzgerald, DiGangi & Phan, 2018), attention-

deficit/hyperactivity disorder (Steinberg & Drabick, 2015), conduct disorder (Beauchaine,

Gatzke-Kopp & Mead, 2007), borderline personality disorder (Herpertz, Schneider, Schmahl & Bertsch, 2018; van Zutphen et al., 2018) and psychotic disorders (Kring & Caponigro, 2010; Nook et al., 2018).

This evidence confirms both the clinical relevance and the pivotal role of emotion regulation in mental disorders. In contrast, strategies reflecting adaptive emotional competence, such as problem-solving and identifying and seeking social support, predict relatively good functioning across childhood and adolescence in non-clinical samples (e.g. Aldao, Nolen-Hoeksema & Schweizer, 2010; Compas et al., 2017). Therefore, adaptive emotion regulation is associated with mental health and high levels of well-being, while maladaptive emotion regulation strategies that indicate a tendency for reduced engagement tend to be strongly associated with a range of mental disorders (Aldao, Jazaieri, Goldin & Gross, 2014; Aldao et al., 2010; Compas et al., 2017; Schafer, Naumann, Holmes, Tuschen-Caffier & Samson, 2017). An overall weakness in emotion regulation can intensify background emotional experience, cause distortions in the perception of the social context in which emotion is experienced, lead to an emotional reaction through the mere anticipation of experiencing intense affect, generate inappropriate emotional reactions and sometimes lead to dramatic actions taken in order to avoid the aversive experience of emotion (Heller & Casey, 2016; Kircanski et al., 2018; Macdonald, Goines, Novacek & Walker, 2016).

Thus, while emotional dysregulation itself is not a mental disorder, the associated mood states, their persistence, and their lability will lead to symptoms of disorder including irritability, negative affect, anxiety, and aggression (Macdonald et al., 2016). These are often coping strategies that aim to avoid aversive experiences, but also contribute to social behaviors that lead to rejection and thus worsening of the individual's emotional experiences (Kim & Cicchetti, 2010). In sum, adaptive emotion regulation seems to be a characteristic of mental health. In contrast, maladaptive emotion regulation is associated with defensive coping

behavior, is characterized by a mismatch of effort and expense in favor of the effort to be made, and can lead to reduced wellbeing and interpersonal problems – in both clinical samples and non-clinical populations (In-Albon, 2013, Euler et al., 2019).

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The significant relationship between emotion regulation and mentalizing is first shown in the theoretical model of the development of these capacities. According to the model, initially the co-regulation of emotional states by caregivers plays a central role in (1) the development of the child's capacity to mentalize and (2) the corresponding capacity for emotion regulation that is independent from the caregiver (Fonagy et al., 1997). This requires mentalizing by the caregiver in order to understand the child's intrapsychic experiences, which in turn leads to co-regulation of the child's emotions. Emotional states, iteratively co-regulated by the caregiver based on sensitive interactions, constitute an interpersonal and safe "learning environment" in which the child experiences emotional states as meaningful, predictable, and somewhat controllable. The mirrored expressions of emotions in turn serve as an external representation of the child's inner psychic experience and allow the child to gain knowledge of its feelings at the present time and to build second-order representations of affect, initially experienced primarily as bodily sensations (Fonagy et al., 2015). The increasingly differentiated intrapsychic representations (second-order representations), in turn, allow the child to perceive mental states as initiators of their own and others' behavior. Additionally, they allow the regulation and adaptation of these emotional states independently of the caregiver (Fonagy & Target, 2011). Thus, the corresponding relationship between mentalizing and emotion regulation in childhood can be described as bidirectional, starting as a co-regulatory process and leading to autonomous emotion regulation. Reviewing current theoretical approaches concerning the development of mentalizing capacities and emotion regulation, it seems that dyadic interactions are still one of the main influences in achieving mentalizing and regulatory capacities. However, research indicates that human development

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is a multifactorial process that is influenced by several environmental factors, leading to a more systemic understanding of psychosocial development with important experiences beyond dyadic relationships (e.g. Fonagy et al., 2017; 2020).

In turn, the capacity to regulate emotion is conceptualized as an important aspect of mental health (Cicchetti, Ackerman & Izard, 1995; Kullik & Petermann, 2012). As reviewed above, maladaptive forms of emotion regulation are associated with mental illness (Aldao et al., 2010) while adaptive forms of emotion regulation are described as a health-promoting factor (Southam-Gerow & Kendall, 2002). In this context, the concept of mentalized affectivity may be relevant. This comprises three fundamental aspects contributing to emotion regulation: identifying emotions, processing emotions, and expressing emotions (Jurist, 2005). Recently, Greenberg, Kolasi, Hegsted, Berkowitz, and Jurist (2017) confirmed this notion empirically, using data from 2840 subjects. Mentalized affectivity is considered to be the prerequisite for autonomous emotion regulation and denotes the ability to discover the subjective meanings of one's own feelings, relying on the capacity to mentalize (Fonagy & Target, 2011). The conscious experience of one's own emotions, the exploration of their meaning, the reflection and the reappraisal of them becomes possible. Mentalized affectivity allows emotion-conscious and meaningful behavior on the basis of emotional mental states as well as insight during mental elaboration processes (Jurist, 2005; Allen et al., 2011; Taubner, 2015).

Research on mentalizing and emotion regulation

Surprisingly, despite the extensive theoretical considerations, only a few studies to date have investigated the relationships between mentalizing and emotion regulation. Indirect evidence suggests that parental mentalizing predicts a parent's sensitivity in dealing with their child, thereby enabling an increasingly well-adapted regulation of the child's emotional states (e.g. Ensink, Normandin, Plamondon, Berthelot & Fonagy, 2016). Moreover, Gottman, Katz,

& Hooven (1996) show that children whose parents have a pronounced awareness of mental states have even more adaptive emotion regulatory capacities. In addition, clinical studies indicate that mentalizing is significantly reduced in patients with severe psychopathology compared with healthy samples (e.g. Fonagy et al., 1996, Németh et al., 2018), but also that the ability to regulate emotions in specific patient groups is impaired (e.g. Chapman, Leung & Lynch, 2008; Salsman & Linehan, 2012). A recent study by Euler et al. (2019) reported that both mentalizing and emotion regulation predicted interpersonal problems in a sample of 210 patients with borderline personality disorder. Results showed that impairments in mentalizing did not contribute to interpersonal problems, but predicted interpersonal problems indirectly via emotion dysregulation, indicating a direct effect of mentalizing on emotion regulation, which in turn could be seen to create interpersonal problems. These associations were confirmed by Innamorati and colleagues (2017), who reported correlations between self-rated mentalizing and emotion dysregulation, based on data from adults, as well as by Sharp and colleagues (2011), who reported mediation effects from impaired mentalizing on borderline personality disorder traits via emotion dysregulation in adolescent inpatients. These studies suggest an association between mentalizing and the ability to regulate emotions. A recent study by Borelli and colleagues (2018) confirmed the hypothesized relationship using physiological measures. Comparing mentalizing and cardiovascular reactivity in stress induction in 76 eight- to 12-year-old children the authors demonstrated that with increasing mentalizing capacity the emotional stress response of the children was lower and that, subsequently, a more efficient normalization of psychophysiological functions was achieved. Although concrete forms of emotion regulation have not been assessed, the findings can be interpreted as direct indications of an association between emotion regulation and mentalizing.

Objective

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In light of these findings, the question remains as to whether mentalizing as a prerequisite predicts adaptive as well as maladaptive forms of emotion regulation in non-clinical adults, as has been suggested by several authors (e.g. Allen et al., 2011; Fonagy & Target, 2011; Fonagy et al., 2015). Reviewing current research this association is to be expected, but further empirical data are urgently needed, which was the objective of the current study. In particular, as mentalizing is described as a protective capacity which enables the processing of adverse circumstances, this proves to be important, as the promotion of mentalizing using mentalization-based interventions such as supervision is possible (e.g. Adkins, Luyten, & Fonagy, 2018; Valle et al., 2016; Welstead et al., 2018).The current study investigates associations between mentalizing as predictor and emotion regulation as dependent variable, leading to the following hypotheses:

Hypothesis 1: It is expected that in a non-clinical adult sample better mentalizing will predict the amount of adaptive or maladaptive emotion regulation as part of a causal pathway independently of gender, age and native language based on the assumption that mentalizing capacity enables the individual to identify, process and express emotional states.

Hypothesis 2: Since emotions are based on self-affect state propositions (Fonagy & Luyten, 2009), it is furthermore expected that self-focused mentalizing is especially associated with the ability to regulate emotions ("What do I feel and how does it affect my own behavior?"). However, the capacity to attribute mental states to others ("What does my counterpart feel and how does this affect his behavior?") is less likely to be linked to emotion regulation, as this is a mainly self-focused capacity.

Method

The study

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The study was part of a cross-sectional research project examining the role of mentalizing capacities in fostering well-being in a non-clinical sample of prospective and already employed nursery teachers, primary school teachers, and childcare workers, as well as teachers in training at a university. Participation in the study was voluntary. Participants were recruited at a university, at a vocational school, and in daycare centers in southern Germany. All participants completed a series of questionnaires and performance tests. Data collection took approximately 90 minutes and was conducted in small groups in college seminars, in training classes, and in team sessions. Beforehand, all participants were informed about the aims of the study and gave written informed consent to take part in the study. They were able to stop data collection at any time and to withdraw their data retrospectively. The study was approved by the Ethics Committee of XXXXXX.

Participants

The current study included data from 535 participants aged 15 to 57 years ($M = 23.67$; $SD = 7.25$). The sample largely consisted of female participants, which is typical of the pedagogical field (approximately 88% of the total sample). No significant difference in age between female and male participants was found (t-test: $p = 0.98$). None of the participants were in inpatient psychiatric care at the time of data collection. All were working in a pedagogical institution at the time of the survey.

Measures

Mentalizing. The study used a pair of instruments to assess mentalizing: (1) the German version of the Mentalization Questionnaire (MZQ) (Hausberg et al., 2012) and (2) the Movie for the Assessment of Social Cogitation (MASC) (Dziobek et al., 2006).

The German version of the MZQ assesses self-focused mentalizing (Hausberg et al., 2012). The MZQ consists of 15 items (e.g. "Sometimes I only realize in retrospect, what

feelings I had before.") rated on a 5-point Likert scale from 1 (= *totally disagree*) to 5 (= *totally agree*). According to the test authors (Hausberg et al., 2012), all items contribute to a total score which reflects self-rated mentalizing in all further analyses. After recoding of all values, high scores indicate robust self-focused mentalizing, whereas low scores represent impaired mentalizing. The internal consistency of the scale was good ($\alpha = 0.81$). A non-significant Kolmogorov–Smirnov test confirmed the normal distribution ($p = 0.129$).The psychometric properties of the MZQ are consistent with those reported by Hausberg and colleagues (2012). Construct validity was confirmed in several studies, in which the MZQ was shown to be able to differentiate between healthy and clinical samples with large effects (e.g. Murri et al., 2016; Schwarzer, 2019). Furthermore, Hausberg and colleagues (2012) showed that during inpatient treatment patients' mentalizing continuously improves as measured using the MZQ. In addition, the MZQ is associated positively with other measures of mentalizing (Schwarzer, 2019), and negatively with severity of psychological symptoms (e.g. Probst et al., 2018).

The capacity to attribute mental states to others was assessed using the MASC (Dziobek et al., 2006). The MASC is considered to be a reliable and valid performance test that measures accuracy in mentalizing attributions (Taubner, 2015). Participants watch a film and are asked to attribute mental states such as feelings, thoughts and desires to the protagonists in an everyday social context. At 45 time points, the film stops and the participants are challenged with questions to attribute a mental state that they believe was underlying the protagonists' behaviors. Presented with four answers in a multiple-choice format, participants choose the answer they think most accurately represents what is underlying the interpersonal events portrayed in the film clip. One of the four answer categories is considered "correct" in terms of a mentalizing framework to interpret the events and correct answers are included in the total score for the MASC. The other three categories represent distorted interpretations of the social interactions shown in the film (e.g. hostility, concretism). High score values

indicate accurate mentalizing. The internal consistency of the scale was $\alpha = 0.67$. The values

were not normally distributed (Kolmogorov–Smirnov test: $p = 0.000$). The psychometric

properties of the MASC are consistent with those reported by Dziobek and colleagues (2006).

Furthermore, the MASC assesses a number of subscales, representing specific attribution

styles that are considered to be skewed and indicate a non (or over)-mentalistic understanding

of behavior. Due to their low internal consistencies the subscales are not represented in the

reported results.

Emotion regulation. The way in which participants regulate emotion was assessed

using the questionnaire for adult emotion regulation (FEEL-E) (Grob & Horowitz, 2014). The

FEEL-E assumes that adults use strategies to deal with emotions that are robust over time.

(Grob & Horowitz, 2014). Based on 72 statements, FEEL-E comprises five-point Likert

scales (1 = *almost never* to 5 = *almost always*) to measure self-estimated emotion regulation.

The FEEL-E assesses (1) adaptive emotion regulation for the emotions anger ($\alpha = 0.82$,

Kolmogorov–Smirnov test: $p = 0.235$), anxiety ($\alpha = 0.80$, Kolmogorov–Smirnov test: $p =

0.015$) and sadness ($\alpha = 0.85$, Kolmogorov–Smirnov test: $p = 0.017$) (sample items: "When

I'm angry / scared / sad I think about what I could do") and (2) maladaptive emotion

regulation for the emotions anger ($\alpha = 0.69$, Kolmogorov–Smirnov test: $p = 0.078$), anxiety ($\alpha

= 0.80$, Kolmogorov–Smirnov test: $p = 0.021$) and sadness ($\alpha = 0.81$, Kolmogorov–Smirnov

test: $p = 0.267$) (sample items: "When I'm angry / afraid / sad, I do not feel like doing

anything anymore"). In addition, the FEEL-E (3.) examines the adaptive and the maladaptive

nature of emotion regulation, which are both independent of anger, anxiety and sadness. The

internal consistency of both scales was very good with $\alpha = 0.92$ and $\alpha = 0.90$, respectively.

Both scales were normally distributed (Kolmogorov–Smirnov test: $p = 0.556$ and $p = 0.220$,

respectively). The psychometric properties of the FEEL-E in this study are consistent with

those reported by Grob and Horowitz (2014).

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Covariates: As covariates age, gender and native language were assessed and included in all further analyses.

Statistical analysis

The number of missing values was minimal ($< 1\%$). Missing values were randomly distributed (Little test $p > 0.05$) and were reconstructed using the expectation-maximization algorithm (Tabachnick & Fidell, 2012). The dataset contained one multivariate outlier (Mahalanobis distance), which was excluded from all analyses using the χ^2-test ($p \leq 0.001$) (Tabachnick & Fidell, 2012). Correlation analyses (Pearson) were used to test correlations between the MASC and MZQ and adaptive or maladaptive emotion regulation. Moreover, correlational analyses were employed to examine associations between mentalizing and adaptive or maladaptive emotion regulation for the emotions anger, anxiety and sadness. Two linear regression models with the predictor variables age, gender, and native language, as well as the MASC and MZQ, predicted the amount of adaptive and maladaptive emotion regulation (Hypothesis 1 and Hypothesis 2). To assess whether statistical requirements were met, graphical residual analyses were carried out first. Multicollinearity was tested using tolerance values and variance inflation factors. The independence of the residuals was estimated using the Durbin–Watson statistic (Tabachnick & Fidell, 2012).

Results

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Please place Table 1 here

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Descriptive statistics as well as correlations between all measures are shown in Table 1. There was a significant positive correlation between values of the MASC and MZQ ($r = 0.24$; $p < 0.001$). Furthermore, no correlation between the MASC and adaptive emotion

regulation ($r = 0.08$; $p > 0.05$) could be found. MZQ and adaptive emotion regulation, on the other hand, were associated ($r = 0.34$; p < 0.001). In contrast, maladaptive emotion regulation was correlated with both MASC ($r = –0.14$; $p = 0.001$) and MZQ ($r = –0.52$; $p < 0.001$) scores. In addition, the values of the MZQ were positively correlated with adaptive regulation of anger ($r = 0.34$; $p < 0.001$), anxiety ($r = 0.29$; $p < 0.001$) and sadness ($r = 0.28$; $p < 0.001$), whereas the MASC showed a correlation only with the adaptive regulation of anxiety ($r = 0.12$; $p = 0.006$). In addition, both the MASC and MZQ were correlated negatively with maladaptive regulation of anger ($r = –0.19$, $p < 0.001$ and $r = –0.50$, $p < 0.001$, respectively) and anxiety ($r = –0.12$, $p = 0.008$ or $r = –0.44$; $p < 0.001$). The maladaptive regulation of sadness was correlated only with the MZQ ($r = –0.45$; $p < 0.001$), but not with the MASC.

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Please place Table 2 here

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In both models, the residuals were normally distributed and spread regularly (homoskedasticity); autocorrelations between the residuals did not exist (Durbin–Watson statistic). Variance inflation factors and tolerance values indicated sufficient separability despite correlative relationships between the predictors. The regression model for adaptive emotion regulation was significant with approximately 11 % of variance explained ($R^2 = 0.107$, $F = 13.53$) (medium effect). Regarding the regression coefficients, self-focused mentalizing (MZQ) was the only variable in the regression model that significantly contributed to predicting adaptive emotion regulation ($\beta = 0.33$; $p = 0.000$). The predictors age, gender, and native language, as well as mentalizing relating to others (MASC), varied independently of adaptive emotion regulation and did not account for variance in the dependent variable. Overall, the regression model to predict maladaptive emotion regulation

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revealed a similar pattern. The model could explain 26 % of the variance ($R^2 = 0.26$, $F = 37.91$) but only self-focused mentalizing (MZQ) was a significant predictor of maladaptive emotion regulation ($\beta = -0.53$; $p = 0.000$). All other variables that were simultaneously entered into the regression model did not contribute to predicting maladaptive emotion regulation.

Discussion

In the present cross-sectional study, the hypothesis of an association between mentalizing capacity and emotion regulation was tested using data from more than 500 non-clinical adult participants. In detail, it was hypothesized, that mentalizing capacity could serve as a prerequisite of emotion regulation, leading to higher levels of adaptive strategies and a decrease in the use of maladaptive emotion regulation strategies. Various self-assessments and experimentally derived measures of mentalizing were employed. The subject of this study is of particular interest because mentalization-informed psychological interventions are a promising framework with which to increase mentalizing capacities, leading to an increase in adaptive emotional regulation and a decrease in maladaptive forms of emotion regulation. With reference to the theoretical assumptions of the concept of mentalizing, associations were to be expected between the capacity to perceive and reflect upon one's own and others' behavior on the basis of mental states and the regulation of emotional states. Regarding the current study, the correlation coefficients found in this study indicate that both self-focused mentalizing (self-report) as well as the capacity to attribute mental states to others (experimentally assessed) are negatively correlated with self-rated maladaptive emotion regulation. Better mentalizing was correlated with a decrease in the reported use of maladaptive emotion regulation. The statistical correlations between mentalizing and self-rated adaptive emotion regulation were less consistent. While self-focused mentalizing correlated positively with successful emotion regulation, emotion regulation and accuracy in

attributing mental states to other people varied in different ways. In addition, data indicate that, in particular, participants' tendency to modify the emotion "anxiety" using adaptive emotion regulation correlated positively with their mentalizing capacity. Moreover, there were statistically significant negative correlations between both measures for operationalizing partial aspects of mentalizing on the one hand and the self-rated tendency to use maladaptive strategies such as escape or avoidance to regulate anger and anxiety on the other hand. Furthermore, it is noticeable that in the studied sample self-focused mentalizing was more clearly correlated with self-rated emotion regulation, as was expected.

In order to clarify to what extent both aspects of mentalizing (self- versus other-focused) independently contribute to adaptive or maladaptive emotion regulation capacities, two regression models were estimated. The F-coefficients of the regression models indicated that both models explain a significant amount of the variance in adaptive emotion regulation and maladaptive emotion regulation (medium effects), whereas the regression model for predicting maladaptive emotion regulation was overall more powerful. A further examination reveals that the self-reported tendency of the sample to use adaptive or maladaptive emotion regulation was independent of age, gender, and native language. Instead, both forms of regulatory processes were explained exclusively by self-focused mentalizing in both regression models. In contrast, the capacity to attribute mental states to another person was of no statistical relevance. In view of these results, hypothesis 1 and hypothesis 2 can be verified: In particular, (1) the ability to precisely perceive one's own mental states (such as emotions or feelings) and (2) their integration into regulatory processes are likely to be accompanied by increasingly well-coordinated emotion regulation: Following Fonagy and colleagues (2015), the marked mirrored expressions of emotion of the caregiver in early life serve as an external representation of the child's inner psychic experience and allow the child to gain knowledge of what a primary, raw feeling state may mean and represent. These increasingly differentiated intrapsychic representations, in turn, allow the child to regulate

these states in a manner that is independent of the caregiver (Fonagy & Target, 2011). So, the development of emotion regulation is characterized by a transition from a mainly interpersonal co-regulation to a more and more autonomous emotion regulation, realized by the person themselves.

Moreover, the concept of mentalized affectivity with its psychoanalytical roots (Jurist, 2005; Fonagy & Target, 2011) proves to be important in this context: It enables the conscious experience of one's own emotions, such that the exploration of their meanings and their reflection become possible (Allen et al., 2011; Taubner, 2015). This is possible only, if there is a well-established capacity to perceive and reflect on one's own experiences, which in turn is defined as self-focused metalizing. With this in mind, the result in the current study, which showed that emotion regulation was exclusively predicted by self-focused mentalizing in both regression models, is not surprising. It may indicate that in adulthood, self-focused mentalizing has a more powerful impact on the individual's emotion regulatory capacities. Consequently, the ability to attribute mental states to other people may be independent of emotion regulation from a conceptual perspective: Emotions are subjective states that are independent of others. In turn, the ability to attribute mental states to other people seems to be independent of one´s own emotional regulation because of the different foci.

In a wider context, the current findings fit well with the intersubjective understanding of psychosocial development, as psychoanalytic literature has suggested (e.g. Winnicott, 1971; 1988; Kernberg, 1976). More precisely, the capacity to mentalize as well as the ability to regulate emotion autonomously are results of intersubjective experiences in childhood. With reference to current psychoanalytic literature (e.g. Schüßler, 2016; Rabinovich, 2016), a distinction can be made between affect and emotion, highlighting the important role of mentalizing in processing emotions adaptively, as underpinned by the results of the current study. In detail, affects largely contain unconscious parts – emotions, on the other hand, are

conscious parts of these affects (Damasio, 2001). Exploring the conscious parts of affects

requires the ability to perceive and reflect upon mental states (Schore, 2009; Jurist, 2005),

which is a key target of psychotherapeutic interventions in general, but of psychoanalytic and

mentalization-informed therapies in particular (Fonagy et al., 2015).

Limitations

In light of the interpretation of the results, some limitations must be taken into

account. The findings are based on a cross-sectional study design and therefore do not allow

causal relationships to be defined. A replication of the findings in a longitudinal design is

needed to validate the reported results. Furthermore, the current sample is highly

homogeneous, predominantly comprising female participants from pedagogical fields, who on

average are likely to have a higher than average mentalizing capacity. Contrary to our results,

differences between gender could exist in larger samples. Therefore, the extent to which

findings can be generalized remains a future empirical task. In addition, the MASC has some

test-statistical problems ($\alpha = 0.62$ in the current study). Seeing the complex and diverse

manifestations (second-order beliefs, more complex processes such as irony or

embarrassment) of mentalizing that the MASC measures during the procedure, this finding is

not surprising. Nevertheless, a replication study should reflect on alternative means of

assessing mentalizing. In addition, the question arises to what extent complex phenomena

such as emotion regulation or mentalizing can be measured via self-report instruments. While

Borelli and colleagues (2018) used physiological data, the present study is based on self-

reported data. Alternative forms of operationalization, as well as the already mentioned

replication of findings in longitudinal designs, could provide further insight, as well as

avoiding shared method variance, which may have skewed the results. Finally, the extent to

which mentalizing as an umbrella concept can be empirically measured must be critically

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reflected upon. This study uses two measures in tandem to increase the validity of the reported results.

Conclusion

This study examined the associations between mentalizing and self-rated emotion regulation in a non-clinical adult sample. It was possible to confirm the hypothesized assumption that mentalizing and the capacity to regulate emotions are positively associated. Data indicate that the capacity to perceive and reflect upon one's own mental states is a prerequisite for emotion regulation, predicting adaptive and maladaptive forms of emotion regulation. While self-focused mentalizing leads to better adaptive emotion regulation with only small effects, self-focused mentalizing explains a significant amount of variance of maladaptive emotion regulation in the current sample with large effects, indicating a buffering effect of mentalizing capacity on using maladaptive forms of emotion regulation. The reported results are important because they confirm theoretical assumptions of the mentalizing concept empirically. Further investigations are needed to replicate and validate these findings. Moreover, these results are important due to the current shift in mentalizing theory, focusing on mentalizing as a health preserving capacity, that enables the adaptive and regulated processing of stress-related affective arousal in the face of adverse stimuli.

Conflict of interests

The authors of this study declare that they have no biomedical or financial conflicts of interest to disclose.

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