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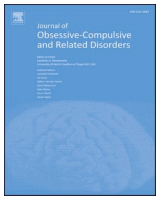

Associations between emotion regulation, symptom severity, and affect in obsessive-compulsive disorder

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ABSTRACT

Previous cross-sectional, retrospective studies have shown associations between dysfunctional emotion regulation (ER) and obsessive-compulsive (OC) symptoms. No studies to date have, however, used intensive longitudinal designs to assess the theoretically proposed, yet empirically understudied dynamic relations between momentary OC symptoms, affect, and ER. Up to six times a day across six days, $n = 68$ individuals with OCD and $n = 43$ mentally healthy controls reported engagement-oriented and avoidance-oriented ER strategies, self-perceived ER effectiveness, negative and positive affect, and OC symptoms. We investigated associations between ER behavior and current outcomes (i.e., affect or symptoms in the moment) as well as subsequent outcomes (i.e., 1–2 h later). Results showed that higher-than-usual self-perceived ER effectiveness was associated with higher current positive affect and lower current negative affect and OC symptoms. Use of avoidance-oriented ER strategies was also partly associated with less beneficial outcomes. Effects for engagement-oriented ER strategies were mostly non-significant, except from a negative association with subsequent OC symptoms. All other associations with subsequent outcomes did not reach statistical significance. One possible explanation may be the overall low endorsement of ER strategies across groups. Future studies with varying study designs are needed. Constraints on generality and possible clinical implications are also discussed.

Emotion regulation (ER) describes all cognitive or behavioral strategies that individuals use to modify emotional experiences as well as emotion-provoking situations (Gross, 2013). Following the multidimensional model of emotion dysregulation (Gratz & Roemer, 2004), manifold difficulties in ER may occur during these complex regulatory processes, e.g., nonacceptance of emotions, difficulties in goal-directed behavior, impulse-control difficulties, limited access to ER strategies as well as lack of emotional awareness and clarity. Previous research has indicated that various psychopathologies, including obsessive-compulsive disorder (OCD; Aldao et al., 2010; Moritz et al., 2018; Yap et al., 2018), are often associated with these ER difficulties. Relatedly, current cognitive-behavioral models of OCD emphasize that the dysregulation of disorder-specific negative emotions plays a central role in maintaining the disorder (e.g., Salkovskis et al., 1995). Specifically, OCD-inherent obsessions (e.g., the intrusion "I forgot to lock the door") evoke intense negative emotions (e.g., anxiety) that individuals seek to regulate via ritualized compulsions (e.g., checking the door). While these compulsions may decrease emotional intensity in the short-term, they help to maintain OC symptoms in the long-term, as they prevent patients from disconfirming underlying maladaptive core beliefs (Salkovskis et al., 1995). Beyond this centrality of ER in disorder-specific situations, ER difficulties in OCD are also displayed in disorder-non-specific contexts throughout daily life (Bischof et al., 2024).

Given this expansive nature of ER deficiencies, it appears vital to further disentangle the momentary dynamics at play during ER within an individual's everyday life. These insights may enable us to further augment first-line treatments for OCD, such as exposure and response prevention (ERP; Hezel and Simpson, 2019), which show good, yet

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optimizable efficacy (Ong et al., 2016; Skapinakis et al., 2016). Potentially, integrating ER-focused components into CBT rationales could lower dropout rates and increase response rates (Ong et al., 2016; Öst et al., 2015). It is possible that generally improved ER abilities may transfer to OCD-specific situations, increase tolerance for obsession-elicited emotions, as well as extend existing behavioral repertoire. And indeed, previous studies implementing general ER trainings have shown promise in boosting treatment efficacy across various disorders (Allen & Barlow, 2009; Barlow et al., 2017; Shaw et al., 2020).

Difficulties in ER are traditionally assessed via retrospective self-report questionnaires that measure general trait-like attitudes and behavioral tendencies in response to emotional events. Given the used instructions and item wordings, these questionnaires assess ER regardless of whether the elicited emotions are due to psychopathology or completely unrelated to experienced symptoms (e.g., Gratz & Roemer, 2004; Gross & John, 2003; Moritz et al., 2016). Previous studies using aforementioned instruments have demonstrated cross-sectional correlations between ER difficulties (e.g., non-acceptance of emotions, difficulties in goal-directed behavior, limited access to effective strategies) and symptom severity in OCD (e.g., Fergus & Bardeen, 2014; Yap et al., 2018). Further, ER difficulties were found to be more pronounced in OCD (vs. matched healthy control groups) even after accounting for anxiety and depression (Bischof et al., 2024; Khosravani et al., 2020; Yap et al., 2018; Yazici & Yazici, 2019). Relatedly, ER difficulties emerged as a significant longitudinal predictor of OC symptoms and their worsening during the COVID-19 pandemic while engagement-oriented coping strategies (e.g., positive reframing, planning) were associated with fewer OC symptoms in the pandemic (Fang et al., 2022; Hong et al., 2022). Overall, these findings highlight the central role of general ER deficits in the maintenance of OC symptoms. Yet, it remains largely unknown which specific aspects of ER account for these effects.

To address this question, ER should be considered at a more fine-grained strategy level, thus, differentiating engagement- and avoidance-oriented ER strategies. Specifically, engagement-oriented ER strategies (i.e., reappraisal, problem solving, social support) focus on direct contact with emotions, while avoidance-oriented ER strategies (i.e., expressive suppression, thought suppression, behavioral avoidance) aim at distraction (Daros et al., 2019; McMahon & Naragon-Gainey, 2019). Although research acknowledges contextual variations, avoidance-oriented ER strategies are often considered putatively maladaptive as they are linked to more psychopathology on a trait level. In contrast, due to their weak links to psychopathology, engagement-oriented ER strategies are considered putatively adaptive (Aldao et al., 2010; Aldao & Nolen-Hoeksema, 2010; Mennin et al., 2007). Along these lines, expressive suppression has been positively associated with OC symptom severity, while cognitive reappraisal has been associated with less severe OC symptoms (Fergus & Bardeen, 2014; Goldberg et al., 2016). Interestingly, these associations were mediated by changes in affect: While associations between cognitive reappraisal and OC symptoms were partly mediated by increased positive affect, the association between expressive suppression and OC symptoms was partly mediated by increased negative affect (Goldberg et al., 2016). In sum, previous research has indicated that ER strategies, OC symptoms, and affect are meaningfully interconnected, thus, fostering the model-congruent role of ER difficulties in OCD.

Retrospective self-report measures warrant, however, some limitations. Past studies showed that the retrospective recall of emotional experiences is often biased, especially in clinical populations (e.g., MacLaren Kelly et al., 2019). In addition, ER processes are fast-moving and complex. Despite trait differences between individuals in certain regulatory tendencies, emotions and regulatory behavior within one individual vary substantially over time and across different situations (Aldao et al., 2015; Park & Naragon-Gainey, 2019). In order to capture state differences and to reduce recall biases, we need to assess ER repeatedly in varying situations (Trull & Ebner-Priemer, 2020). Therefore, the assessment of emotional experiences and regulatory abilities with intensive longitudinal designs (e.g., ecological momentary assessment; EMA) becomes increasingly important (Trull & Ebner-Priemer, 2020). By assessing relevant constructs several times a day, we capture phenomena of interest with greater proximity in time and are able to consider differences *within* one individual from one assessment point to another, next to differences *between* individuals.

As one example for an intensive longitudinal study, Southward and Cheavens (2020) showed that the *number* of momentarily used engagement-oriented and avoidance-oriented ER strategies was also significantly associated with affect within individuals. More specifically, while the simultaneous use of more engagement-oriented ER strategies improved current mood within an individual, a higher number of avoidance-oriented strategies worsened mood in a non-clinical sample (Southward & Cheavens, 2020). These findings imply an important extension of the polyregulation theory, which postulates that individuals typically use *multiple* (vs. single) ER strategies to manage emotional experiences (Ford et al., 2019). Consistently, it would appear plausible that not merely a higher total number of ER strategies, but a higher number of putatively adaptive (vs. maladaptive) ER strategies leads to better emotional outcomes. However, so far, intensive longitudinal study designs that allow for the assessment of multiple emotion regulation strategies in OCD are still missing.

Building upon this gap, in a recent study we used a six-day EMA and demonstrated its sensitivity in detecting ER difficulties in OCD (Bischof et al., 2024). We found that OCD participants reported lower positive and higher negative affect, a higher number of momentarily used avoidance-oriented ER strategies, and low perceived effectiveness of ER (Bischof et al., 2024). These group differences remained significant even when we omitted assessment points where participants experienced OC symptoms, supporting general – rather than symptom-dependent – ER deficits in OCD (Bischof et al., 2024). Overall, our findings replicate previously identified trait-level group differences on a momentary level and additionally extend research using traditional self-report measures by explicitly considering the momentary presence of OC symptoms. More fine-grained research on momentary associations among ER strategies, affect, and OC symptoms using EMA designs, however, is needed. For example, it remains unclear whether a higher-than-usual number of used avoidance-oriented ER strategies is associated with more OC symptoms in the moment or a few hours later.

EMA-based research insights in other psychopathologies yield a potential framework for answering these questions. Here, greater use of avoidance-oriented strategies and less use of engagement-oriented strategies was associated with more internalizing symptoms at the same time point or shortly after (Kashdan et al., 2014; McMahon & Naragon-Gainey, 2019; Short et al., 2018). Further, greater use of engagement-oriented strategies was related to more positive affect, while avoidance-oriented ER strategies were linked to more negative and less positive affect later during the day in non-clinical and clinical samples (McMahon & Naragon-Gainey, 2019; Southward & Cheavens, 2020). However, past research also showed that it can be fruitful to consider additional ER variables beyond regulatory strategies. For example, higher self-perceived ER effectiveness seems to be related to less psychopathology and more beneficial emotional outcomes as well (Bigman et al., 2016; Ottenstein, 2020). Despite high regulatory effort, individuals may perceive their ER as unsuccessful depending on personality, mental health status, and context (Gruber et al., 2012; Wylie et al., 2023). Therefore, it appears important to include this more subjective measure of ER behavior within EMA studies.

Given the current state of research for ER in OCD, two open questions remain. First, to our knowledge, no study has assessed associations among the momentarily used number of engagement-oriented and avoidance-oriented ER strategies, affect, and symptom severity in OCD using an EMA design. Thus, this design would extend findings from cross-sectional studies and longitudinal studies which focused on more long-term outcomes, i.e., within days or weeks (e.g., Fang et al., 2022;

Hong et al., 2022). Notably, it is still unclear whether the synergistic use of multiple avoidance-oriented ER strategies or engagement-oriented ER strategies differently impacts emotional outcomes within a few hours for individuals with OCD. Elucidating this question would yield a critical starting point for developing additional ER-based treatment components. Second, the role of subjective regulatory effectiveness for emotional outcomes in OCD (above and beyond the chosen number of ER strategies) remains unclear. Using intensive longitudinal designs to explore this association would increase ecological validity and decrease the risk of recall biases. This might be especially important in clinical populations, such as OCD, which are vulnerable to biased retrospective reports of emotional outcomes (MacLaren Kelly et al., 2019).

Thus, in the current study, we investigated two main hypotheses based on a large EMA assessment:

(1) Individuals using a higher (vs. lower) number of avoidance-oriented ER strategies and individuals using a lower (vs. higher) number of engagement-oriented ER strategies will report greater overall negative affect across six days (differences *between* individuals, i.e., between-person level).
At time points when individuals use a higher (vs. lower) number of avoidance-oriented ER strategies and when they use a lower (vs. higher) number of engagement-oriented ER strategies than they usually do, they will report greater current and subsequent negative affect (differences *within* an individual, i.e., within-person level).
The reverse relationships should emerge for positive affect.
(2) Individuals using a higher (vs. lower) number of avoidance-oriented ER strategies and individuals using a lower (vs. higher) number of engagement-oriented ER strategies will report greater overall OC symptom severity across six days (between-person level).
At time points when individuals use a higher (vs. lower) number of avoidance-oriented ER strategies and when they use a lower (vs. higher) number of engagement-oriented ER strategies than they usually do, they will report greater current and subsequent OC symptom severity (within-person level).

To further test the relevance of synergistic effects when using several avoidance- or engagement-oriented ER strategies, we additionally considered binary variables, representing whether or not *any* strategy from the respective group was selected. Due to past EMA findings, we still expect less beneficial outcomes for the use of any (vs. none) avoidance-oriented ER strategies and more beneficial outcomes for the use of any (vs. none) engagement-oriented ER strategies as described above. In line with the extended polyregulation theory (Southward & Cheavens, 2020), associations should, however, be stronger for the *number* of ER strategies.

For Hypothesis 1, we additionally assessed the moderating impact of group membership (OCD vs. mentally healthy controls) and for both hypotheses, the incremental influence of self-perceived ER effectiveness was considered exploratorily.

1. Method

1.1. Transparency and openness

The study design, hypotheses, and analysis plan were preregistered at osf.io under the registration ID osf.io/3V4X7 in August 2021. Data analysis started after preregistration. The study was approved by the ethics committee of the Department of Psychology and Sport Science at the University of Münster, Germany, on March 12, 2020 (ID 2020-63-UB). Study material, data, and analysis code are available online at osf.io/mgs5a/.

1.2. Participants

Data collection was conducted between February 2021 and April 2022. All participants were recruited online from January 2021 to April 2022 via social media, public advertisements, OCD-specific online forums, and outpatient clinics in Germany. After obtaining written informed consent, $N = 155$ participants ($n = 92$ individuals with OCD and $n = 63$ mentally healthy controls) took part in an initial online diagnostic session. Inclusion criteria for all participants were an age between 18 and 65 years old and fluency in German. For the OCD group,

Table 1
Sociodemographic and clinical characteristics.

	OCD ($n = 68$)	HC ($n = 43$)	p
Age (M (SD))	29.07 (7.99)	27.63 (4.56)	.28
Gender (female (%))[a]	$n = 55$ (80.88)	$n = 35$ (81.40)	>.99
Years of education (M (SD))	17.67 (3.63)	18.43 (3.44)	.28
Nationality (%)	$n = 67$ German (98.53) $n = 1$ Bulgarian (1.47)	$n = 43$ German (100.00)	>.99
Comorbidity (yes (%))	$n = 43$ (63.24)		
Number of comorbidities (M (SD))	1.99 (1.10)		
OC-spectrum disorder (%)	$n = 4$ (9.30)		
Anxiety disorder (%)	$n = 35$ (81.40)		
PTSD (%)	$n = 6$ (13.95)		
Psychosomatic disorder (%)	$n = 5$ (11.63)		
Depressive disorder (%)	$n = 13$ (30.23)		
Sexual dysfunction (%)	$n = 3$ (6.98)		
Eating disorder (%)	$n = 1$ (2.33)		
Sleeping disorder (%)	$n = 2$ (4.65)		
ADHD (%)	$n = 1$ (2.33)		
Current psychotherapy (yes (%))	$n = 31$ (45.59)		
Current medication (yes (%))	$n = 24$ (35.29)		
Y-BOCS (M (SD))	22.09 (5.41)		
BABS (M (SD))	8.28 (3.04)		

Note. OCD = obsessive-compulsive disorder; HC = mentally healthy controls; PTSD = posttraumatic stress disorder; ADHD = attention deficit hyperactivity disorder; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale; BABS = Brown Assessment of Beliefs Scale.
[a] Gender was assessed as female, male, and diverse, however, the option diverse was not selected by any individual.

individuals were included when they fulfilled the diagnostic criteria according to the DSM-5 (American Psychiatric Association, 2013) at the time of testing. Exclusion criteria were lifetime diagnoses of psychosis, bipolar disorder, or borderline personality disorder, substance abuse within the last five years, change in psychotropic medication in the last eight weeks, and current suicidality. Mentally healthy controls were excluded if they had ever met any diagnosis of a mental disorder, received psychotherapy, or been on a psychotropic medication in their life. Thus, due to exclusion criteria and premature dropout, the sample included $n = 72$ OCD participants and $n = 54$ mentally healthy participants. For our data analyses, $n = 15$ individuals (affect as outcome variable) and $n = 4$ individuals (OC symptoms as outcome variable) had to be excluded due to missing emotion regulation. Overall, this resulted in a final sample size of $N = 111$ (affect as outcome variable) or $N = 68$ participants (OC symptoms as outcome variable). Individuals in the OCD group were on average 29.07 years old ($SD = 7.99$ years), and mentally healthy controls reported an average age of 27.63 years old ($SD = 4.56$ years). Overall, 80.88% of the OCD group and 81.40% of the mentally healthy controls identified as female. Groups did not significantly differ in age nor gender ($p > .05$) For detailed sociodemographic and clinical characteristics, see Table 1.

1.3. Power analysis

The sample size was estimated based on a power analysis addressing the main research questions using simulations with the R package *simr* (version 1.0.7; Green & MacLeod, 2016). For analyses including both groups, aiming for a statistical power of at least 80%, the a priori suggested sample size was $N = 100$ when including both groups and $N = 70$ for analyses only including the OCD group (for more details, refer to Bischof et al., 2024).

2. Materials

At pre-assessment, clinical interviews and several self-report questionnaires were used to ensure that inclusion criteria were fulfilled and to assess relevant sample characteristics. We only describe measures relevant to the present research questions, remaining self-report questionnaires will be reported elsewhere (e.g., Bischof et al., 2024).

2.1. Baseline assessment

Diagnostic Interview for Mental Disorders (DIPS; Margraf et al., 2021). The DIPS is a widely used and well validated structured clinical interview for mental disorders based on the DSM-5 criteria (Margraf et al., 2021). Interrater reliability in the current study was excellent with Cohen's $\kappa = 1$, which was based on 20% of randomly selected ratings for the OCD section (i.e., fulfillment of DSM-5 criteria: yes or no). The DIPS was conducted by the shared first-authors of this manuscript, N.H. and C.B., who were both in the late stages of their training as cognitive behavioral psychotherapists during data collection and therefore familiar with the use of the DIPS in the clinical context.

Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989; Hand & Büttner-Westphal, 1991). We used this 10-item semi-structured interview to assess the severity of obsessive-compulsive symptoms. Items (scored from 0 to 4) were summed and the total score could range from 0 (no symptoms) to 40 (very severe symptoms). The Y-BOCS is a widely used measure for symptom severity, which demonstrated good psychometric properties and construct validity in the past (Deacon & Abramowitz, 2005; Jacobsen et al., 2003). Based on randomly drawn 20% of the data of our sample, the intraclass correlation coefficient of .99 indicated excellent agreement between the two raters (N.H. and C.B.).

Brown Assessment of Beliefs Scale (BABS; Buhlmann, 2014; Eisen et al., 1998). We used this six-item semi-structured interview to assess insight into disorder-related beliefs. Items were scored from 0 to 4 and the total score ranged from 0 (excellent insight) to 24 (no insight, delusional). Internal consistency as well as convergent and divergent validity were high in past studies (Buhlmann, 2014). Based on 20% of randomly drawn BABS total scores, the intraclass correlation coefficient of .97 yielded excellent interrater reliability in the current sample.

2.2. EMA assessment

Momentary affect. For momentary affect, individuals were asked to complete the sentence "*Immediately before the signal I felt ….*" with eleven affect items rated on a five-point Likert scale from 1 (*not at all*) to 5 (*extremely*). Items were mostly based on the Emotion Sense Application, a mood monitoring app developed at the University of Cambridge, UK (e.g., Lathia et al., 2017). Momentary positive affect comprised four items (i.e., *active*, *in a good mood*, *calm*, *relaxed*). Negative affect was assessed via seven items and was augmented by OCD-specific emotions (i.e., *angry*, *anxious*, *lonely*, *sad*, *ashamed*, *guilty*, *disgusted*). We operationalized momentary negative or positive affect as the mean of the corresponding items. The *disgust* item was added after the first ten participants had been assessed, based on feedback that this disorder-specific emotion was missing.[2] The intraclass correlation coefficient (ICC), as derived from a null model, was .61 for negative affect and .48 for positive affect, indicating that 61% of the variance in negative affect and 48% of the variance in positive affect, respectively, was accounted for by *between-person* variation. Due to between-group heteroscedasticity, individual ICCs were calculated based on the ratio of the between-person variance (across the two groups) and the total variance. The total variance was derived from the sum of the between-person variance and the person-specific residual variances using multilevel Gaussian location-scale models (see data analysis for further details). The range of ICCs was .52 to .78 for negative affect and .46 to .61 for positive affect.

Emotion regulation strategies. Participants were asked to report whether they tried to change their emotions. If yes, participants were presented with a multiple-selection list of nine emotion regulation strategies, which were classified as either avoidance-oriented (i.e., emotional suppression, distraction, expressive suppression, rumination, behavioral avoidance) or engagement-oriented (i.e., problem-solving, cognitive reappraisal, introspection, seeking advice). We used simple, concrete action phrases adapted from item wordings in previous EMA studies to assess strategies (e.g., "I try to ignore or push away my thoughts/feelings"). Momentary strategy use was measured in two ways: (1) as the sum of strategies selected at each time point from the respective group (Daniel et al., 2019; Daros et al., 2020; Ford et al., 2019) and (2) as a binary variable indicating whether any strategy from the respective group was chosen at the current time point or not. The ICC was .47 for avoidance-oriented ER strategies and .39 for engagement-oriented strategies. Considering between-group heteroscedasticity, the range of individual ICCs was .42 to .85 for avoidance-oriented ER strategies and .36 to .67 for engagement-oriented ER strategies.

Perceived ER effectiveness. Following Daniel et al. (2019), participants were asked to rate the perceived effectiveness of the currently chosen ER strategies on a scale from 0 (*much worse*) to 100 (*much better*). As for ER strategies, perceived ER effectiveness was only rated when participants indicated that they tried to change their emotions. The ICC was .32 for perceived ER effectiveness. Considering between-group heteroscedasticity, the range of individual ICCs was .30 to .41.

Momentary OC symptoms. Only participants in the OCD group indicated whether they were currently experiencing OC symptoms. If

[2] Analyses were conducted with and without the first ten participants missing the affect item *disgusted*. For the vast majority of our statistical models, this did not change the significance of our findings. The results reported herein include these ten participants. Results for the two deviating models are marked in the respective tables in the supplements.

yes, momentary OCD symptoms were assessed separately for obsessions and compulsions on a five-point Likert scale from 1 (*mild*) to 5 (*extreme*). For analyses, we operationalized momentary psychopathology in two ways: (1) as momentary intensity of reported, averaged OC symptoms and (2) as binary variable indicating whether individuals reported any OC symptoms (obsessions and/or compulsions) at the current time point or not. The ICC was .37 for averaged momentary OC symptoms. Considering between-group heteroscedasticity, the range of individual ICCs was .34 to .47.

2.3. Study procedure

Data were collected online via video appointments with RED connect software (RED Medical Systems GmbH, Version 4.3.0), self-report questionnaires via EFS Survey (Tivian XI GmbH, Version 21.2), and smartphone application-based EMA using MovisensXS (Movisens GmbH, Version 1.5).

After two screenings, online and telephone-based, individuals participated in an initial video appointment during which the DIPS was conducted. If participants met the inclusion criteria, they progressed to the assessment period. During a second video session, participants completed several self-report questionnaires (described elsewhere) and participants in the OCD group additionally answered Y-BOCS and BABS. Subsequently, all participants received a detailed introduction to the application, especially regarding the interpretation of the different ER strategies, with individually discussed examples for each item. Additionally, participants received an information sheet with general instructions and examples to review at home. They used the app on their own smartphones and completed up to 36 EMAs within six days (up to six times per day), between 9:00 a.m. and 9:00 p.m., with at least one hour in between each assessment. Participants had 15 minutes to react to incoming alarms, and they could delay alarms by five or ten minutes. Furthermore, participants could pause the application to be undisturbed during crucial appointments. All EMA questions were answered in reference to the current time point right before the alarm was received. Following participation, individuals received up to €80 with an additional possible bonus of €20 if they completed at least 80% of the assessments (based on the rationale described in Schulte et al., 2021).

2.4. Data analysis

Data were analyzed using the software R (R Core Team, 2023). Due to between-group heteroscedasticity, we used Gaussian location-scale models as implemented in the function *gaulss* from the R package *mgcv* (version 1.8–33; Wood, 2017). In this way, it is possible to model the scale parameter of the response as a function of the predictors (here, group membership, gender, and age). The resulting individual specific residual variances may decrease the risk of overly conservative or liberal inference due to heteroscedasticity. In contrast to many other regression techniques, the *mgcv*-package does therefore not use maximum likelihood in the narrow sense. Penalty terms are added to the likelihood, especially when fitting additive terms (e.g., Wood, 2017). The penalty serves as a regularizer of estimates to avoid overfitting, i.e., the penalty terms ensure appropriate smoothing of the functional estimates. Embedded in this (penalized) likelihood framework, standard errors are readily available, and we used them to compute 95% confidence intervals for all quantities of interest.

To test our between-person level hypotheses, we averaged all variables of interest across the EMA period and conducted general linear regression models. Separate models were conducted for overall (1) negative affect, (2) positive affect, (3) intensity of OC symptoms, and (4) likelihood to report OC symptoms as outcome variables. All outcome measures were separately predicted from either (1) the average number of used engagement-oriented and avoidance-oriented ER strategies or, deviating from our preregistration, (2) the average likelihood to report any engagement-oriented and avoidance-oriented ER strategies. In a second step, averaged self-perceived ER effectiveness was included on an exploratory base in addition to our preregistered analyses.[3] The described procedure resulted in 16 regression models. All predictor variables were grand-mean centered to ensure clearer interpretation of the results. For models with negative and positive affect as outcome variables, we included a two-way interaction term between strategy type (engagement-oriented or avoidance-oriented) and group as well as perceived ER effectiveness and group. All models were additionally estimated with age and gender to check whether any of the relationships changed when we controlled for these variables.

To test our within-person level hypotheses, we used multilevel regression models because of the hierarchical structure of the EMA data (i.e., measurements, level 1, are nested within participants, level 2). First, multilevel models with random intercepts and random slopes were tested in which current (1) negative affect, (2) positive affect, (3) intensity of OC symptoms, and (4) presence of any OC symptoms (binomial distribution with 1 = yes and 0 = no) were separately predicted from either (1) the currently used number of avoidance- and engagement-oriented ER strategies or (2) the binary variable indicating whether any avoidance- and engagement-oriented ER strategies were used or not. Again, this procedure resulted in 16 multilevel regression models. Thus, in the current models, we predicted outcome variables measured at one time point *t* from current ER behavior measured at the same time point *t*. Because one of the strongest predictors of behavioral or psychological outcomes often still is their previous level of these outcomes (see Adachi & Willoughby, 2015 for an overview), we included the score of the outcome variable measured at the previous time point in all models (i.e., affect or OC symptoms one to two hours earlier, $t-1$). Including this variable ensured that observed effects for ER strategies and perceived ER effectiveness were not driven by autocorrelation, i.e., variance due to affect or OC symptom levels a few hours earlier. Importantly, the first EMA prompts of each day were excluded from the analyses, because for these observations the previous score of the outcome variable was not assessed at the same day. In a second step, current self-perceived ER effectiveness was included again. All level 1 predictor variables were person-mean centered to ensure clearer interpretation of the results. For models with negative and positive affect as outcome variables, we included a two-way interaction term between strategy type and group as well as perceived ER effectiveness and group. All models were additionally estimated with day of assessment, age, and gender to check whether any of the relationships changed.

Second, multilevel models with random intercepts and random slopes were tested in which subsequent (1) negative affect, (2) positive affect, (3) intensity of OC symptoms, and (4) presence of OC symptoms were separately predicted from either the currently used number of avoidance- and engagement-oriented ER strategies or a binary variable indicating the presence of avoidance- and engagement-oriented ER strategies (i.e., 16 multilevel regression models). Thus, in the subsequent models, we predicted outcome variables measured one to two hours later at time point $t+1$ from current ER behavior measured at time point *t*. Again, to account for autocorrelation, we included the current trial's score of the outcome variable, measured at time point *t*. Models with affect as outcome variable included a two-way interaction term between strategy type and group as well as perceived ER effectiveness and group, while models with OC symptoms as outcome included perceived ER effectiveness only as a main effect. Again, all level 1 predictor variables were person-mean centered. Finally, all models were estimated again with day of assessment, age, and gender as control variables. In

[3] None of the result patterns regarding avoidance-oriented or engagement-oriented ER strategies changed when we additionally included ER effectiveness as predictor. Therefore, the herein reported results are derived from statistical models including all these predictors. See Tables B.1 to B.6 in the supplements for estimates of statistical models only including avoidance-oriented or engagement-oriented ER strategies.

accordance with the study design, all analyses that included OC symptoms were only conducted in the OCD sample.

Including perceived ER effectiveness as a predictor deviated from our preregistration, and it was done on an exploratory basis. Due to this extension of the analyses and for brevity's sake, we refrained from the preregistered plan to additionally analyze the associations between OC symptoms, affect, and ER behavior with retrospective self-report questionnaires collected at baseline (see Bischof et al., 2024 for more details on baseline measures).

Due to the high number of conducted statistical models, we corrected our analyses for multiple comparisons in order to reduce type 1 error. All reported results are adjusted using false discovery rate correction (Benjamini & Hochberg, 1995) and a false discovery control level of $\alpha = .05$.

3. Results

3.1. Descriptive analysis

Compliance rates were high, with an average of 32.24 assessments ($SD = 3.86$) submitted across the six days with no group differences (OCD: $M = 31.82$ (4.28); HC: $M = 32.91$ (3.01), $p = .15$). Completion of EMA prompts took participants on average $M = 1.35$ (2.01) minutes (OCD: $M = 1.67$ (2.49); HC: $M = .85$ (.59); $p < .001$). Because the use of ER strategies and perceived ER effectiveness were only assessed when participants indicated that they tried to change their emotions (i.e., in around 25% of the assessments) and we analyzed only fully completed prompts, within-person multilevel models with affect as the outcome variable included 742 (current) to 776 (subsequent) observations. OC symptoms *and* ER strategies were reported in 198 (current) to 199 (subsequent) assessment points. Models assessing the presence of OC symptoms as binary variable included 533 (current) to 550 (subsequent) observations. See Table 2 for the Pearson correlation matrix of variables of interest.

3.2. Hypothesis testing

Estimates along with *p*-values and 95% confidence intervals of between-person level regressions and multilevel regression at the within-person level can be found in Tables A.1 and A.2, and Tables A.3 to A.6 of the Supplements, respectively. An overview of the main results of interests is shown in Table 3.

3.2.1. Emotion regulation and affect (hypothesis 1)

Affect at the between-person level. For *negative affect* as the outcome variable, we found a significant main effect of self-perceived ER effectiveness, consistently for statistical models including number of engagement-oriented, average likelihood for any avoidance-oriented or engagement-oriented ER strategy ($bs = -.056$ to $-.105$; $p_{fdr}s = <.001$ to .016; 95% CIs [−.105; −.008] to [−.157; −.053]). The significant main effect in these three models indicated that individuals who perceived their ER overall as more successful (vs. individuals who perceived their ER as less successful) tended to report lower overall negative affect. For the statistical model including the number of avoidance-oriented ER strategies, the main effect of self-perceived ER effectiveness was not significant anymore after false discovery rate correction ($p_{fdr} = .057$). As expected, participants who used a higher (vs. lower) average number of avoidance-oriented ER strategies, reported higher negative affect ($b = .067$; $p_{fdr} = .021$; 95% CI [.018; .116]). Unexpectedly, the average number of engagement-oriented ER strategies as well as the average likelihood to report any engagement- or avoidance-oriented strategies was not significantly associated with overall negative affect (all $p_{fdr}s > .05$).

Regarding *positive affect* as the outcome variable, we found again a consistent, significant association with self-perceived ER effectiveness: Individuals who perceived their ER overall as more (vs. less) successful tended to report higher overall positive affect ($bs = .173$ to $.202$; $p_{fdr}s = .004$ to $.015$; 95% CIs [.049; .298] to [.077; .327]). Additionally, the interaction effect between self-perceived effectiveness and group was consistently significant across all statistical models, indicating a significant difference between groups in their association with positive affect ($bs = -.281$ to $-.267$; $p_{fdr}s = .016$ to $.030$; 95% CIs [−.484; −.077] to [−.471; −.063]). Interaction plots indicated that the positive association between self-perceived ER effectiveness and positive affect was only observable in controls, while individuals with higher overall perceived ER effectiveness in the OCD group reported lower overall positive affect (see Fig. 1). Not in line with our hypotheses, all predictors addressing avoidance- or engagement-oriented ER strategies were non-significant (all $p_{fdr}s > .05$).

Current affect at the within-person level. Regarding *negative affect* as the outcome variable, we found a consistent, significant main effect of self-perceived ER effectiveness across all statistical models. At time points when individuals experienced higher (vs. lower) ER effectiveness than they usually did, i.e., on average across the whole EMA period, they reported lower negative affect ($bs = -.007$ to $-.006$; $p_{fdr}s = .005$ to $.021$; 95% CIs [−.011; −.003] to [−.010; −.002]). All associations with the current number of avoidance-oriented or engagement-oriented strategies were non-significant (all $ps > .05$). However, as expected, we found that individuals who reported any (vs. none) avoidance-oriented ER strategies at a given time point, were more likely to report higher negative affect ($b = .234$; $p_{fdr} = .036$; 95% CI [.048; .419]). Effects for the use of any engagement-oriented strategies as well as all interaction effects were non-significant (all $p_{fdr}s > .05$).

Regarding *positive affect* as the outcome variable, at time points when participants reported higher-than-usual self-perceived ER effectiveness, they consistently reported higher positive affect ($bs = .013$ to $.015$; $p_{fdr}s < .001$ to $.008$; 95% CIs [.006; .019] to [.008; .021]). In addition, at time points when individuals used a higher (vs. lower) number of avoidance-

Table 2
Pearson correlation matrix.

Variable	1	2	3	4	5	6	7
1. Negative Affect	–	−.44[b]	.17[b]	.01	−.26[b]	.33[b]	–
2. Positive Affect	−.64[b]	–	−.14[b]	.05	.33[b]	−.27[b]	–
3. Number of Avoidance-oriented ER Strategies	.41[b]	−.26[b]	–	−.24[b]	−.17[b]	.08	–
4. Number of Engagement-oriented ER Strategies	−.08	.23[a]	−.15	–	.27[b]	<.01	–
5. Self-perceived ER Effectiveness	−.27[b]	.37[b]	−.50[b]	.32[b]	–	−.26[b]	–
6. OC Symptoms[1]	.46[b]	−.21	.40[b]	−.06	−.07	–	–
7. Y-BOCS total	.22	−.36[b]	.15	−.05	.09	.31[b]	–

Note. Correlations at the within-person level are shown above the diagonal and correlations on an aggregated between-person level are shown below the diagonal. [1] = All correlations with OC symptoms are reported for $N = 68$ individuals with OCD only. ER = emotion regulation; OC = obsessive-compulsive; Y-BOCS = Yale-Brown Obsessive-Compulsive Scale.

[a] $p < .05$.

[b] $p < .01$.

Table 3
Overview of the main results of interest.

	Between-person level				Within-person level							
					Current				Subsequent (≥1 h later)			
	NA	PA	OC (in)	OC (bin)	NA	PA	OC (in)	OC (bin)	NA	PA	OC (in)	OC (bin)
AV (nr)	+	n.s.	+	(+)	n.s.	–	n.s.	(+)	n.s.	n.s.	n.s.	n.s.
EFF	(–)	+	n.s.	n.s.	–	+	–	n.s.	n.s.	n.s.	n.s.	n.s.
AV:GR	n.s.	n.s.			n.s.	n.s.			n.s.	n.s.		
EFF:GR	n.s.	–			n.s.	n.s.			n.s.	n.s.		
AV (bin)	n.s.	n.s.	n.s.	+	+	–	n.s.	n.s.	n.s.	n.s.	(+)	n.s.
EFF	–	+	n.s.	n.s.	–	+	–	(–)	n.s.	n.s.	n.s.	n.s.
AV:GR	n.s.	n.s.			n.s.	n.s.			n.s.	n.s.		
EFF:GR	n.s.	–			n.s.	n.s.			n.s.	n.s.		
EN (nr)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	(+)	n.s.	n.s.	n.s.	(–)	n.s.
EFF	–	+	n.s.	n.s.	–	+	–	(–)	n.s.	n.s.	n.s.	n.s.
EN:GR	n.s.	n.s.			n.s.	n.s.			n.s.	n.s.		
EFF:GR	n.s.	–			n.s.	n.s.			n.s.	n.s.		
EN (bin)	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	–	n.s.
EFF	–	+	n.s.	n.s.	–	+	–	(–)	n.s.	n.s.	n.s.	n.s.
EN:GR	n.s.	n.s.			n.s.	n.s.			n.s.	n.s.		
EFF:GR	n.s.	–			n.s.	n.s.			n.s.	n.s.		

Note. '-' indicates a negative association, '+' indicates a positive association, 'n.s.' indicates non-significant associations, and '(-)' indicates associations that did not remain significant after false discovery rate correction. NA = negative affect; PA = positive affect; OC (in) = obsessive-compulsive disorder symptoms (intensity); OC (bin) = obsessive-compulsive disorder symptoms (binary); AV (nr) = number of avoidance-oriented ER strategies; AV (bin) = use of any avoidance-oriented ER strategies; EN (nr) = number of engagement-oriented ER strategies; EN (bin) = use of any engagement-oriented ER strategies; EFF = self-perceived emotion regulation effectiveness; GR = group (OCD vs. HC).

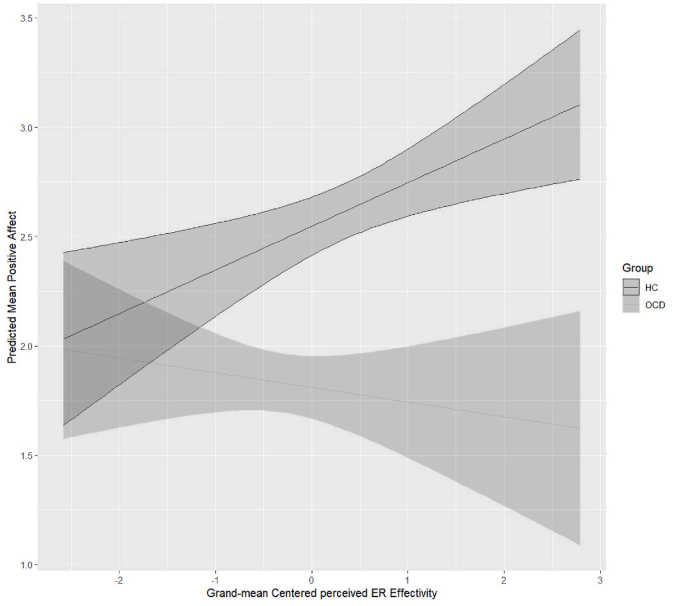

Fig. 1. Plot for the significant interaction effect between average self-perceived ER effectiveness and group when predicting overall positive affect
Note. ER = emotion regulation; HC = mentally healthy controls; OCD = obsessive-compulsive disorder.

oriented strategies ($b = -.086$; $p_{fdr} = .034$; 95% CI [−.156; −.017]) than they usually did or reported the use of any (vs. none) avoidance-oriented ER strategies ($b = -.247$; $p_{fdr} = .041$; 95% CI [−.454; −.040]), they reported lower positive affect. These findings were in line with our hypotheses. There was no significant association with engagement-oriented strategies and all interaction effects were non-significant as well (all p_{fdr}s > .05).

Subsequent affect (i.e., ≥ one hour later) at the within-person level. Unexpectedly, there were no significant associations with avoidance-oriented or engagement-oriented strategies for both subsequent negative and positive affect (all p_{fdr}s > .05). Associations with self-perceived ER effectiveness and all interaction effects were non-significant as well (all p_{fdr}s > .05).

3.2.2. Emotion regulation and OC symptoms (hypothesis 2)

Overall OC symptoms at the between-person level. Regarding the intensity of OC symptoms, individuals who used a higher (vs. lower) average number of avoidance-oriented strategies tended to consistently report more intense OC symptoms ($b = .314$; $p_{fdr} = .001$; 95% CI [.152; .477]). Surprisingly, the average likelihood to report any avoidance-oriented strategies, engagement-oriented strategies and overall self-perceived ER effectiveness were not significantly associated with overall intensity of OC symptoms (all p_{fdr}s > .05).

Regarding the average likelihood to report any (vs. none) OC symptoms, we found a significant main effect of the average likelihood to report any avoidance-oriented ER strategies. Individuals who were more (vs. less) likely to report the use of any avoidance-oriented ER strategies ($b = .153$; $p_{fdr} = .047$; 95% CI [.032; .273]), were more likely to report OC symptoms. This is in line with our hypotheses. A significant positive main effect of the average number of avoidance-oriented ER strategies did not withstand false discovery rate correction ($p_{fdr} = .061$). Unexpectedly, all associations with engagement-oriented ER strategies and self-perceived ER effectiveness were non-significant (all ps > .05).

Current OC symptoms at the within-person level. Regarding the intensity of OC symptoms, we found a significant negative association with self-perceived ER effectiveness across all statistical models. At time points where participants perceived their ER as more (vs. less) successful than they usually did, they reported less intense OC symptoms (bs = −.023 to −.021; p_{fdr}s < .001; 95% CIs [−.031; −.015] to [−.029; −.013]). After false discovery rate correction, we did not find any significant effects for engagement-oriented ER strategies or avoidance-oriented ER strategies (all p_{fdr}s > .05).

Regarding the current presence of OC symptoms, identified main effects of perceived ER effectiveness and the number of avoidance-oriented ER strategies were not significant anymore after false discovery rate correction (all p_{fdr}s > .05). Against our expectations, results for avoidance-oriented ER strategies as binary predictor and engagement-oriented ER strategies were non-significant as well (all p_{fdr}s > .05).

Subsequent OC symptoms (i.e., ≥ one hour later) at the within-person level. Regarding the intensity of OC symptoms, we found that

individuals who reported the use of any (vs. none) engagement-oriented strategies ($b = -.402$; $p_{fdr} = .027$; 95% CI [−.691; −.113]), reported less intense OC symptoms at the subsequent time point. This finding was in line with our hypotheses. Identified main effects of the number of engagement-oriented ER strategies and the use of any avoidance-oriented ER strategies were not significant anymore after false discovery rate correction (all p_{fdr}s $> .05$). Surprisingly, the number of used avoidance-oriented ER strategies was non-significant and all associations with self-perceived ER effectiveness were not significant as well (all p_{fdr}s $> .05$).

Regarding the presence of OC symptoms at the subsequent time point, there were no significant associations with avoidance-oriented or engagement-oriented strategies (all p_{fdr}s $> .05$). Associations with self-perceived ER effectiveness were non-significant as well (all p_{fdr}s $> .05$).

3.2.3. Day of assessment, age, and gender

All result patterns remained mostly unaffected when including day of assessment, age, and gender as control variables in our regression models. Therefore, reported estimates refer to uncontrolled models.

4. Discussion

This study was one of the first to use an intensive longitudinal design to investigate associations between ER, affect, and symptom severity in a large clinical OCD sample. Our results showed a complex interplay between the use of ER strategies, perceived ER effectiveness, affect, and OC symptoms that varied depending on the referring time frame. Overall, three main findings emerged from our analyses.

4.1. Perceived ER effectiveness was most consistently associated with affect and OC symptoms

Our results showed that individuals with higher (vs. lower) levels of perceived ER effectiveness reported lower levels of negative affect and higher levels of positive affect across six days. Similarly, at time points when individuals reported higher-than-usual perceived ER effectiveness, they tended to report lower levels of negative affect and higher levels of positive affect (across groups). In the OCD group, higher-than-usual perceived ER effectiveness was additionally associated with lower intensity of current OC symptoms. These findings are in line with previous research (e.g., Daniel et al., 2019) and extended it to a clinical OCD population. Above and beyond the type and number of ER strategies, perceived ER effectiveness was related to emotional outcomes irrespective of clinical status. To our knowledge, only one prior study assessed the incremental importance of more general ER difficulties beyond the use of ER strategies for OC symptoms (Fergus & Bardeen, 2014). Consistent with our results, one of the identified facets of ER difficulties that contributed significantly to all OC symptom dimensions was 'difficulties engaging in goal-directed behavior' (Fergus & Bardeen, 2014). Our study, however, extended this past research from a community sample to a clinical population. In addition, participants reported on perceived ER effectiveness of ER strategies specifically chosen in the moment instead of general attitudes and behavioral tendencies reflected on retrospectively. Future work should further investigate the role of self-perceived ER effectiveness in daily life. As one potentially interesting direction, De France et al. (2022) showed that cognitive reappraisal was only associated with lower depressive symptoms for individuals who perceived their ER effectiveness as higher-than-average. Future studies should investigate this moderation effect more closely across different psychopathologies.

For positive affect on a between-person level, we additionally found a significant interaction effect with group. Specifically, mentally healthy controls reported higher levels of positive affect when they perceived themselves comparatively more effective in their ER. We, however, found the reverse relationship for individuals with OCD. That is, participants who perceived their ER as more effective reported lower overall levels of positive affect. Past research showed that individuals with internalizing symptoms aim for the down-regulation of their positive affect more often (e.g., Carl et al., 2014). Since we did not explicitly assess ER goals (i.e., aim for the down- or up-regulation of negative or positive affect), one possible explanation for this moderation effect might be that individuals with OCD (vs. HC) considered the down-regulation of positive affect when evaluating ER success more often. Since interaction effects between self-perceived ER effectiveness and group, however, were rare, and the main effects of self-perceived ER effectiveness were mostly significant, the result pattern did not indicate that individuals with OCD *generally* evaluate their self-perceived ER effectiveness differently than mentally healthy controls. Future research examining explicit ER goals and positive emotion regulation in OCD in more depth is needed.

4.2. Use of avoidance-oriented ER strategies was associated with worse emotional outcomes

Supporting our hypotheses, at time points when individuals used any (vs. none) avoidance-oriented ER strategies, they reported lower levels of current positive affect and higher levels of current negative affect. In addition, we also found a significant negative association between a higher-than-usual number of avoidance-oriented ER strategies and positive affect, and a significant positive association between a higher average number of used strategies and overall negative affect. Further, we identified a similar pattern for associations with psychopathology. Specifically, individuals with OCD who used a higher (vs. lower) average number of avoidance-oriented ER strategies reported higher intensity of OC symptoms across the six days. At the within-person level, participants were more likely to report any current and more intense subsequent symptoms when they currently somehow engaged in avoidance-oriented ER strategies. These within-person effects, however, did not remain significant after false discovery rate correction. Overall, our findings align with past research emphasizing the more maladaptive character of these ER strategies in regard to affect and psychopathology, including OCD (e.g., Goldberg et al., 2016; McMahon & Naragon-Gainey, 2019; Southward & Cheavens, 2020). Consistent with the extended polyregulation theory (e.g., Southward and Cheavens, 2020), the *general* tendency to use a higher number of avoidance-oriented ER strategies was more relevant for the associations with emotional outcomes across the six days than a higher average likelihood to use any of these strategies. In contrast, in a specific moment, the use of any (vs. none) avoidance-oriented ER strategies seemed to be slightly more relevant, which may point towards more complex effects and relevance of momentary context factors, beyond mere strategy summation. Many associations at the within-person level, especially for predicting subsequent outcomes, were, however, non-significant. One possible explanation for these findings might be low occurrence of reported ER. Participants reported in only 25% of all observations that they tried to change their emotions using ER strategies. Therefore, the statistical power might have been too low to detect small effect sizes at the within-person level. Moreover, the time frame of one to two hours between assessments might have been too large to identify relevant associations with emotional outcomes. Thus, replications with more assessment points per day and larger sample sizes are needed.

4.3. Use of engagement-oriented ER strategies was only associated with more beneficial outcome in individuals with OCD at the subsequent time point

Surprisingly, after false discovery rate correction, only one significant finding for engagement-oriented ER strategies remained: Individuals who reported to currently use any (vs. none) engagement-oriented strategies, reported less intense OC symptoms a few hours later, even when controlling for current OC symptoms. This effect may

point towards long-term benefits of engagement-oriented ER strategies for psychopathology, which is in line with previous research showing that selecting engagement-oriented ER strategies can be impacted by momentary long-term motives (Ortner et al., 2022). The ability to engage in behavior that unfolds its beneficial effects more on the long run, may be especially relevant for individuals with OCD, who reported difficulties in goal-directed behavior and lack of engagement-oriented coping in the past (Fergus & Bardeen, 2014; Moritz et al., 2018; Yap et al., 2018). Extending past research, we examined associations between OC symptoms and engagement-oriented ER strategies in a shorter time frame (i.e., within hours).

Contrary to expectations, however, the vast majority of associations with engagement-oriented ER strategies were non-significant, possibly owing to the aforementioned lack of statistical power or temporal resolution of our study design.[4] Nonetheless, past studies also showed that engagement-oriented ER strategies in particular are not entirely adaptive, but can be associated with adverse outcomes depending on the context (e.g., Sheppes, 2020). Therefore, combining several engagement-oriented ER strategies in one group may have blurred their differential associations with emotional outcomes, thereby biasing effects. The fact that our binary operationalization of engagement-oriented ER strategies (any vs. none) was a stronger predictor for subsequent OC symptoms than the number of strategies may also point towards the higher importance of specific ER strategies from this group. Therefore, replications and future studies assessing engagement-oriented strategies separately in OCD are needed.

4.4. Strengths of the present study

To our knowledge, this study is one of the first to assess emotion regulation behavior, affect, and symptom severity simultaneously, in a large clinical OCD sample. In line with the polyregulation theory (Ford et al., 2019), we explored a wide range of emotion regulation strategies (classified as either engagement- or avoidance-oriented strategies). By assessing different strategy types as well as perceived ER effectiveness, we were able to shed light on differential associations with affect and symptom severity depending on timing, operationalization of predictors (number of strategies vs. binary variable), and clinical (vs. non-clinical) status. Importantly, our within-person level models were controlled for autocorrelation. Thus, we ensured that observed effects for regulatory behavior were not driven by variance due to the level of affectivity or OC symptoms at the previous assessment point.

4.5. Constraints on generality

This study has some limitations warranting acknowledgement. First, our study design allowed for a maximum of six assessments per day, resulting in up to two hours between assessment points. To reduce participants' burden, we additionally used a branching EMA design wherein items varied depending on whether participants tried to change their emotions or experienced OC symptoms. Thus, the number of assessment points and our statistical power decreased and the non-significant results in our models assessing emotional outcomes at the subsequent time point may have been partly due to these EMA design choices. Future studies with more assessment points per day, possibly omitting the branching EMA design, are needed. Second, based on the extended polyregulation theory (Ford et al., 2019; Southward & Cheavens, 2020), we operationalized ER behavior as the sum of all engagement- or avoidance-oriented strategies used in the moment. This operationalization assumes that each strategy is equally additive in effect alongside others, which may not be the case. Even though, we tried to address this limitation by additionally considering binary versions of our variables, future studies should further invest the relative importance of single ER strategies from each group and their interaction effects. Third, our design was not experimental and, therefore, we cannot draw any causal conclusions from our results, i.e., it remains unclear whether use of ER strategies influenced OC symptoms and affect, or vice versa. The use of an EMA design, however, allowed us to control within-person models for autocorrelation which is already an advantage in comparison to traditional cross-sectional studies. Future studies focusing on experimental manipulations are needed to further illuminate the question of causality. Fourth, our choice of exclusion criteria limited the generalizability of our findings to the general OCD population. Because we were one of the first to address these specific research questions with an EMA design, we, however, decided to maximize internal validity. We excluded certain comorbidities such as substance abuse, bipolar disorder, or borderline personality disorder because these mental disorders are characterized by very distinct ER deficits (Miola et al., 2022; Stellern et al., 2023). Thus, it would have been more challenging to clearly link our findings to the diagnosis of OCD. At the same time, we still allowed most common comorbidities such as depression or anxiety disorders to be able to collect a decent sample size. In addition, our sample was mostly female, maybe explainable by the higher prevalence of OCD in women and self-selection biases (Fawcett et al., 2020; Stone et al., 2024). To further increase external validity, future studies should include more comorbidities and more diverse samples.

5. Conclusion

Our study helped improve the current understanding of dysfunctional ER in OCD and its association with affect and symptom severity. In sum, the self-perceived experience of ER effectiveness seemed to be most consistently associated with more beneficial emotional outcomes. However, some of our results showed that individuals with OCD might perceive their ER effectiveness differently than mentally healthy controls, suggesting that caution should be taken when transferring findings from subclinical to clinical populations (Aldao et al., 2010). We also found some evidence for the more "maladaptive" profile of avoidance-oriented ER strategies and the potential long-term benefits of engagement-oriented ER strategies. With regard to treating OCD, it might be helpful to augment disorder-specific ERP with ER training components that especially target the use of these ER strategies and self-perception of ER effectiveness. Future studies using experimental designs are needed in order to explore causal links and provide further evidence for ER training components as fruitful option to treat OCD.

CRediT authorship contribution statement

Nicola Hohensee: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Claudia Bischof:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Fanny Alexandra Dietel:** Writing – review & editing, Visualization, Validation, Supervision, Methodology, Formal analysis. **Nadja Klein:** Writing – review & editing, Visualization, Validation, Supervision, Methodology, Formal analysis. **Philipp Doebler:** Writing – review & editing, Visualization, Validation, Supervision, Methodology, Formal analysis. **Ulrike Buhlmann:** Writing – review & editing, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Funding acquisition, Formal analysis, Conceptualization.

[4] Please note that a particularly pronounced floor effect for the use of engagement-oriented ER strategies in the OCD sample cannot explain our non-significant findings. Descriptive statistics do not indicate differential endorsement patterns for both groups (e.g., $M_{OCD} = 1.74$ ($SD_{OCD} = .92$), $M_{HC} = 1.98$ ($SD_{HC} = .89$), $p = .17$, range in both groups = 0–4).

Author note

We have no conflicts of interest to disclose.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Nicola Hohensee reports financial support was provided by Christoph Dornier Foundation Münster. Claudia Bischof reports financial support was provided by Christoph DornierFoundation Münster. Senior author serves as an associate editor for JOCRD - U.B.

Given their role as an Associate Editor (U.B.) and Editorial Board Member (F.A.D.), U.B. and F.A.D. were not involved in the peer-review of this article and had no access to information regarding its peer-review. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jocrd.2024.100934.

Data availability

Study material, data, and analysis code are available online at osf.io/mgs5a/.

References

Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: Implications for psychological science. *European Journal of Developmental Psychology, 12*(1), 116–128. https://doi.org/10.1080/17405629.2014.963549

Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: A transdiagnostic examination. *Behaviour Research and Therapy, 48*(10), 974–983. https://doi.org/10.1016/j.brat.2010.06.002

Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review, 30*(2), 217–237. https://doi.org/10.1016/j.cpr.2009.11.004

Aldao, A., Sheppes, G., & Gross, J. J. (2015). Emotion regulation flexibility. *Cognitive Therapy and Research, 39*(3), 263–278. https://doi.org/10.1007/s10608-014-9662-4

Allen, L. B., & Barlow, D. H. (2009). Relationship of exposure to clinically irrelevant emotion cues and obsessive-compulsive symptoms. *Behavior Modification, 33*(6), 743–762. https://doi.org/10.1177/0145445509344180

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Barlow, D. H., Farchione, T. J., Bullis, J. R., Gallagher, M. W., Murray-Latin, H., Sauer-Zavala, S., Bentley, K. H., Thompson-Hollands, J., Conklin, L. R., Boswell, J. F., Ametaj, A., Carl, J. R., Boettcher, H. T., & Cassiello-Robbins, C. (2017). The unified protocol for transdiagnostic treatment of emotional disorders compared with diagnosis-specific protocols for anxiety disorders: A randomized clinical trial. *JAMA Psychiatry, 74*(9), 875. https://doi.org/10.1001/jamapsychiatry.2017.2164

Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B, 57*(1), 289–300. https://doi.org/10.1111/j.2517-6161.1995.tb02031.x

Bigman, Y. E., Mauss, I. B., Gross, J. J., & Tamir, M. (2016). Yes I can: Expected success promotes actual success in emotion regulation. *Cognition & Emotion, 30*(7), 1380–1387. https://doi.org/10.1080/02699931.2015.1067188

Bischof, C., Hohensee, N., Dietel, F. A., Doebler, P., Klein, N., & Buhlmann, U. (2024). Emotion regulation in obsessive-compulsive disorder: An ecological momentary assessment study. *Behavior Therapy*. https://doi.org/10.1016/j.beth.2024.01.011

Buhlmann, U. (2014). The German version of the Brown Assessment of Beliefs Scale (BABS): Development and evaluation of its psychometric properties. *Comprehensive Psychiatry, 55*(8), 1968–1971. https://doi.org/10.1016/j.comppsych.2014.07.011

Carl, J. R., Fairholme, C. P., Gallagher, M. W., Thompson-Hollands, J., & Barlow, D. H. (2014). The effects of anxiety and depressive symptoms on daily positive emotion regulation. *Journal of Psychopathology and Behavioral Assessment, 36*, 224–236. https://doi.org/10.1007/s10862-013-9387-9

Daniel, K. E., Baee, S., Boukhechba, M., Barnes, L. E., & Teachman, B. A. (2019). Do I really feel better? Effectiveness of emotion regulation strategies depends on the measure and social anxiety. *Depression and Anxiety, 36*(12), 1182–1190. https://doi.org/10.1002/da.22970

Daros, A. R., Daniel, K. E., Boukhechba, M., Chow, P. I., Barnes, L. E., & Teachman, B. A. (2020). Relationships between trait emotion dysregulation and emotional experiences in daily life: An experience sampling study. *Cognition & Emotion, 34*(4), 743–755. https://doi.org/10.1080/02699931.2019.1681364

Daros, A. R., Daniel, K. E., Meyer, M. J., Chow, P. I., Barnes, L. E., & Teachman, B. A. (2019). Impact of social anxiety and social context on college students' emotion regulation strategy use: An experience sampling study. *Motivation and Emotion, 43*(5), 844–855. https://doi.org/10.1007/s11031-019-09773-x

De France, K., Hicks, O., & Hollenstein, T. (2022). Understanding the association between reappraisal use and depressive symptoms during adolescence: The moderating influence of regulatory success. *Cognition & Emotion, 36*(4), 758–766. https://doi.org/10.1080/02699931.2022.2043245

Deacon, B. J., & Abramowitz, J. S. (2005). The Yale-Brown Obsessive Compulsive Scale: Factor analysis, construct validity, and suggestions for refinement. *Journal of Anxiety Disorders, 19*(5), 573–585. https://doi.org/10.1016/j.janxdis.2004.04.009

EFS Survey (Version 21.2) [Software]. Tivian XI GmbH. https://www.tivian.com/de/.

Eisen, J. L., Phillips, K. A., Baer, L., Beer, D. A., Atala, K. D., & Rasmussen, S. A. (1998). The Brown assessment of beliefs scale: Reliability and validity. *American Journal of Psychiatry, 155*(1), 102–108. https://doi.org/10.1176/ajp.155.1.102

Fang, A., Berman, N. C., Hoeppner, S. S., Wolfe, E. C., & Wilhelm, S. (2022). State and trait risk and resilience factors associated with COVID-19 impact and obsessive–compulsive symptom trajectories. *International Journal of Cognitive Therapy, 15*(2), 168–190. https://doi.org/10.1007/s41811-021-00128-4

Fawcett, E. J., Power, H., & Fawcett, J. M. (2020). Women are at greater risk of OCD than men: A meta-analytic review of OCD prevalence worldwide. *The Journal of Clinical Psychiatry, 81*(4), Article 13075. https://doi.org/10.4088/JCP.19r13085

Fergus, T. A., & Bardeen, J. R. (2014). Emotion regulation and obsessive–compulsive symptoms: A further examination of associations. *Journal of Obsessive-Compulsive and Related Disorders, 3*(3), 243–248. https://doi.org/10.1016/j.jocrd.2014.06.001

Ford, B. Q., Gross, J. J., & Gruber, J. (2019). Broadening our field of view: The role of emotion polyregulation. *Emotion Review, 11*(3), 197–208. https://doi.org/10.1177/1754073919850314

Goldberg, X., Cardoner, N., Alonso, P., López-Solà, C., Real, E., Hernández-Ribas, R., Jiménez-Murcia, S., Subirà, M., Segalàs, C., Menchón, J. M., & Soriano-Mas, C. (2016). Inter-individual variability in emotion regulation: Pathways to obsessive-compulsive symptoms. *Journal of Obsessive-Compulsive and Related Disorders, 11*, 105–112. https://doi.org/10.1016/j.jocrd.2016.10.002

Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., Heninger, G. R., & Charney, D. S. (1989). The Yale-Brown obsessive compulsive scale: I. Development, use, and reliability. *Archives of General Psychiatry, 46*(11), 1006–1011. https://doi.org/10.1001/archpsyc.1989.01810110048007

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*(1), 41–54. https://doi.org/10.1023/B:JOBA.0000007455.08539.94

Green, P., & MacLeod, C. J. (2016). SimR: an R package for power analysis of generalized linear mixed models by simulation. *Methods in Ecology and Evolution, 7*(4), 493–498. https://doi.org/10.1111/2041-210X.12504

Gross, J. J. (2013). Emotion regulation: Taking stock and moving forward. *Emotion, 13*(3), 359–365. https://doi.org/10.1037/a0032135

Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*(2), 348–362. https://doi.org/10.1037/0022-3514.85.2.348

Gruber, J., Harvey, A. G., & Gross, J. J. (2012). When trying is not enough: Emotion regulation and the effort–success gap in bipolar disorder. *Emotion, 12*(5), 997–1003. https://doi.org/10.1037/a0026822

Hand, I., & Büttner-Westphal, H. (1991). Die Yale-Brown Obsessive Compulsive Scale (Y-BOCS): Ein halbstrukturiertes Interview zur Beurteilung des Schweregrades von Denk- und Handlungszwängen. *Verhaltenstherapie, 1*(3), 223–225. https://doi.org/10.1159/000257972

Hezel, D., & Simpson, H. (2019). Exposure and response prevention for obsessive-compulsive disorder: A review and new directions. *Indian Journal of Psychiatry, 61*(7), 85. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_516_18

Hong, D., Zhu, Y., Chen, R., Xiao, B., Huang, Y., & Yu, M. (2022). The bidirectional effects of obsessive-compulsive symptoms and difficulties in emotion regulation in Chinese adults during the COVID-19 pandemic – a dynamic structural equation model. *BMC Psychology, 10*(1), 129. https://doi.org/10.1186/s40359-022-00841-5

Jacobsen, D., Kloss, M., Fricke, S., Hand, I., & Moritz, S. (2003). Reliabilität der deutschen Version der Yale-Brown Obsessive Compulsive Scale. *Verhaltenstherapie, 13*(2), 111–113. https://doi.org/10.1159/000072184

Kashdan, T. B., Goodman, F. R., Machell, K. A., Kleiman, E. M., Monfort, S. S., Ciarrochi, J., & Nezlek, J. B. (2014). A contextual approach to experiential avoidance and social anxiety: Evidence from an experimental interaction and daily interactions of people with social anxiety disorder. *Emotion, 14*(4), 769–781. https://doi.org/10.1037/a0035935

Khosravani, V., Samimi Ardestani, S. M., Sharifi Bastan, F., & Malayeri, S. (2020). Difficulties in emotion regulation and symptom dimensions in patients with obsessive-compulsive disorder. *Current Psychology, 39*(5), 1578–1588. https://doi.org/10.1007/s12144-018-9859-x

Lathia, N., Sandstrom, G. M., Mascolo, C., & Rentfrow, P. J. (2017). Happier people live more active lives: Using smartphones to link happiness and physical activity. *PLoS One, 12*(1), Article e0160589. https://doi.org/10.1371/journal.pone.0160589

MacLaren Kelly, J., Kertz, S. J., Simpson, R., Bloch, M. H., & Pittenger, C. (2019). Exploring retrospective biases in obsessive-compulsive disorder: An experience-sampling study. *Journal of Technology in Behavioral Science, 4*, 297–302. https://doi.org/10.1007/s41347-018-0078-y

Margraf, J., Cwik, J. C., von Brachel, R., Suppiger, A., & Schneider, S. (2021). DIPS open access 1.2: Diagnostic interview for mental disorders [DIPS Open Access 1.2: Diagnostisches Interview bei psychischen Störungen.] Bochum: Mental Health Research and Treament Center, Ruhr-Universität Bochum https://doi.org/10.13154/rub.100.89.

McMahon, T. P., & Naragon-Gainey, K. (2019). The multilevel structure of daily emotion-regulation-strategy use: An examination of within- and between-person associations in naturalistic settings. *Clinical Psychological Science, 7*(2), 321–339. https://doi.org/10.1177/2167702618807408

Mennin, D. S., Holaway, R. M., Fresco, D. M., Moore, M. T., & Heimberg, R. G. (2007). Delineating components of emotion and its dysregulation in anxiety and mood psychopathology. *Behavior Therapy, 38*(3), 284–302. https://doi.org/10.1016/j.beth.2006.09.001

Miola, A., Cattarinussi, G., Antiga, A., Caiolo, G., Solmi, M., & Sambataro, F. (2022). Difficulties in emotion regulation in bipolar disorder: A systematic review and meta-analysis. *Journal of Affective Disorders, 302*(1), 352–360. https://doi.org/10.1016/j.jad.2022.01.102

Moritz, S., Fink, J., Miegel, F., Nitsche, K., Kraft, V., Tonn, P., & Jelinek, L. (2018). Obsessive–compulsive disorder is characterized by a lack of adaptive coping rather than an excess of maladaptive coping. *Cognitive Therapy and Research, 42*(5), 650–660. https://doi.org/10.1007/s10608-018-9902-0

Moritz, S., Jahns, A. K., Schröder, J., Berger, T., Lincoln, T. M., Klein, J. P., & Göritz, A. S. (2016). More adaptive versus less maladaptive coping: What is more predictive of symptom severity? Development of a new scale to investigate coping profiles across different psychopathological syndromes. *Journal of Affective Disorders, 191*, 300–307. https://doi.org/10.1016/j.jad.2015.11.027

MovisensXS (n.d.) [Software]. movisens GmbH. https://www.movisens.com/de/.

Ong, C. W., Clyde, J. W., Bluett, E. J., Levin, M. E., & Twohig, M. P. (2016). Dropout rates in exposure with response prevention for obsessive-compulsive disorder: What do the data really say? *Journal of Anxiety Disorders, 40*, 8–17. https://doi.org/10.1016/j.janxdis.2016.03.006

Ortner, C. N. M., Chadwick, L., & Pennekamp, P. (2022). Do motives matter? Short- and long-term motives as predictors of emotion regulation in everyday life. *Emotion, 22*(7), 1625–1638. https://doi.org/10.1037/emo0000989

Öst, L.-G., Havnen, A., Hansen, B., & Kvale, G. (2015). Cognitive behavioral treatments of obsessive–compulsive disorder. A systematic review and meta-analysis of studies published 1993–2014. *Clinical Psychology Review, 40*, 156–169. https://doi.org/10.1016/j.cpr.2015.06.003

Ottenstein, C. (2020). Emotion regulation effectiveness accounts for the associations of self-reported emotion differentiation with well-being and depression. *Cognition & Emotion, 34*(5), 994–1002. https://doi.org/10.1080/02699931.2019.1691506

Park, J., & Naragon-Gainey, K. (2019). Daily experiences of emotional clarity and their association with internalizing symptoms in naturalistic settings. *Emotion, 19*(5), 764–775. https://doi.org/10.1037/emo0000482

R Core Team [Software]. (2023). *R: A language and environment for statistical computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

RED connect. (2022). RED medical Systems GmbH [Software] Version 4.3.0. https://www.redmedical.de.

Salkovskis, P. M., Richards, H. C., & Forrester, E. (1995). The relationship between obsessional problems and intrusive thoughts. *Behavioural and Cognitive Psychotherapy, 23*(3), 281–299. https://doi.org/10.1017/S1352465800015885

Schulte, J., Dietel, F. A., Wilhelm, S., Nestler, S., & Buhlmann, U. (2021). Temporal dynamics of insight in body dysmorphic disorder: An ecological momentary assessment study. *Journal of Abnormal Psychology, 130*(4), 365–376. https://doi.org/10.1037/abn0000673

Shaw, A. M., Halliday, E. R., & Ehrenreich-May, J. (2020). The effect of transdiagnostic emotion-focused treatment on obsessive-compulsive symptoms in children and adolescents. *Journal of Obsessive-Compulsive and Related Disorders, 26*, Article 100552. https://doi.org/10.1016/j.jocrd.2020.100552

Sheppes, G. (2020). Transcending the "good & bad" and "here & now" in emotion regulation: Costs and benefits of strategies across regulatory stages. *Advances in Experimental Social Psychology, 61*, 185–236. https://doi.org/10.1016/bs.aesp.2019.09.003

Short, N. A., Boffa, J. W., Clancy, K., & Schmidt, N. B. (2018). Effects of emotion regulation strategy use in response to stressors on PTSD symptoms: An ecological momentary assessment study. *Journal of Affective Disorders, 230*, 77–83. https://doi.org/10.1016/j.jad.2017.12.063

Skapinakis, P., Caldwell, D. M., Hollingworth, W., Bryden, P., Fineberg, N. A., Salkovskis, P., Welton, N. J., Baxter, H., Kessler, D., Churchill, R., & Lewis, G. (2016). Pharmacological and psychotherapeutic interventions for management of obsessive-compulsive disorder in adults: A systematic review and network meta-analysis. *The Lancet Psychiatry, 3*(8), 730–739. https://doi.org/10.1016/S2215-0366(16)30069-4

Southward, M. W., & Cheavens, J. S. (2020). More (of the right strategies) is better: Disaggregating the naturalistic between- and within-person structure and effects of emotion regulation strategies. *Cognition & Emotion, 34*(8), 1729–1736. https://doi.org/10.1080/02699931.2020.1797637

Stellern, J., Xiao, K. B., Grennell, E., Sanches, M., Gowin, J. L., & Sloan, M. E. (2023). Emotion regulation in substance use disorders: A systematic review and meta-analysis. *Addiction, 118*(1), 30–47. https://doi.org/10.1111/add.16001

Stone, A. A., Schneider, S., Smyth, J. M., Junghaenel, D. U., Couper, M. P., Wen, C., … Goldstein, S. (2024). A population-based investigation of participation rate and self-selection bias in momentary data capture and survey studies. *Current Psychology, 43*(3), 2074–2090. https://doi.org/10.1007/s12144-023-04426-2

Trull, T. J., & Ebner-Priemer, U. W. (2020). Ambulatory assessment in psychopathology research: A review of recommended reporting guidelines and current practices. *Journal of Abnormal Psychology, 129*(1), 56–63. https://doi.org/10.1037/abn0000473

Wood, S. N. (2017). *Generalized additive models: An introduction with R*. CRC press.

Wylie, M. S., Colasante, T., De France, K., Lin, L., & Hollenstein, T. (2023). Momentary emotion regulation strategy use and success: Testing the influences of emotion intensity and habitual strategy use. *Emotion, 23*(2), 375–386. https://doi.org/10.1037/emo0001074

Yap, K., Mogan, C., Moriarty, A., Dowling, N., Blair-West, S., Gelgec, C., & Moulding, R. (2018). Emotion regulation difficulties in obsessive-compulsive disorder. *Journal of Clinical Psychology, 74*(4), 695–709. https://doi.org/10.1002/jclp.22553

Yazici, K. U., & Yazici, I. P. (2019). Decreased theory of mind skills, increased emotion dysregulation and insight levels in adolescents diagnosed with obsessive compulsive disorder. *Nordic Journal of Psychiatry, 73*(7), 462–469. https://doi.org/10.1080/08039488.2019.1652341