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3 **Translation, Validation and Extended Factor Models of the**
4 **German State Difficulties in Emotion Regulation Scale (S-DERS)**

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Abstract

Background: Difficulties in emotion regulation are a key transdiagnostic factor in mental health disorders. While much research has focused on emotion regulation difficulties as stable, trait-like constructs, emotion regulation is inherently dynamic, unfolding over time. This highlights the need for state-like measures to capture these temporal dynamics in both laboratory and real-world contexts, such as the State Difficulties in Emotion Regulation Scale (S-DERS). The present study aimed to (a) translate the S-DERS into German, (b) validate its psychometric properties, and (c) ~~explore~~ provide novel examinations whether state-based emotion regulation difficulties share an underlying general factor or are interconnected but distinct sub-components, complemented with an exploratory network approach, the interrelations among its subcomponents using extended factor models and cross-sectional network analysis.

Methods: A sample of 214 participants, predominantly young females, completed the 21-item German version of the S-DERS following a negative mood induction procedure. Participants also completed a broader battery of psychological assessments. Factor structure, reliability, and construct validity were examined using confirmatory factor analysis and exploratory structural equation modeling (ESEM) with cross-loadings. These were compared to bi-factor, higher-order, and network models. Additionally, network analysis was employed to generate hypotheses about pathways linking discrete emotion regulation difficulties.

Results: The German S-DERS demonstrated a robust four-factor structure, high reliability, and strong construct validity, consistent with the original English version. ESEM indicated that extensive cross-loadings were necessary to achieve good model fit. A four-factor correlated model outperformed both bifactor and higher-order models, suggesting that emotion regulation difficulties are best conceptualized as four distinct but interrelated constructs without a shared general factor: (a) Non-acceptance of Current Emotions, (b) Limited Ability to Modulate Current Emotional and Behavioral Responses, (c) Lack of Awareness of Current Emotions, and (d) Lack of Clarity about Current Emotions.

Conclusions: The German version of the S-DERS is a reliable and valid tool for assessing state-like difficulties in emotion regulation. The extended factor models findings highlight the multidimensional nature of emotion regulation difficulties, with complex interrelations among distinct but related constructs. These insights can inform future research on emotion dysregulation and support efforts to validate the S-DERS in clinical populations.

1 *Keywords:* emotion regulation, psychometrics, psychopathology, assessment, structural
2 equation models
3

Introduction

Emotion regulation is a key concept for mental and physical well-being, comprising all implicit and explicit strategies affecting the occurrence, intensity, or duration of emotional experiences (Gross & Thompson, 2007). There are many stages at which these processes can fail, starting from the identification of emotions, over the selection of a strategy, its implementation, and the monitoring of success (Fernandez et al., 2016). One particularly influential clinical model outlined six categories of emotion regulation difficulties, which can negatively affect a person's well-being (Gratz & Roemer, 2004): A *Lack of Awareness* as the diminished tendency to attend and acknowledge one's emotions, a *Lack of Clarity* as the extent to which people understand their emotional experiences, the *Non-Acceptance* of primary emotions in the form of secondary meta-emotional responses (e.g., shame or anger for feeling a certain way), a limited access to helpful *Strategies*, difficulties engaging in *Goal-Directed Behavior* as well as *Impulsive Behavior* when confronted with negative emotions. This model gave rise to the six factor Difficulties in Emotion Regulation Scale (DERS), which has been used in thousands of empirical studies, repeatedly demonstrating the relevance of these dimensions for the etiology and maintenance of psychopathology across diagnostic boundaries (Clamor et al., 2024; Daros & Williams, 2019; Miola et al., 2022; Stellern et al., 2023).

Originally, most emotion regulation studies focused on trait-like constructs assessed with cross-sectional questionnaires—including the DERS—at a single time point, primarily measuring a person's general concept of their own emotional processes. Still, emotions and their regulation typically unfold over brief time periods (Gross, 2015). Studies in the laboratory or daily life can address this state-like dynamic nature of emotion regulation difficulties as they emerge, which is the fundamental building block of trait-like difficulties (Fernandez et al., 2016). Therefore, Lavender and colleagues (2017) used original items of the 36-item DERS to construct the 21-item State Difficulties in Emotion Regulation Scale (S-DERS) for momentary assessments. Based on an experimental induction of negative mood and exploratory factor analysis, they determined that state difficulties are best captured by a smaller item set comprising four factors instead of the original six DERS factors. This solution merged the factors for strategies, goal-directed behavior, and impulsiveness into a single factor reflecting the limited ability to *Modulate* current emotional and behavioral responses. It has been applied to a large range of clinical topics such as eating disorders, alcohol use, sleep disruption, and daily affective experiences (Emery & Simons, 2020; Forester et al., 2023; Pavlacic et al., 2022; Reid et al., 2022).

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1 In the present study, we aimed to advance research on state-like emotion regulation
2 difficulties by (a) providing a translated and validated German version of the S-DERS and (b)
3 testing competing structural models to determine whether state-based difficulties reflect a
4 single overarching construct or distinct but interrelated subcomponents. In the present study,
5 we present a translation, preregistered validation, and factor modeling extension for a German
6 version of the S-DERS. For the translation and validation, At the core, we aimed to perform a
7 conceptual replication of the original S-DERS construction study, which included an
8 experimental induction of negative mood to provide an appropriate affective context for
9 emotion regulation difficulties to occur and was conducted in a sample of young women. We
10 preregistered hypotheses that (H1) our mood induction increased negative affect based on the
11 valence dimension, (H2) we replicate the original four-factor structure, (H3) internal
12 consistency reliability will be satisfactory ($>.80$) for all scales except for the Clarity scale,
13 which had limited internal consistency in the original study ($>.60$), (H4) there is convergent
14 validity between the S-DERS and the trait-DERS scales, and (H5) concurrent criterion validity
15 for other relevant constructs from the clinical and personality domain. Specifically, we
16 expected positive associations of the global S-DERS score with psychopathology, neuroticism,
17 and affective reactivity to the mood induction. Concerning S-DERS subscales, we expected
18 positive associations between Non-Acceptance and experiential avoidance, Modulate and
19 impulsivity, Awareness and mindfulness, as well as Clarity and mindfulness.

20 The basis of the original four factor solution of the S-DERS was an exploratory factor
21 analysis (EFA) with parallel analysis and main loadings above .40. We preregistered the same
22 procedure as a criterion for successful structural validation, but also planned stricter models in
23 terms of assumptions and decision criteria. Concerning the extended factor models, For even
24 for the trait-DERS, it is still unclear whether subscales capture there exists a common trait latent
25 construct of emotion regulation difficulties or distinct but correlated components (Bardeen et
26 al., 2016; Sousa et al., 2023; Weathers et al., 2013). This question is of theoretical relevance,
27 but also crucial relevant to decide whether the total score or subscale scores should be preferred
28 in a given research application, but previous studies are inconsistent (Bardeen et al., 2016;
29 Sousa et al., 2023; Weathers et al., 2013). The original four-factor solution of the S-DERS was
30 based on exploratory factor analysis (EFA) with parallel analysis. While this provided initial
31 support for the scale's structure, theory-driven confirmatory modeling approaches are needed
32 to determine whether state-based difficulties in emotion regulation entail a single overarching
33 construct (similar to the p-factor of psychopathology) or distinct but interconnected domains.

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1 To address this question, we started by fitting a simple structure confirmatory factor
2 analysis without a general factor, where each indicator only loads on a single scale and no
3 general factor is assumed (Figure 1a). Still, even for the trait-DERS models without cross-
4 loadings fit measures are often insufficient (Gutzweiler & In-Albon, 2018). Exploratory
5 structural equation modeling (ESEM) provides a framework to fit a model with cross-loadings
6 for all items and has provided improved model fit for the trait DERS in the past as well as a
7 reduction in factor correlations (Gutzweiler & In-Albon, 2018; Marsh et al., 2014; Sousa et al.,
8 2023). These models entail the perspective that observed behaviors, like indicated
9 questionnaire responses, are complex and multidetermined. Therefore, we also conducted an
10 ESEM-based analysis with fit measures as the success criterion, which in terms of strictness is
11 between inference based on CFA simple structures and EFA loading sizes (Figure 1b).

12 ThereforeNext, we also computed a higher-order and a bifactor model to test for a
13 superordinate general factor of state-based emotion regulation difficultieswhich influences the
14 subscales. Conceptually, such a higher-order model implies that a general latent construct of
15 emotion regulation difficulties causally influences the four subscales, which in turn causally
16 influence the participant responses to the items (Figure 1c). As a competing non-preregistered
17 alternativeIn post-hoc exploratory analyses, we contrasted this model with a the bifactor model,
18 which implies a direct effect of global difficulties on indicators, which is distinct from the
19 specific constructs underlying the subscale factors (Figure 1d). All tested structural equation
20 models are illustrated in Figure 1. Further, as the existence of cross-loadings might indicate
21 more complex relations between indicators, we provide an exploratory network analysis as a
22 hypothesis-generating tool to support future research on the causal structure of emotion
23 regulation difficulties (Borsboom et al., 2021).

24
25 These included a confirmatory factor analysis (CFA) without cross-loadings (simple
26 structure), as the strictest possible model. Still, even for the trait-DERS models without cross-
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1 For the trait DERS, it is still unclear whether subscales capture a common trait of
2 emotion regulation difficulties. This question is relevant to decide whether the total score or
3 subscale scores should be preferred in a given research application, but previous studies are
4 inconsistent (Bardeen et al., 2016; Sousa et al., 2023; Weathers et al., 2013). Therefore, we
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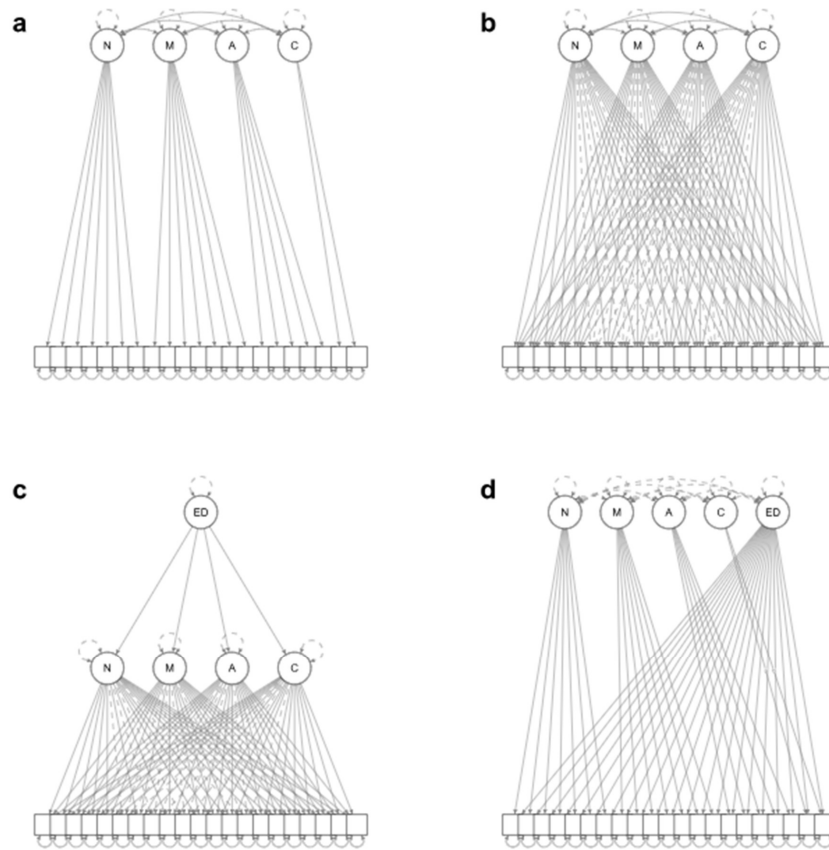


Figure 1. Factor models tested for the S-DERS. (a) CFA simple structure without cross-loadings. (b) ESEM with cross-loadings. (c) Model with a higher-order factor. (d) Bi-factor model. ED = Emotion regulation difficulties. N = Non-Acceptance. M = Modulate. A = Awareness. C = Clarity.

Methods

Participants and Procedures

The sample comprised 214 participants of ages 18-61, which were predominantly young (mean age = 22.5, $SD = 6.5$) female (89%, 10% male, one person gender-diverse) university students (93%). This composition is overall similar to the original S-DERS validation study, which only included young adult women between the age of 18-25. In our

sample, 51 participants (24%) reported a diagnosis for a mental disorder in the past, with 26 (12%) having received treatment.

Following the literature on power simulations for confirmatory factor analysis, we aimed to recruit at least 200 participants (Wolf et al., 2013). An a priori stopping rule was set if recruiting plateaus after 200 participants (< 8 participants per week for 4 weeks in a row) or reaches a maximal sample size of 250. According to power calculations with G*Power (v3.1) for one-tailed zero-order correlations, a sample size of 200 allows a statistical power of 90% to detect a population correlation of .20 or higher. This can be viewed as sufficient, given the moderate-to-high correlations needed to attest validity. Custom-simulations using the simsem package showed that a simple structure CFA based on the factor structure of Lavender and colleagues (2017) is unbiased for our sample size using the criteria of Wolf and colleagues (2013; i.e., relative bias in coefficients and standard errors below 0.05 and confidence interval coverage of the population parameter in at least 90% of 10,000 iterations). These criteria were also fulfilled for a more complex bi-factor model, simulated from a population model with general- and specific-factor loadings of .50, except that standard errors are slightly underestimated, albeit to a degree which maintained confidence interval coverage above the acceptable threshold (median relative standard error bias = .06, range -0.12-0.01)

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Participants were recruited over mailing lists, social media, and internal advertisements at Heidelberg and Regensburg University. As a participation incentive, 25 online coupons á 40€ were provided after study completion to randomly drawn participants. The only inclusion criterion was age between 18-65. The study was performed contactless on participants' smartphones using the SEMA3 platform (O'Brien et al., 2024). This included a demographic section, followed by a section with psychological questionnaires, a mood induction, and the translated S-DERS. This procedure took on average 31.4 minutes ($SD = 20.6$). Psychology students could participate for course credit, which was taken by 88% of participants.

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Translation

The S-DERS (21 items) was separately translated into German by M.S., M.E., and D.K. without reference to the German DERS version. Then, translations were compared for consistency and discussed, followed by a comparison to the German DERS version to resolve conflicts, settling on a consensual translation. The final German items were retranslated to English by two independent psychologists with no significant differences between the back-translation and the original English S-DERS items.

1 The translated items can be found in Table S1 (ordered by factor) and Table S2
2 (administration order with English items for comparison). Item responses ranged from 1 (“Not
3 at all”/“Überhaupt nicht”) to 5 (“Completely”/“Völlig”). The items of the Awareness scale
4 were reversed and then sum scores for the total scale and the subscales calculated. Notably,
5 while this scoring is consistent with the previous procedure, it differently weighs the four
6 subscales, as they consist of a different number of items. We present exploratory analyses on
7 the differences between this and an unweighted procedure.
8

9 Further Psychological Measures

10 Other psychological measures used for validation included the trait-DERS (36 items,
11 Gutzweiler & In-Albon, 2018), the Neuroticism scale of the NEO Five Factor Inventory (12
12 items, Borkenau & Ostendorf, 2007), the Depression, Anxiety, and Stress Scale (DASS-21, 21
13 items, Nilges & Essau, 2021), the Barrett Impulsivity Scale (BIS-15, 15 items, Meule et al.,
14 2011), the Acceptance and Action Questionnaire II (AAQ-II, 7 items, Hoyer & Gloster, 2013),
15 and Awareness and Describe Subscales of the Five Facet Mindfulness Questionnaire Short
16 (FFMQ, 16 items, Michalak et al., 2016). Lastly, the Interpersonal Emotion Regulation
17 Questionnaire (20 items; Pruessner et al., 2020) and the Childhood Trauma Questionnaire
18 (Klinitzke et al., 2012) were administered for a different research project and are therefore not
19 reported in the present study.
20

21 Mood Induction

22 Before the assessment of the S-DERS, all participants underwent a negative mood
23 induction, as negative emotions are likely a prerequisite for the meaningful assessment of
24 momentary emotion regulation difficulties (Lavender et al., 2017). The mood induction
25 consisted of a combination of sad music and autobiographical recall (Werthmann et al., 2014).
26 Participants listened to 6 minutes of the ‘Adagio for Strings’ by Samuel Barber while writing
27 about a recent negative experience. This negative experience was instructed to be a 5-6 on a
28 scale from 0 (not a negative experience) to 10 (extremely negative experience). Immediately
29 before and after the mood induction, participants indicated their momentary affective state
30 based on a two-dimensional affective grid with the dimensions *valence* (from 0 = unpleasant
31 emotion to 10 = pleasant emotion) and *arousal* (from 0 = low energy to 10 = high energy;
32 Tiede, 2020). Lastly, as another manipulation check, participants were asked how well they
33 could immerse themselves in the recalled negative experience (from 1 = not at all to 5 = very
34 well).

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Data Analysis

The success of the mood induction was tested as the difference between affective valence before versus after the manipulation using a paired t-test. An exploratory test on the affective arousal dimension is also reported without previously specified expectations.

All factor models tested for the S-DERS are shown in Figure 1. First, we conducted a confirmatory factor analysis for four factors without cross-loadings (i.e., simple structure; Figure 1a) using maximum likelihood estimation with the R package Lavaan (Rosseel, 2012). We preregistered that if model fit measures did not meet the criteria of $RMSEA \leq 0.06$; $CFI \geq 0.95$; $TLI \geq 0.95$; $SRMR \leq 0.08$ (Hu & Bentler, 1999), we test an ESEM model with cross-loadings for all items (Figure 1b) using the esem package (Prokofieva et al., 2023). In this procedure, first, an EFA was fit with the psych package using principal axis factoring and promax rotation, which was also used in the original S-DERS validation. Referent items were identified using the automated procedure of the esem package. Then, this model was refit as a CFA in Lavaan with the loadings of the referent items fixed to their EFA loadings, while the remaining EFA loadings were used as starting values. If this model also did not meet the fit measure criteria above, we preregistered to perform EFA with the number of factors based on parallel analysis at the 99% quantile, with loadings $>.40$ considered as substantial loadings on the main factors and loadings $>.30$ considered as substantial cross-loadings. This EFA procedure is identical to that used in the original validation study. Internal consistency (composite reliability) was calculated as McDonald's ω from the final model (Flora, 2020). Additionally, the higher-order (Figure 1c) and bifactor models (Figure 1d) were tested against the winning model using the Vuong test (Vuong, 1989). Lastly, we conducted an exploratory network analysis on the partial correlation matrix (Figure 2). Pruning of edges was performed based on the Extended Bayesian Information Criterion with $\lambda = 0.5$ and graphical lasso using the bootNet package (Epskamp et al., 2018).

For associations between the S-DERS and other variables, bivariate correlations were computed with a preregistered one-tailed $\alpha = .05$. All analyses were performed in R (v4.3.2).

Open Science Practices

Preregistration, codebook, data, and analysis code can be found at: <https://osf.io/ebj6u/>. For reproducibility or other reuse of data and code, we recommend directly accessing the github repository, which also includes a documentation of files, version

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1 control, and steps to reproduce analyses:

2 https://github.com/MaurizioSicorello/SDERSvalid_Analysis . A print version of the
3 questionnaire can be found in both repositories as well as the supplements.

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4 There were two notable changes to the preregistration. First, we originally preregistered
5 to conduct EFA with Geomin rotation and maximum likelihood estimation. This is in contrast
6 to the analyses performed by Lavender et al. (2017) and was considered as the *esem* package
7 did not exist at the time of preregistration and the only validated procedure was performed with
8 this estimation procedure. Using the same procedure as Lavender et al. (2017) is an
9 improvement not only due to consistency, but also because principal axis factoring is better
10 suited to identify factors with few items, such as the Clarity scale which only consists of two
11 items. Secondly, we preregistered likelihood ratio tests for model comparisons, but the net
12 procedure indicated models resulting from CFA and ESEM were not nested. Possibly, this was
13 due to the selective fixing of values in ESEM, thus making the Vuong test for non-nested
14 models the safer option (Vuong, 1989). Both procedures led to the same inferential decision.

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15 Results

17 Manipulation check (H1)

18 Affective valence decreased after the mood induction, indicating a successful
19 manipulation, albeit with a small-to-moderate effect size ($t(213) = 4.58, p < .001, d_c = .31; M_{pre}$
20 $= 5.9, SD_{pre} = 1.9; M_{post} = 5.3, SD_{post} = 2.1$). Exploratory analyses indicated that affective
21 arousal also decreased with a slightly larger effect size ($t(213) = 5.9, p < .001, d_c = .40; M_{pre} =$
22 $5.6, SD_{pre} = 1.9; M_{post} = 4.9, SD_{post} = 1.9$), further confirming the successful induction of
23 sadness, which is generally classified as a low arousal emotion (Barrett & Russell, 1999).
24 Overall, most participants stated they were successfully immersed in the experience ($M = 3.8,$
25 $SD = 0.9$).

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27 **Basic factor structure and extended higher-order models (H2)**

28 The correlations between items visually indicated a solution with four factors and
29 considerable cross-loadings (Figure 2a). For the four-factor simple structure CFA without
30 cross-loadings, none of the fit measures crossed the preregistered threshold (Table 1). The four-
31 factor ESEM structure with cross-loadings improved model fit significantly, while only SRMR
32 crossed the threshold. This model also outperformed the higher-order and bifactor models
33 (Table 1) and no modification indices were statistically significant after Bonferroni-Holm
34 correction. A parallel analysis also indicated a four-factor solution. Overall, the loading pattern

conformed to the original S-DERS validation except for two cross-loadings (Table 2): Item 17 of the Modulate scale (“My emotions feel out of control”) had a substantial cross-loading of .46 on the Clarity factor; item 7 of the Clarity scale had a substantial cross-loading of .37 on the Awareness factor (see discussion).

The four factors were moderately to highly correlated, with the lowest correlation between Modulate and Awareness ($r = .18$) and the largest between Modulate and Non-Acceptance ($r = .58$) the latter being visible as a large block in Figure 2a. Notably, this correlation was even higher in the validation of the original S-DERS. In-between were the correlations for Non-Acceptance and Awareness ($r = .30$), Non-Acceptance and Clarity ($r = .43$), Awareness and Clarity ($r = .35$), and Modulate and Clarity ($r = .41$). Overall, this pattern of factor correlations resembled those of the original S-DERS validation, except for larger correlations between the Awareness scale and the remaining three scales.

In contrast, the network model based on partial correlations emphasizes the proximity of the Awareness and Clarity scales (Figure 2b). Also, it indicates that items 5 (“I am feeling very bad about myself”) and 15 (“I believe that I am going to end up feeling very depressed”) might serve as connectors between the Non-Acceptance and the Modulate clusters (see discussion).

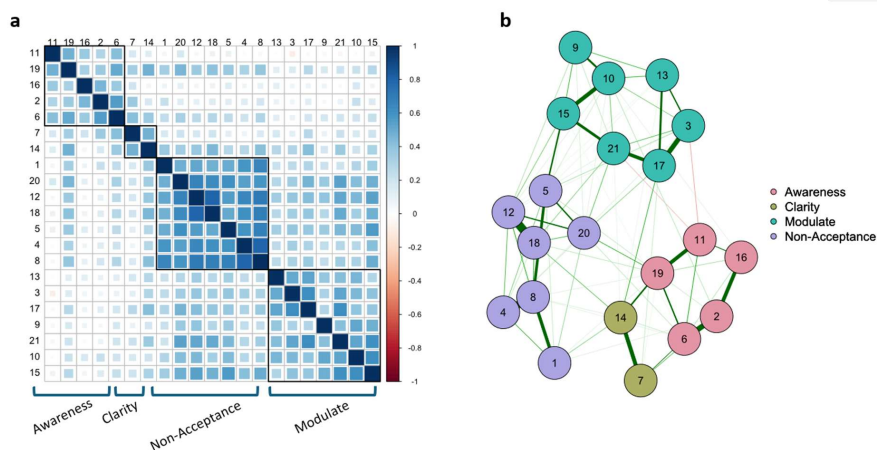


Figure 2. (a) Correlations between S-DERS items. Clusters were determined using hierarchical agglomerative clustering with complete linkage. (b) Network analysis based on the partial correlation matrix.

Table 1*Fit measures and inferential statistics for competing structural equation models*

	SRM R	RMSE A	CFI	TLI	AIC	BIC	χ^2	df	Model Compariso n	p- Value
CFA Simple Structur e	0.078	0.094	0.85 0	0.82 8	10,84 9	11,01 1	527. 6	18 3		
ESEM Cross- loadings	0.039	0.078	0.92 3	0.88 1	10,72 9	11,04 9	313. 3	13 6	Model 2 > Model 1	≥ 0.00 <u>1</u>
ESEM Higher- order	0.076	0.086	0.90 4	0.85 4	10,77 0	11,08 3	357. 9	13 8	Model 2 > Model 3	≥ 0.00 1
Bi-factor	0.066	0.082	0.89 3	0.86 7	10,76 4	10,97 3	414. 3	16 9	Model 2 > Model 4	0.008

Note. Based on $N = 214$ participants. SRMR = standardized root mean square residual, RMSEA = root mean square error of approximation, CFI = comparative fit index, TLI = Tucker–Lewis index, CFA = confirmatory factor analysis, ESEM = exploratory structural equation model, EFA = exploratory factor analysis, AIC = Akaike information criterion, BIC = Bayesian information criterion.

1
2

Table 2*Factor loadings and correlations*

Item	Factor			
	1	2	3	4
Factor 1: Non-acceptance of Current Emotions				
Item 8	0.97 (0.91)	-0.12 (0.48)	0.00 (0.29)	0.03 (0.38)
Item 4	0.91 (0.82)	-0.07 (0.43)	-0.06 (0.2)	-0.06 (0.28)
Item 12	0.71 (0.83)	0.19 (0.62)	-0.06 (0.23)	0.04 (0.41)
Item 18	0.69 (0.78)	0.05 (0.53)	-0.01 (0.26)	0.17 (0.47)
Item 1	0.68 (0.68)	-0.08 (0.37)	0.06 (0.27)	0.06 (0.33)
Item 5	0.59 (0.73)	0.29 (0.61)	0.06 (0.28)	-0.13 (0.26)
Item 20	0.53 (0.72)	0.24 (0.6)	0.09 (0.33)	0.05 (0.4)
Factor 2: Limited Ability to Modulate Current Emotional and Behavioral Responses				
Item 10	-0.06 (0.42)	0.87 (0.77)	0.14 (0.26)	-0.22 (0.16)
Item 21	-0.02 (0.47)	0.71 (0.77)	-0.09 (0.11)	0.21 (0.48)
Item 9	0.02 (0.35)	0.64 (0.59)	0.05 (0.16)	-0.15 (0.14)
Item 3	-0.03 (0.38)	0.62 (0.66)	-0.15 (0.03)	0.21 (0.43)
Item 13	-0.12 (0.31)	0.61 (0.6)	-0.03 (0.11)	0.17 (0.37)
Item 15	0.23 (0.58)	0.6 (0.72)	0.07 (0.25)	-0.1 (0.27)
Item 17	-0.08 (0.42)	0.54 (0.67)	-0.07 (0.14)	0.46 (0.64)
Factor 3: Lack of Awareness of Current Emotions				
Item 6 (r)	0.03 (0.32)	0.00 (0.24)	0.70 (0.75)	0.16 (0.35)
Item 2 (r)	-0.09 (0.17)	0.06 (0.16)	0.67 (0.66)	0.02 (0.18)
Item 11 (r)	-0.04 (0.09)	-0.09 (0.01)	0.62 (0.58)	-0.02 (0.08)
Item 16 (r)	-0.13 (0.09)	0.13 (0.13)	0.61 (0.56)	-0.11 (0.04)
Item 19 (r)	0.25 (0.46)	-0.09 (0.27)	0.54 (0.66)	0.22 (0.42)
Factor 4: Lack of Clarity about Current Emotions				
Item 14	0.14 (0.44)	-0.03 (0.37)	0.13 (0.34)	0.66 (0.74)
Item 7	-0.16 (0.17)	0.04 (0.22)	0.37 (0.44)	0.47 (0.51)

Note. Structure coefficients are in parentheses. Bold coefficients mark absolute loadings larger than .30. (r) indicated reversed items. The structure of this table is based on Lavender et al. (2017) for ease of comparison.

Reliability (H3)

As expected, reliabilities were sufficient for the total scale and all subscales except the Clarity scale, converging with the pattern of the original validation study (in parentheses): Total Score: $\omega = .94$ (.86), Non-Acceptance: $\omega = .92$ (.92), Modulate: $\omega = .79$ (.85), Clarity: $\omega = .63$ (.65).

Construct and Criterion validity (H4-H5)

The S-DERS subscales all had the highest correlations with their analogue trait-DERS subscales (Table 3). Still, notably, almost all subscales from both questionnaires had substantial intercorrelations. Together with ESEM-like structure of the four factors with considerable cross-loadings, this indicates a moderate specificity of subscales, inherent to all English and German versions of the trait and state DERS (Gratz & Roemer, 2004; Gutzweiler & In-Albon, 2018; Lavender et al., 2017). A similar pattern emerged for the remaining external constructs: Experiential avoidance most strongly correlated with Non-Acceptance, but also very strongly with the Modulate subscale. Mindful Description appeared to be more specific to the Awareness subscale, as hypothesized, while Mindful Acting with Awareness was strongly correlated to all subscales, with the strongest correlation for the Modulate scale.

There were two surprising findings, which deviated from our expectations. First, the correlations between the BIS-15 scale for impulsivity and the S-DERS subscales were much smaller than expected, albeit still statistically significant for the preregistered association with the Modulate scale, as well as the non-preregistered association with the Clarity scale. Post-hoc analyses indicated this is because only the BIS-15 subscale for attentional impulsivity was substantially related to the S-DERS scales. For this subscale, the correlations conformed to the expectations, with the strongest effect for the Modulate scale at $r = .32$ (Non-Acceptance: $r = .16$, Awareness: $r = .12$, Clarity: $r = .23$).

The second surprising finding was the absence of the expected correlation between affective reactivity to the mood induction and the global S-DERS. In fact, the association went in the opposite direction, with higher state emotion regulation difficulties showing a small association with a stronger decrease in negative affect. These reactivity scores were calculated from two variables: affective valence before minus after the mood induction. Therefore, we inspected the correlations with the two separate variables (pre and post measurement). This showed that the global S-DERS score was substantially correlated with lower (i.e., more

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1 negative) affect before but not after the mood induction (before: $r = -.22, p = .001$; after: $r = -$
2 $.07, p = .260$). To test whether this observation is specific to the S-DERS, we repeated these
3 correlation analyses with the neuroticism scores instead of S-DERS scores as a trait-based
4 construct for negative affective reactivity, showing the same pattern (reactivity: $r = -.18, p =$
5 $.008$; before: $r = -.28, p < .001$; after: $r = -.08, p = .231$). In sum, both the S-DERS and
6 neuroticism were more strongly correlated to affect before than after the mood induction, albeit
7 with the plausible effect direction of more negative affect (smaller values) being associated
8 with more emotion regulation difficulties and neuroticism (higher values). To understand how
9 two correlations in a psychologically plausible direction can lead to an unexpected effect
10 direction for a difference score, consider the covariance decomposition:

$$\begin{aligned}
 & \text{cov(S-DERS, Reactivity)} \\
 &= \text{cov(S-DERS, Affect}_{\text{pre}} - \text{Affect}_{\text{post}}) \\
 &= \text{cov(S-DERS, Affect}_{\text{pre}}) - \text{cov(S-DERS, Affect}_{\text{post}})
 \end{aligned}$$

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16 Inserting different correlation sizes in the last line shows, if the covariance between the
17 S-DERS and affect *before* the manipulation is more negative than after the manipulation, the
18 observed effect will have a negative sign (i.e., the “wrong” direction). Consequently, if the
19 covariance between the S-DERS and affect *after* the manipulation is more negative than before
20 the manipulation, the observed effect will have a positive sign (i.e., the “right” direction). We
21 will expand on potential psychological reasons in the discussion section.

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Table 3*Correlations between S-DERS scales and other constructs*

	S-DERS				
	Total	Non-Acceptance	Modulate	Awareness	Clarity
DERS	0.78	0.64	0.63	0.55	0.48
DERS: Nonacceptance	0.64	0.69	0.44	0.32	0.30
DERS: Awareness	0.44	0.27	0.16	0.68	0.35
DERS: Clarity	0.47	0.31	0.24	0.53	0.55
DERS: Strategies	0.75	0.63	0.68	0.40	0.39
DERS: Impulse	0.58	0.42	0.57	0.32	0.36
DERS: Goals	0.46	0.36	0.50	0.20	0.19
DASS-21	0.58	0.45	0.60	0.30	0.29
Neuroticism	0.58	0.46	0.57	0.33	0.24
Affective Reactivity: Valence	-0.12	-0.07	-0.15	-0.08	-0.07
AAQ-II	0.64	0.51	0.58	0.37	0.39
BIS	0.10	0.01	0.12	0.08	0.15
FFMQ: Describe	-0.29	-0.14	-0.12	-0.48	-0.26
FFMQ: Awareness	-0.44	-0.27	-0.46	-0.29	-0.33

Note. (S-)DERS = (State) Difficulties in Emotion Regulation Scale, DASS-21 = Depression, Anxiety, and Stress Scale, BIS-15 = Barrett Impulsivity Scale, AAQ-II = Acceptance and Action Questionnaire II, FFMQ = Five Facet Mindfulness Questionnaire (short form).

Statistically significant correlations (one-sided, $\alpha = .05$) are shown in bold. The cutoffs for one-sided tests at different common statistical thresholds were:

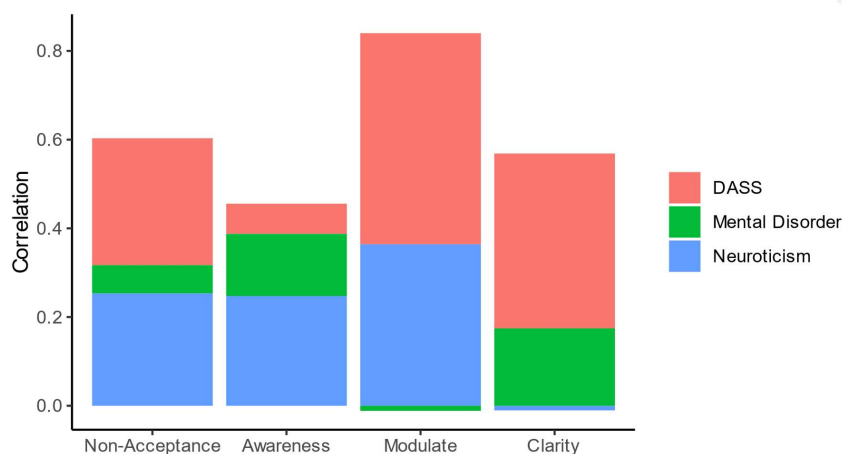
$p < .05$ (one-sided): 0.11

$p < .01$ (one-sided): 0.16

$p < .001$ (one-sided): 0.21

1 **Weighted versus Unweighted Subscales (Post-hoc)**

2 The fact that S-DERS subscales consist of a different number of items implies a
3 differential weighting of these subscales when a global score is calculated (e.g., the Clarity
4 scale has a lower weight than Non-Acceptance in a global S-DERS sum score as it only consists
5 of two items). Therefore, we tested whether equally weighting all subscales increases
6 correlations with psychopathology-related outcomes. We calculated mean scores instead of
7 sum scores for each subscale. Then, we calculated a global scale score as the average over those
8 four means, leading to an equal weight for all subscales independent of the number of items.
9 Overall, we found that the previously used (implicit) differential weighting of scales in the S-
10 DERS is superior to equally weighting all scales for the DASS ($\Delta r = .10$), neuroticism ($\Delta r =$
11 $.11$), and having been diagnosed with a mental disorder ($\Delta d = .14$). One possible explanation
12 is that the overrepresented subscales (i.e., Non-Acceptance and Modulate) have stronger
13 relations to the three outcomes, as indicated in Table 3. Still, this might also be a result of their
14 higher reliability (i.e., equally representing Clarity in the total score lowers the overall
15 reliability). Therefore, we also computed correlations between the latent (measurement error-
16 free) S-DERS factors and the three outcomes within the ESEM framework (Figure 3). This
17 provided evidence for both explanations as latent effect sizes were much more similar than
18 manifest effect sizes for the four subscales, but the Modulate scale still appeared to outperform
19 the other measures in terms of cumulative effect sizes across all three outcomes. This was
20 driven by strong relations to DASS and neuroticism.



21
22 **Figure 3.** Latent correlations between S-DERS subscales and psychopathology-related
23 outcomes.

Discussion

We presented a reliable and valid German translation ~~and validation~~ of the S-DERS together with insights from extended analysis on complex factor and network models, which might serve future studies on the temporal dynamics of emotion regulation difficulties in the laboratory or daily life.

As most previous studies, we started by assuming a common factor model, implying that latent causes (Non-Acceptance, Modulate, Awareness, and Clarity) influence the responses on the individual items. Here, we found that generally no overall factor of “emotion regulation difficulties” can be assumed, based on comparisons to a higher-order and bi-factor model. Hence, a global S-DERS score would be simply an amalgam of four correlated but distinct factors. While a S-DERS sum score might still be statistically useful (e.g. for prediction), this observation speaks against the existence of general state-based emotion regulation difficulties as a coherent psychological construct.

We further confirmed the observation from the trait DERS that comprehensive cross-loadings are necessary for sufficient model fit (Gutzweiler & In-Albon, 2018). This indicates that specific self-reported behaviors are not a simple mono-causal consequence of clearly delineated sub-facets of emotion regulation difficulties (e.g., Non-Acceptance), but rather influenced by all sub-facets to some degree. Hence, there is considerable complexity in the relation between single indicators of emotion regulation difficulties and latent sub-facets. An ESEM model is only one of many possible highly complex models, which might capture the actual complexities in these relations.

Network models are an alternative to such common-cause factor models, which are difficult to compare on the basis of fit measures (Fried, 2020). They represent a (mostly) hypothesis-generating tool to consider potentially causal links between single items. For example, outside its target scale, item 7 of the Clarity scale (“I have no idea how I am feeling”) is most strongly connected to item 6 Awareness scale (“I am acknowledging my emotions”). As mentioned above, recognizing one’s emotions appears as a prerequisite to acknowledging them at face-value, showing a potential causal interpretation of substantial cross-loadings for item 7. Similarly, we found that item 5 might serve as a connector between the Modulate and the Non-Acceptance scale. A hypothesis-generating causal interpretation would be, for example, that feeling very bad about oneself (item 5) may make someone expect increasingly depressed mood (item 15), which makes one feel overwhelmed (item 21) and believing one will continue to feel this way for a long time (item 10). Therefore, zooming in on the potential

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causal relations between individual difficulties might be an important target for future clinical research.

We found that our version largely conforms to the standards of the original validation study based on factor structure, reliability, and associations with related constructs.

Based on parallel analysis and item loadings, we confirmed a four-factor solution with moderately correlated factors and considerable cross-loadings. The importance of cross-loadings for the S-DERS was also confirmed by a comparison to a simple structure model, which had considerably worse fit. This four-factor solution was overall also discernible from the raw correlation matrix and the network analysis.

While all items had sufficiently large loadings on their targeted factor, two items showed stronger cross-loadings than expected. First, item 17 of the Modulate factor “My emotions feel out of control” had a substantial cross-loading on the Clarity factor. In the original trait-DERS, the item wording was “I experience my emotions as overwhelming and out of control”, which might have benefitted a stronger alignment with the Modulate versus the Clarity factor. For example, if someone is confused about their feelings (item 14, Clarity), this might be closer to experiencing emotions as out of control than them being overwhelming. Still, given that we confirmed previous patterns of only moderate discriminant validity for the S-DERS subscales, it might be advantageous to retain this item translation for consistency with the English S-DERS. Also, the trait-DERS wording combines two different items into one, “out of control” and “overwhelming”, which are both already present in the trait-DERS as separate items. This might artificially improve factor solutions by effective doubling of content, which could even favor the removal of this item from all DERS versions entirely.

The second item with substantial cross-loadings was item 7 of the Clarity scale (“I have no idea how I am feeling”), which also loaded on the Awareness scale. We would argue it is almost trivial that the awareness someone has of their current emotions influences whether they have an idea how they are feeling. In fact, a well-powered study on the trait-DERS found that the Awareness and Clarity scales were not distinct (Bardeen et al., 2016). This highlights general questions on the causal structure of the (S-)DERS.

As most previous studies, we started by assuming a common factor model, implying that latent causes (Non-Acceptance, Modulate, Awareness, and Clarity) influence the responses on the individual items. Here, we found that generally no overall factor of “emotion regulation difficulties” can be assumed, based on comparisons to a higher order and bi-factor model. Hence, a global S-DERS score would be simply an amalgam of four correlated but distinct

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There are several limitations in our study. First, while our sample composition resembled that of the original S-DERS validation and had a substantial proportion of people with a history of diagnosed mental disorders, this is still a highly educated, mostly young, female sample, imposing constraints on generalizability. Secondly, while our mood induction did increase negative affect, there was no association between affective reactivity and the S-DERS. In turn, there was a substantial association between affect *before* but not after the mood induction and the S-DERS, despite the latter being administered *after* the mood induction. One potential explanation might be that despite the mood induction being successful, its only small-to-moderate effect size was not sufficient to observe an association with reactivity, as participants might fastly revert to their affective set point before the mood induction. Put simply, our mood induction might have been insufficiently strong to overwrite the emotion regulation difficulties participants experienced before the mood induction.

Lastly/Thirdly, while the EFA models largely conformed to the criteria for conceptual replication of the original S-DERS study (with the exception of two slightly larger cross-loadings discussed above), only the SRMR index crossed the preregistered threshold for a stricter test of model fit. These thresholds were determined based on default standards in the field, which has been increasingly shown to have major shortcomings. Fit measures other than SRMR have been shown to lead to over-extraction of factors, underestimation of model fit for small sample sizes, and particularly bad diagnostic performance for determining the number for factors of RMSEA based on simulations (Haslbeck & van Bork, 2024; Hu & Bentler, 1999; Montoya & Edwards, 2021). For our sample size, more recent studies have shown that flexible cutoffs on the SRMR based on simulations have the best performance for model diagnostics

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1 (Mai et al., 2021, Groskurth et al., 2024; McNeish & Wolf, 2023; Niemand & Mai, 2018).
2 When performing such analyses with the FCO package (Niemand & Mai, 2018), we found a
3 cutoff of SRMR = .055, which our ESEM model passes. Generally, we believe that for DERS-
4 like structures, psychometric decisions based on fixed absolute literature-based thresholds
5 might not be a fruitful path. In items and scales with such complex interrelations, it is highly
6 unlikely that a CFA simple structure without any cross-loadings or an ESEM structure with
7 cross-loadings for all items can reflect the true data generating model. In the long run, such
8 formal models of emotion regulation difficulties might be improved based on clinical theory
9 and evidence targeting causal relations.

10 Lastly, wWhile all items had sufficiently large loadings on their targeted factor, two
11 items showed stronger cross-loadings than expected. First, item 17 of the Modulate factor “My
12 emotions feel out of control” had a substantial cross-loading on the Clarity factor. In the
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22 which could even favor the removal of this item from all DERS versions entirely. The second
23 item with substantial cross-loadings was item 7 of the Clarity scale (“I have no idea how I am
24 feeling”), which also loaded on the Awareness scale. We would argue it is almost trivial that
25 the awareness someone has of their current emotions influences whether they have an idea how
26 they are feeling. In fact, a well-powered study on the trait-DERS found that the Awareness and
27 Clarity scales were not distinct (Bardeen et al., 2016). This highlights general questions on the
28 causal structure of the (S-)DERS.

30 Conclusion

31 Our study provides a robust German translation and validation of the S-DERS,
32 expanding its applicability for research on state-like emotion regulation difficulties. Beyond
33 validation, our findings challenge the assumption of a unidimensional construct of general
34 emotion regulation difficulties, demonstrating that the four subscales—Non-Acceptance,

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1 Modulate, Awareness, and Clarity—are correlated but distinct. This has important theoretical
2 and practical implications, suggesting that while a global S-DERS score may be statistically
3 useful, it does not reflect a coherent psychological entity.

4 Moreover, our structural analyses reinforce findings from trait-based research
5 (Gutzweiler & In-Albon, 2018) that emotion regulation difficulties cannot be cleanly separated
6 into distinct latent causes, given the pervasive cross-loadings in CFA models. This supports the
7 use of ESEM as a flexible modeling approach that accommodates the complexity of emotion
8 regulation processes. However, as factor models inherently assume latent common causes,
9 future work may also benefit from network-based perspectives. Our exploratory network
10 analysis highlights potential causal relationships between individual items, offering a
11 hypothesis-generating framework for future studies to investigate the dynamic interplay of
12 emotion regulation difficulties in real-world settings.

13 Taken together, these findings underscore the importance of moving beyond static trait
14 assessments to study the fluid nature of emotion regulation difficulties. Future research should
15 further explore these dynamics beyond experimental settings, using intensive longitudinal
16 designs in daily life, integrating both factor-analytic and network approaches to capture the full
17 complexity of state-based emotion regulation.

18 The translated S-DERS showed a sufficient four factor solution similar to the original
19 S-DERS version. The S-DERS further showed good reliability and association with related
20 constructs. We therefore recommend using the S-DERS when investigating temporal dynamics
21 of emotion regulation difficulties in laboratory or daily life settings. A replication of the factor
22 structure in clinical and more representative samples will be crucial.

23 24 **List of Abbreviations**

25 S-DERS = State Difficulties in Emotion Regulation Scale

26 DASS-21 = Depression

27 Anxiety, and Stress Scale

28 BIS-15 = Barrett Impulsivity Scale

29 AAQ-II = Acceptance and Action Questionnaire II

30 FFMQ = Five Facet Mindfulness Questionnaire (short form).

Declarations

Ethics approval and consent to participate

The study was approved by the Ethical Board II of Heidelberg University, Germany (2021-519).

Consent for publication

Not applicable

Availability of data and materials

Preregistration, codebook, data, and analysis code can be found at: <https://osf.io/ebj6u/>

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

M.S. contributed to conception, design, acquisition, analysis, and interpretation of data and drafted the manuscript. M.E. contributed to conception, design, and interpretation of data and provided substantive revisions to the manuscript. D.K. contributed to conception, design, acquisition, and interpretation of data and provided substantive revisions to the manuscript

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