**The Unified Protocol as an Internet-based Intervention for Emotional Disorders:
Randomized Controlled Trial**

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Abstract

The Unified Protocol (UP) as a transdiagnostic intervention has primarily been applied in the treatment of anxiety disorders and in face-to-face-settings. The current study investigated the efficacy of a 10-week Internet-based adaptation of the UP for anxiety, depressive, and somatic symptom disorders. The trial was registered under DRKS00014820 at the German Clinical Trial Registry, DRKS. $N=129$ participants were randomized to treatment or waitlist control. Significant treatment effects were found for symptom distress, satisfaction with life, positive/negative affect and markers of anxiety, depression, and somatic symptom burden (within-group *Hedges' g* = 0.32-1.38 and between-group $g = 0.20-1.11$). Treatment gains were maintained at 1- and 6-month-follow-up. Subgroup analyses showed comparable effects in participants with anxiety and depressive disorders. 26.6 % dropped out of treatment and 35.38 % did not provide post-treatment assessments.

The results strengthen the application of the UP as an Internet-based treatment for alleviating symptom distress across emotional disorders. More research on the applicability for single disorders is needed and avenues to improve adherence and attrition rates should be explored.

Keywords: transdiagnostic; Internet-based cognitive behavior therapy; Unified Protocol, emotional disorders; guided self-help

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About a third of the German population fulfilled criteria for at least one mental disorder in the previous 12 months [1]. The emotional disorders, subsuming anxiety, depressive, and related disorders, are most common and highly comorbid [1]. While comorbidity results in greater severity, impairment, and chronicity [2–4], the majority of evidence-based treatments is focused on treating single disorders [5]. Transdiagnostic treatments, that simultaneously target several disorders, address comorbidity and have the potential to facilitate the dissemination of evidence-based treatments [6]. Transdiagnostic approaches have been applied successfully in face-to-face [7,8] and Internet-based settings [9,10].

While there is a growing evidence base for transdiagnostic treatments, transdiagnostic treatments encompass heterogeneous approaches that vary considerably in their foundation in theory [11]. In addition, the majority of treatments are applied exclusively in Internet-based or face-to-face settings [7–10]. However, this impedes dissemination and efforts to integrate online interventions with face-to-face therapy. Instead, it seems reasonable to concentrate on effective transdiagnostic treatments with clear assumptions about “shared mechanisms” between disorders to target a wider range of disorders and adaptability across different settings and populations, like the Unified Protocol (UP) [6,12,13]. The Unified Protocol is a transdiagnostic treatment for emotional disorders that targets dysfunctional reactions towards emotions, originally developed for the face-to-face setting [14]. The UP led to moderate to large effect sizes compared to waitlist and showed equivalence to gold-standard single-disorder protocols for mixed anxiety disorders [15,16]. The UP has been delivered over the Internet as a 10-week guided intervention in a first preliminary study for anxiety and

depression [17]. While encouraging, the study sample seemed less impaired than in face-to-face RCTs and the trial suffered from high attrition.

The high comorbidity, overlap, and shared mechanisms between emotional disorders, raises the question of the UP's applicability beyond anxiety disorders. So far, the majority of research efforts have been concentrated on anxiety and the evidence base beyond anxiety disorders is still limited [12]. While a meta-analysis found that the UP led to medium to large effects across anxiety and depression [18], the trials that did investigate the UP for primary depression are single case studies and open trials [14,19–23]. The Internet-based RCT included primary depression but did not report findings for this diagnostic group separately [17]. The third most prevalent group of emotional disorder are somatic symptom disorders [1]. Despite their prevalence in primary care, their high medical health care utilization as well as high risk of chronicity and disability [24], somatic symptom disorders have not been investigated within the UP framework.

Our goal for this study was to extend the evidence-base for the UP in an Internet-based setting for disorders beyond anxiety disorders. We were interested in both overall and differential efficacy of the UP in the context of a guided self-help intervention for emotional disorders, namely anxiety, depressive, and somatic symptom disorders.

Method

Design

We compared the Internet-based intervention based on the UP to waitlist control in an RCT to explore its efficacy. The trial was registered under DRKS00014820 at DRKS. Participation was free of charge and not reimbursed.

Participants

We included participants if they (a) were over 18 years, (b) had a sufficient knowledge of German, (c) had Internet access, (d) had a stable dose of medication over the preceding

three months, and (e) had one of the following primary diagnoses: panic disorder, agoraphobia, social anxiety disorder, generalized anxiety disorder, persistent depressive disorder, major depressive disorder, illness anxiety disorder, and somatic symptom disorder.

We excluded participants from the study if they (a) currently experienced symptoms of a psychotic, bipolar, or substance use disorder, (b) were suicidal, or (c) were currently in psychotherapy.

We recruited participants in mental health online forums as well as via online advertising. Participants were directed to a study website with detailed information as well as a registration and consent form. After obtaining written informed consent, we activated an online screening with demographic and self-report measures. If participants' ratings reached one or more pre-defined cut-offs (PHQ-9>10, LSAS>30, GAD-7>10, PAS>10, SHAI>18), we invited them to a structured clinical interview via telephone to determine inclusion and exclusion diagnoses [25]. A detailed description of the recruitment procedure is shown in the flow diagram in Fig 1. Recruitment commenced in December 2018 and ended in February 2020.

Fig 1. Consort Flow Chart.

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Intervention

The 10-week guided transdiagnostic intervention is an adaptation of the UP for Internet-based use. We shortened and simplified the protocol, while retaining the core concepts of the UP (see Table 1). The sequence and contents of the modules were fixed for all participants. We recommended participants to complete one module per week, but participants were free to work at their own pace. Weekly asynchronous guidance was provided by the first and last author as well as by 16 graduate students of clinical psychology. The master students were

trained in a 1-day workshop and biweekly supervision meetings were held throughout the trial to ensure adherence. On average, online therapists spent 24.44 ($SD = 7.92$) minutes per week on every participant.

Table 1. Overview of Guided Intervention.

Week	Name	Description
1	Motivation and goal setting	Participants learn about motivation and goal setting. They fill in a decisional balance sheet and set 1-3 goals for treatment.
2	Understanding Emotions	Participants learn about emotions and the difference between cognition, emotion, and behavior. They record their emotional experiences and reflect the short- and long-term consequences of their behavior.
3	Mindfulness	Participants learn about primary and secondary emotions and the benefits of mindful emotion awareness. They practice a selection of mindfulness exercises.
4	Cognitive Flexibility I	Participants learn about the relationship of thoughts and emotions, automatic thoughts and thinking traps. They challenge their thoughts by finding alternative thoughts.
5	Cognitive Flexibility II	Participants learn about thoughts about emotions and core beliefs. They continue with challenging their thoughts.
6	Countering Avoidance	Participants learn about avoidance and countering avoidance. They reflect on their avoidance tendencies and record their experience with countering avoidance.
7	Interoceptive Exposure	Participants learn about the effect of physical sensations. They induce physical sensations with video-guided interoceptive exposures and own exercises.
8	Emotion Exposure	Participants set a hierarchy of “difficult situations” and conduct emotion exposures in vivo and sensu.
9	Emotion Exposure II	Participants continue to expose themselves to emotion-inducing situations and images.
10	Relapse Prevention	Participants reflect on achievements and compile a training schedule for when treatment is over.

Outcome Measures

We interviewed participants with a structured clinical interview via telephone prior to randomization. After 10 weeks, participants of the treatment group were interviewed again to determine diagnostic status at post-treatment. All other outcomes were self-reported on the

online platform. We assessed the primary outcome measure (BSI-18) and transdiagnostic secondary outcome measures at baseline, mid- and post-treatment as well at 1-month and 6-month follow-up. We assessed all disorder-specific measures at baseline and post-treatment. Negative effects and treatment satisfaction were collected at post-treatment.

Structured Clinical Interview

We interviewed participants with the Diagnostic Interview for Mental Disorders (DIPS) [25,26], a structured clinical interview for DSM-5, via telephone to determine diagnostic status of participants. The DIPS has good psychometric properties [25]. Interviewers were the first author as well as six master students of clinical psychology who were trained and supervised. Ten interviews were audiotaped and rated by an independent second rater. Interrater reliability ranged between 95.12 % (anxiety disorders) and 100 % accordance (all other diagnostic groups).

Primary Outcome

Primary outcome was symptom distress, as measured by the Brief Symptom Inventory 18 (BSI-18). The BSI-18 [27,28] is an 18-item short-version of the Symptom-Checklist-90-R and includes three subscales (anxiety, depression, and somatization). The BSI-18 shows high internal reliability and overall satisfactory psychometric properties (Derogatis & Fitzpatrick, 2004; Franke et al., 2011; Prinz et al., 2013).

Transdiagnostic Secondary Outcome Measures

We assessed positive and negative affect with the Positive and Negative Affect Schedule (PANAS). The PANAS [31,32] measures positive and negative affect with two 10-item scales. Both scales show high internal consistency and are quasi-independent (Watson et al., 1988). Satisfaction with life was assessed with the Satisfaction with Life Scale (SWLS). The SWLS [33,34] is a 5-item measure of life satisfaction. Internal consistency and re-test reliability are high.

Disorder-specific Secondary Outcome Measures

We assessed depressive symptoms with the Patient Health Questionnaire (PHQ-9). The PHQ-9 [35,36] is a 9-item screening instrument for depression with satisfactory psychometric properties (Kroenke & Spitzer, 2002; Lowe, 2004). Symptoms of generalized anxiety were assessed with the 7-item Generalized Anxiety Disorder Screener (GAD-7) [37,38]. The GAD-7 is unidimensional and internally reliable. The Liebowitz Social Anxiety Schedule (LSAS) was used to assess social anxiety. The LSAS [39,40] is 24-item measure of social anxiety assessing fear/anxiety and avoidance. Internal consistency of the two subscales as well as the total scale is high and the scale exhibits good psychometric properties [41]. We assessed panic and agoraphobia with the 13-item Panic and Agoraphobia Scale (PAS) [42,43]. The PAS assesses panic attacks and agoraphobic avoidance as well as related concerns. Internal reliability as well as psychometric properties are good. Health anxiety was assessed with the 18-item Short Health Anxiety Inventory (SHAI) [44,45]. The SHAI has a two-factor structure and assesses health anxiety with 14 items and perceived negative consequences of being ill with four items. The SHAI has good psychometric properties. We used the 15-item Patient Health Questionnaire (PHQ-15) to assess somatic symptom burden (Gräfe et al., 2004; Kroenke et al., 2002). Thirteen items represent the most common somatic symptoms and participants rate the extent to which they are bothered by these symptoms. Two items assess sleep disturbance and tiredness and are also included in the PHQ-9 and scored accordingly. Their ratings were obtained in the PHQ-9 assessment and aggregated to a total score. Internal consistency and psychometric properties are good.

Negative Effects and Satisfaction with Treatment

We assessed negative effects of treatment with the Negative Effects Questionnaire (NEQ) [48], a 20-item measure of the occurrence and characteristics of negative effects following treatment. Each item is rated in three steps: if participants agree that the negative effect occurred, then they are asked to rate the negative impact of the negative effect and

attribute it to treatment or other circumstances. We used the Client Satisfaction Questionnaire-8 (CSQ-8) [49,50] to measure client satisfaction with treatment with 8 questions. The CSQ-8 is unidimensional and internally reliable [51].

Sample Size

Sample size was calculated using g*power [52]. We hypothesized a large effect (*Cohen's d* = 0.8) in favor of the intervention [15,21]. To detect this effect (one-sided t-test for independent samples, $\alpha = .05$) with a power of 80%, a sample size of $n = 42$ participants is required. With an assumed attrition rate of 15%, we aimed at recruiting a sample size of $n = 60$ per diagnostic group (anxiety, depressive, and somatic symptom disorder).

Randomization Procedure

We randomized participants to waitlist or treatment in a 1:1 ratio. We used stratified block randomization to ensure a balanced distribution of primary diagnosis groups (anxiety, depressive, and somatic symptom disorder as stratum) across treatment and waitlist. The allocation sequence was generated by an online random number generator and carried out by the online platform that also hosted the intervention. A total of $n = 132$ participants were randomized: $n = 60$ with a primary anxiety, $n = 60$ with a primary depressive disorder, and $n = 12$ with a primary somatic symptom disorder. Despite increased efforts, we failed to meet our original recruitment goal regarding somatic symptom disorder within the study's timeframe.

Statistical Analysis

We conducted all analyses using RStudio [53]. All analyses followed the intent-to-treat framework. Group differences in demographics and baseline measures were tested using t-tests or Pearson's Chi-squared tests. Statistical significance was set at the 5% level, and confidence intervals were calculated at the 95% confidence level. For the efficacy and follow-up analyses, we chose mixed effects models for their advantages in handling missing as well

as longitudinal data. We fitted linear mixed effects models with the lmer-function from the lme4 package [54], using the lmerTest package to obtain p-values [55]. For the efficacy analysis, we included treatment, time, and the interaction of treatment and time as fixed and participants as random effects in the model. We also conducted the same analysis in a subgroup of primarily anxious and primarily depressed participants. To analyze whether treatments gains were maintained in the treatment group at 1- and 6-month follow up, we included time as fixed and participants as random effects in the model. We calculated effect sizes (*Hedges' g*) based on the estimated means and the pooled standard deviations of the observed means. Response was determined based on the reliable change index ($RCI=1.96$) [56]. RCIs were calculated using the BSI-18's internal reliability ($\alpha = .91$) [28,57]. Since norm data from a clinical and general population was available [28,58], we also calculated the *Cutoff C* to determine recovery rates [56]. Individuals are recovered if they fall below the cutoff and show reliable improvement according to the RCI [56].

Ethics

The trial was approved by the ethics committee of the Department of Education and Psychology at Freie Universitaet Berlin, Germany (186/2018).

Results

Demographics

Demographic characteristics are displayed in Table 2. Groups did not differ in demographic variables.

Table 2. Demographic Characteristics of Participants at Baseline.

Demographic Variable	Treatment (<i>n</i> =65)	Waitlist (<i>n</i> =64)	Total	Statistical test of group difference		
				df	χ^2 / t	<i>p</i>
Gender				1	.48	.49
Male	23 (35.4%)	18 (28.1%)	41 (31.8%)			
Female	42 (64.6%)	46 (71.9%)	88 (68.2%)			

Age				127	.18	.86
Mean (SD)	37.51 (11.99)	37.11 (13.04)	37.31 (12.47)			
Range	18-67	18-66	18-67			
Relationship				1	1.99	.16
in a relationship	40 (61.5%)	30 (46.9%)	70 (54.3%)			
single	25 (38.5%)	34 (53.1%)	59 (45.7%)			
Highest Education				4	4.7	.32
up to 9 years of school	4 (6.2%)	5 (7.8%)	9 (7%)			
education						
Secondary school	10 (15.4%)	11 (17.2%)	21 (16.3%)			
College entrance	16 (24.6%)	25 (39.1%)	41 (31.8%)			
qualification						
College / university degree	34 (52.3%)	22 (34.4%)	56 (43.3%)			
other	1 (1.5%)	1 (1.6%)	2 (1.6%)			
Employment status				5	2.99	.7
employed	33 (50.8%)	29 (45.3%)	62 (48.1%)			
self-employed	4 (6.2%)	5 (7.8%)	9 (7%)			
in education	12 (18.5%)	17 (26.6%)	29 (22.5%)			
pensioned	3 (4.6%)	5 (7.8%)	8 (6.2%)			
unemployed	9 (13.8%)	6 (9.4%)	15 (11.6%)			
other	4 (6.2%)	2 (3.1%)	6 (4.7%)			
Currently on medication				1	0	.99
yes	16 (24.6%)	16 (25%)	32 (24.8%)			
no	49 (75.4%)	48 (75%)	97 (75.2%)			
Prior Psychotherapy				1	1.95	.16
yes	44 (67.7%)	51 (79.7%)	95 (73.6%)			
no	21 (32.3%)	13 (20.3%)	34 (26.4%)			
Primary Diagnosis				9	5.66	.77
Agoraphobia	3 (4.6%)	4 (6.3%)	7 (5.4%)			
Generalized Anxiety	9 (13.8%)	5 (7.8%)	14 (10.8%)			
Disorder						
Panic Disorder	5 (7.7%)	5 (7.8%)	10 (7.8%)			
Social Anxiety Disorder	13 (20%)	16 (25%)	29 (22.5%)			
Major Depressive Disorder	14 (21.5%)	17 (26.6%)	31 (24%)			
Persistent Depressive	15 (23.1%)	12 (18.8%)	27 (20.9%)			
Disorder						
Somatic Symptom Disorder	2 (3.1%)	3 (6.3%)	5 (3.9%)			
Illness Anxiety Disorder	4 (6.2%)	2 (3.1%)	6 (4.7%)			
Comorbidity						
1 comorbid diagnosis	51 (78.5%)	48 (75%)	99 (76.7%)			
2 comorbid diagnoses	27 (41.5%)	28 (43.7%)	55 (42.6%)			
3 comorbid diagnoses	18 (27.7%)	18 (28.1%)	36 (27.9%)			
4 comorbid diagnoses	12 (18.5%)	10 (15.6%)	22 (17.1%)			
5 comorbid diagnoses	5 (7.7%)	4 (6.2%)	9 (6.9%)			

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231 **Treatment Adherence, Usage & Attrition**

232 We defined treatment completers based on a theoretical basis. Completers completed

233 six or more sessions within ten weeks, which is equal to being exposed to all core elements of

234 therapy (mindfulness, cognitive flexibility, and emotion avoidance). Non-completers

completed five or less sessions within ten weeks and/or communicated treatment termination. Accordingly, $n = 47$ (73.4%) were completers and $n = 17$ (26.6%) were non-completers. $n=27$ (42.2%) completed all 10 modules. Participants on average logged in 85.3 ($SD = 39.2$) times and spent 57.4 ($SD = 34.9$) hours on the platform. However, this does not reflect actual usage time, as the website did not automatically log participants out. Participants completed on average 7.22 ($SD = 3.15$) modules, 36.17 ($SD = 29.04$) exercises, 0.41 ($SD = 0.3$) exercises per login and wrote 8.05 ($SD = 7.97$) messages. In the treatment group, $n = 23$ (35.38%) failed to complete post-treatment questionnaires, regardless of how they adhered to treatment. In the waitlist group, $n = 7$ (10.94%) failed to complete assessments after 10 weeks of waiting.

Efficacy and Follow Up

Means, standard deviations and effect sizes (*Hedges' g*) are displayed in Table 3. Symptom distress (BSI-18) decreased more in the treatment than in the waitlist group over time ($F = 17.17$, $df = 2$, $p < .01$). Treatment effects were also found for all secondary transdiagnostic and disorder-specific outcomes ($F = 4.63$ – 16.4 , $df = 1$ - 2 , $p < .05$). Between-group effect sizes ranged between $g = 1.12$ (symptom distress) and $g = 0.24$ (health anxiety) and within group effect sizes ranged between $g = 1.38$ (symptom distress) and $g = 0.32$ (social anxiety). Treatment gains for the transdiagnostic outcome measures - symptom distress (BSI-18), positive and negative affect (PANAS), as well as satisfaction with life (SWLS) - were maintained at 1- and 6-month-follow-up ($F = 0.16$ - 1.22 , $df = 2$, $p > .05$).

Table 3. Means and Standard Deviations/Errors for Primary and Secondary Outcome Measures and Within- and Between-Group Effect Sizes.

Measure		Treatment		Waitlist		Pre-Post Within ES <i>Hedges' g</i> 95% CI		Between group ES <i>Hedges' g</i> 95% CI
		<i>M</i>	<i>SD/SE</i>	<i>M</i>	<i>SD/SE</i>	Treatment	Waitlist	
BSI-18	Pre	25.8	10.37	26.62	9.2	-1.38	-0.36	-1.11
	Post	13.11	1.37	23.09	1.25	[-1.77, -1]	[-0.71, -0.01]	[-1.48, -0.74]

	FU1	14.20	1.37					
	FU2	12.58	1.31					
PANAS	Pre	27.38	7.89	28.2	6.53	-0.94	-0.34	-0.76
NA	Post	20.54	1.04	25.81	.95	[-1.3, -0.58]	[-0.69, 0]	[-1.11, -0.4]
	FU1	20.62	1.06					
	FU2	20.20	1.02					
PANAS	Pre	20.11	5.15	19.03	5.0	0.79	0.3	0.70
PA	Post	25.63	.91	20.61	.81	[0.43, 1.14]	[-0.05, 0.65]	[0.35, 1.06]
	FU1	25.35	1.24					
	FU2	24.86	1.19					
SWLS	Pre	15.64	5.9	15.45	6.16	0.46	0.07	0.39
	Post	18.57	.85	15.9	.81	[0.11, 0.81]	[-0.28, 0.42]	[0.05, 0.74]
	FU1	19.22	1.01					
	FU2	19.27	1.0					
PHQ-9	Pre	13.86	4.85	14.67	4.93	-1.15	-0.34	-0.91
	Post	8.2	.74	12.9	.66	[-1.52, -0.78]	[-0.69, 0.01]	[-1.27, -0.55]
GAD-7	Pre	11.77	4.95	12.42	4.2	-1.01	-0.32	-0.85
	Post	7.18	.67	10.97	.59	[-1.37, -0.64]	[-0.67, 0.0]	[-1.21, -0.49]
LSAS	Pre	58.52	26.79	69.23	28.66	-0.32	-0.06	-0.69
	Post	50.33	3.59	67.67	3.4	[-0.67, 0.03]	[-0.4, 0.29]	[-1.04, -0.33]
PAS	Pre	18.43	12.82	18.19	11.26	-0.64	-0.21	-0.49
	Post	10.72	1.64	15.9	1.49	[-0.99, -0.29]	[-0.56, 0.13]	[-0.84, -0.14]
SHAI	Pre	41.82	1.1	39.72	1.11	-0.57	-0.12	-0.20
	Post	36.41	1.36	38.45	1.3	[-0.92, -0.22]	[-0.47, 0.23]	[-0.55, 0.14]
PHQ-15	Pre	12.06	5.24	13.28	5.38	-0.65	-0.25	-0.61
	Post	8.62	.76	11.91	.69	[-1.0, -0.3]	[-0.6, 0.1]	[-0.97, -0.26]

Note. ES: Effect Size. BSI-18: Brief Symptom Inventory 18. PANAS NA: Negative Affect Subscale of the Positive and Negative Affect Schedule. PANAS PA: Positive Affect Subscale of the Positive and Negative Affect Schedule. SWLS: Satisfaction with Life Scale. PHQ-9: Patient Health Questionnaire 9. GAD-7: Generalized Anxiety Screener 7. LSAS: Liebowitz Social Anxiety Scale. PAS: Panic and Agoraphobia Scale. SHAI: Short Health Anxiety Inventory. PHQ-15: Patient Health Questionnaire

Subgroup analyses

Means, standard deviations and effect sizes (*Hedges' g*) for primary and secondary outcome measures in the anxiety, depression, and somatic symptom disorder subsample are displayed in Table 4. For the anxiety subsample, the interaction of time x group was significant for symptom distress, positive and negative affect, panic/agoraphobia, and depression ($F = 3.54-6.37$, $df = 1-2$, $p < 0.05$). For the depressive subsample, the interaction of time x group was significant for symptom distress, positive and negative affect, depression,

270 generalized anxiety, social anxiety, and health anxiety ($F = 3.29-9.99$, $df = 1-2$, $p < .05$). Due
271 to small sample size, the somatic symptom disorder sample was not analyzed separately.

272 **Table 4 Means in Primary Anxiety, Depressive and Somatic Symptom Disorders Subsamples and Effect Sizes in Anxious and Depressive**
 273 **subsample.**

		Anxiety Disorders						Depressive Disorders						Somatic Symptom Disorders			
		Treatment		Waitlist		Between group ES	Within group ES	Treatment		Waitlist		Between group ES	Within group ES	Treatment		Waitlist	
		<i>M</i>	<i>SD/SE</i>	<i>M</i>	<i>SD/SE</i>	<i>Hedges' g</i> 95% CI	<i>Hedges' g</i> 95% CI	<i>M</i>	<i>SD/SE</i>	<i>M</i>	<i>SD/SE</i>	<i>Hedges' g</i> 95% CI	<i>Hedges' g</i> 95% CI	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
BSI-18	Pre	25.63	10.8	28.48	9.97	-1.09	-1.27	25.31	10.3	25.27	7.59	-1.08	-1.28	29.0	9.57	24.0	13.13
	Post	13.14	2.34	24.71	2.09	[-1.46, -0.72]	[-1.65, -0.9]	13.69	1.8	22.4	1.65	[-1.45, -0.71]	[-1.65, -0.9]	10.0	4.90	18.2	5.22
PANAS NA	Pre	28.21	7.98	30.72	7.08	-0.65	-0.86	26	7.82	26.5	5.06	-0.85	-0.89	30.6	7.64	23.8	6.61
	Post	21.76	1.62	26.54	1.43	[-1.01, -0.3]	[-1.22, -0.5]	19.46	1.47	25.42	1.35	[-1.21, -0.49]	[-1.25, -0.53]	19.8	5.26	23.6	5.9
PANAS PA	Pre	21.4	5.56	21.14	5.28	0.69	0.78	18.1	4.09	17.1	4.14	0.58	0.8	24.0	4	18.4	3.65
	Post	26.79	1.44	21.78	1.25	[0.33, 1.04]	[0.42, 1.13]	23.76	1.23	19.49	1.11	[0.23, 0.94]	[0.44, 1.15]	29.6	3.51	20.6	4.83
SWLS	Pre	14.79	6.23	15.83	6.5	0.28	0.58	15.62	5.48	14.1	4.33	0.52	0.3	19.83	5.34	21.4	10.33
	Post	18.22	1.32	16.47	1.22	[-0.07, 0.63]	[0.23, 0.93]	17.65	1.12	14.18	1.04	[0.17, 0.87]	[-0.04, 0.65]	25.2	3.42	22.8	9.04
PHQ-9	Pre	12.83	4.93	13.59	6	-0.92	-1.17	14.97	4.32	16.37	3.06	-0.99	-1.16	13.67	6.5	10.8	3.83
	Post	7.4	1.25	12.2	1.07	[-1.29, -0.56]	[-1.54, -0.8]	9.44	0.92	14.27	0.83	[-1.35, -0.62]	[-1.53, -0.79]	5.0	5.1	9	4.18
GAD-7	Pre	11.77	5.18	13.97	3.84	-1.11	-1.01	11.07	4.93	10.97	3.77	-0.7	-0.93	15.17	2.32	12.2	6.14
	Post	7.07	1.07	11.97	0.89	[-1.48, -0.74]	[-1.38, -0.65]	6.94	0.93	9.99	0.84	[-1.06, -0.35]	[-1.29, 0.56]	8.4	5.5	11.2	4.82
LSAS	Pre	66.7	25.73	75.41	32.53	-0.45	-0.32	57	23.24	67.3	23.82	-0.93	-0.47	25.0	23.63	45	19.29
	Post	59.14	5.7	70.41	5.34	[-0.8, -0.1]	[-0.66, 0.03]	46.72	4.66	68.02	4.3	[-1.3, -0.57]	[-0.82, -0.12]	26.8	33.01	49	13.17
PAS	Pre	22.9	12.67	24	10.7	-0.6	-0.8	12.59	11.1	14.07	9.16	-0.4	-0.37	24.33	11.11	9.2	10.64
	Post	12.65	2.55	19.66	2.26	[-0.95, -0.25]	[-1.15, -0.44]	8.78	2.06	12.5	1.9	[-0.74, -0.05]	[-0.71, -0.02]	11.75	6.8	14	8.72
SHAI	Pre	42.13	8.88	41.62	10.72	-0.24	-0.54	38.31	8.69	36.2	8.47	-0.25	-0.64	57.17	8.38	49.8	6.38
	Post	36.99	2.09	39.51	1.92	[-0.58, 0.11]	[-0.89, -0.19]	33.52	1.68	35.55	1.6	[-0.6, 0.1]	[-1, -0.29]	45.75	7.89	49	12.31
PHQ-15	Pre	12.5	5.35	14.21	5.21	-0.69	-0.82	11.21	5.74	12.83	5	-0.51	-0.41	14.0	5.97	10.6	3.29
	Post	8.34	1.22	11.99	1.05	[-1.05, -0.34]	[-1.17, -0.46]	8.96	1.02	11.87	1.08	[-0.86, -0.16]	[-0.75, -0.06]	8.75	4.99	11	4.95

Note. ES: Effect Size. BSI-18: Brief Symptom Inventory 18. PANAS NA: Negative Affect Subscale of the Positive and Negative Affect Schedule. PANAS PA: Positive Affect Subscale of the Positive and Negative Affect Schedule. SWLS: Satisfaction with Life Scale. PHQ-9: Patient Health Questionnaire 9. GAD-7: Generalized Anxiety Screener 7.

SAS: Liebowitz Social Anxiety Scale. PAS: Panic and Agoraphobia Scale. SHAI: Short Health Anxiety Inventory. PHQ-15: Patient Health Questionnaire 15. For the somatic symptom disorder subsample only observed means and standard deviations are reported because of small sample size

Response and Recovery Rates

The majority of participants ($n=29$; 69%) in the treatment group reliably improved, while $n=13$ (31%) showed no reliable change. Nobody deteriorated. If participants who did not complete post-treatment assessments were classified as non-responders, the ratio of responders and non-responders would shift to 55% non-responders and 45% responders. Approximately half of the participants ($n = 20$; 48%) reliably recovered (falling below the *Cutoff C* and depicting reliable change).

Satisfaction with and Negative Effects of Treatment

Overall, 84.62% were “mostly” or “very” satisfied with treatment. Mean satisfaction was 3.27 out of 4 ($SD = 0.62$). 79.49 % of participants in the treatment group reported at least one negative treatment effect. Participants reported on average 2.54 negative treatment effects ($SD=2.78$). “Unpleasant memories resurfaced” (38.46%) and “I experienced more unpleasant feelings” (38.46%) showed the highest frequency. Items associated with elevated symptoms (“symptom factor”) showed the highest mean ($M = 2.31$, $SD = 3.18$). Participants felt that the negative effects affected their well-being slightly to moderately ($M = 1.39$, $SD = 0.58$).

Diagnostic Status

We reached $n = 37$ (57.81%) of the treatment group for the post-treatment structured clinical interview. The mean number of total diagnoses dropped to 0.81 ($SD = 1.08$). The majority of participants did not fulfill criteria for their primary diagnosis ($n=26$; 70.27%). In regard to comorbidity, $n = 24$ (64.86%) did not fulfill criteria for comorbid diagnoses. The number of comorbid diagnoses at post-intervention ranged from 0 to 3. If participants who we did not reach for the post-treatment interview experienced no effect on their primary diagnosis, 59.3% of participants would be unchanged, while 40.6% of participants did not fulfill criteria of their primary diagnosis.

Discussion

299 This study investigated the effects of a guided Internet-based transdiagnostic
300 intervention based on the UP. Overall, the intervention yielded large reductions on symptom
301 distress and medium to large effects on negative and positive affect, as well as anxiety and
302 depression. Small effects were observed for satisfaction with life and health anxiety. The
303 majority of participants exhibited reliable change. These results are comparable both to
304 research on the UP's efficacy as a face-to-face and Internet-based intervention, as well as
305 other (transdiagnostic) Internet-based treatments [10,15–17,59]. The transdiagnostic
306 intervention's impact on comorbidity is of special interest. The mean number of diagnoses in
307 the fairly comorbid sample (78% comorbidity) dropped from almost 3 (range 1-8) to under 1
308 (range 0-3) which is very comparable to other face-to-face trials on the UP [15,60].

309 Our findings substantiate Tulbure and colleagues' (2018) findings on the efficacy of
310 the UP when applied online. Both interventions were highly similar in length and content and
311 produced comparable results. The degree of comorbidity, prior psychotherapy, and current
312 medication was higher in our sample compared to the other Internet-based UP [17]. This
313 suggests that an Internet-delivered UP can be expanded to a comorbid and impaired
314 population. Subgroup analyses also revealed that the intervention in our study produced
315 similar effects in participants with primary anxiety or depression. While preliminary, these
316 results are encouraging of the UP's potential to treat depression.

317 Beyond symptom improvements, other indicators are important determining factors
318 for the uptake of interventions. About 75% of participants completed the core modules of
319 treatment. While this adherence rate is not unusual in Internet-based settings [61], higher
320 adherence may have benefitted outcomes, especially considering that less than half of
321 participants completed all modules [10]. Usage data suggested that participants who chose to
322 work with the program engaged with it actively. The majority of participants was mostly
323 satisfied to very satisfied with the program but also reported experiencing negative effects.
324 That approximately 80% of participants report negative effects is higher than reports from

other trials (56-65%) [48]. Negative effects are not synonymous to unwanted effects necessarily – that participants experience more negative emotions short-term can even be an intended effect in a program focused on reducing avoidance and experiencing emotions.

Our results need to be interpreted in the light of several limitations: The trial suffered from an attrition rate of 35% of participants who did not provide post-treatment data. High attrition rates like this are not uncommon in Internet-based treatments [62] but they can limit the validity and reliability of findings and could be indicative of limited acceptability of the intervention. Subgroup analyses of the anxiety and depression subsamples revealed that not all symptom measures showed significant effects, likely due to small sample sizes and limited statistical power related to dropout. We failed to recruit a sufficient sample of participants with somatic symptom disorders within the study's timeframe. Recruitment via primary health care providers might be a more fruitful recruitment strategy for this population [e.g., 63]. The self-selection of participants and the predominantly female, highly educated, and psychotherapy-experienced sample does not allow for a generalization of results.

Overall, these results strengthen the evidence base of the UP as a viable treatment option beyond anxiety disorders and demonstrate that the UP can successfully be delivered over the Internet over the course of ten weeks. Applying a transdiagnostic intervention online can help to overcome barriers to treatments and accelerate the dissemination of evidence-based treatments for a broad variety of the most common disorders. However, dropout and attrition rates suggest that several modifications should be made to the intervention before employing it, e.g. by further simplifying it, delivering it modularly [64,65], or implementing monitoring to detect participants at risk of treatment failure [66]. While a waitlist control group is a necessary first step to establish efficacy, the intervention should next be measured against an active control condition, e.g. against disorders-specific treatments. The UP aims at changing transdiagnostic processes – shedding light on whether changes in those processes

350 are relevant for symptom change is an important next research endeavor to further our
351 understanding beyond the treatment's efficacy.

352

Data Availability Statement

De-identified data that support the findings of this study are available on OSF at 10.17605/OSF.IO/7AW3V.

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