

## Running Head: ADHERENCE IN CBT FOR BED

Therapist Adherence in Individual Cognitive-Behavioral Therapy for Binge-Eating  
Disorder: Assessment, Course, and Predictors

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## Abstract

While cognitive-behavioral therapy (CBT) is the most well-established treatment for binge-eating disorder (BED), little is known about process factors influencing its outcome. The present study sought to explore the assessment of therapist adherence, its course over treatment, and its associations with patient and therapist characteristics, and the therapeutic alliance.

In a prospective multicenter randomized-controlled trial comparing CBT to internet-based guided self-help (INTERBED-study), therapist adherence using the newly developed Adherence Control Form (ACF) was determined by trained raters in randomly selected 418 audio-taped CBT sessions of 89 patients (25% of all sessions). Observer-rated therapeutic alliance, interview-based and self-reported patient and therapist characteristics were assessed. Three-level multilevel modeling was applied.

The ACF showed adequate psychometric properties. Therapist adherence was excellent. While significant between-therapist variability in therapist adherence was found, within-therapist variability was non-significant. Patient and therapist characteristics did not predict the therapist adherence. The therapist adherence positively predicted the therapeutic alliance.

The ACF demonstrated its utility to assess therapist adherence in CBT for BED. The excellent levels of therapist adherence point to the internal validity of the CBT within the INTERBED-study serving as a prerequisite for empirical comparisons between treatments. Variability between therapists should be addressed in therapist trainings and dissemination trials.

*Key words:* binge-eating disorder, cognitive-behavioral therapy, therapist adherence, therapeutic alliance, patient characteristics, therapist characteristics

Extensive investigations led to the inclusion of binge-eating disorder (BED) in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; American Psychiatric Association [APA], 2013). While meta-analytical reviews and treatment guidelines identified cognitive-behavioral therapy (CBT) as being the most efficacious treatment for BED (APA, 2006; Hay, Bacaltchuk, Stefano, & Kashyap, 2009; Herpertz et al., 2011; Vocks et al., 2010), therapist adherence has not yet been systematically investigated in the treatment of BED. Defined as the extent to which an intervention is delivered by a therapist as outlined in the treatment manual or model (Waltz, Addis, Koerner, & Jacobson, 1993), therapist adherence is essential to establish experimental validity in randomized-controlled trials (RCTs).

Therapist adherence constitutes a major component of treatment integrity (Moncher & Prinz, 1991; Waltz et al., 1993; Webb, DeRubeis, & Barber, 2010) and is assumed to be a *(theory-)specific or technical factor* facilitating symptom changes within treatments (Castonguay & Holtforth, 2005; Loeb et al., 2005). The manipulation check (i.e., proof of experimental validity) is of essential value within psychotherapy research (Perepletchikova & Kazdin, 2005; Waltz et al., 1993). Only after demonstrating sufficient treatment integrity, one can conclude that treatment effects are attributable to the treatment itself and not to confounding other factors, thus, indicating the treatment's internal experimental validity (e.g., Moncher & Prinz, 1991). Furthermore, treatment integrity checks are necessary to establish external validity as a second aspect of experimental validity assuring potential replications of the treatment and its effects as well as its transfer to various settings and patient samples.

Overall, most clinical research on treatments of mental disorders including BED focused on establishing efficacy, while information on treatment integrity is sparse (Perepletchikova, Treat, & Kazdin, 2007). Across various mental disorders and treatments, therapist adherence-outcome associations can be described as inconsistent at best; Webb et al. (2010) reported a heterogeneous “close to zero”-effect in their meta-analysis. However,

interpretations are limited because of substantial methodological variability in the assessment of therapist adherence, varying intervals between therapist adherence and outcome ratings and assumptions of linear therapist adherence-outcome associations, although nonlinear associations were reported in the literature (Barber et al., 2006; Huppert et al., 2006). In contrast to therapist adherence, the *common or relational factor* (Castonguay & Holtforth, 2005; Loeb et al., 2005) of therapeutic alliance defined as the therapist's and patient's collaborative and affective bond (Bordin, 1979) consistently predicted outcome (e.g., Horvath, Del Re, Flückiger, & Symonds, 2011). Overall, therapeutic alliance and therapist adherence have been shown to be positively associated (Loeb et al., 2005) and the therapist adherence moderated the therapeutic alliance-outcome relationship (Barber et al., 2006).

Besides the therapist adherence-therapeutic alliance associations, few studies focused on potential factors influencing the therapist adherence (Perepletchikova & Kazdin, 2005). Recently, patient characteristics (e. g., interpersonal problems, motivation) were found to predict therapist adherence in CBT for panic disorder (Boswell et al., 2013) and motivational enhancement therapy for substance misuse (Imel, Baer, Martino, Ball, & Carroll, 2011). Regarding therapist characteristics, only one study treating patients with anxiety disorders in a primary care setting related therapist experience to therapist adherence, however, documenting insignificant associations (Brown et al., 2013). Investigations on patient and therapist characteristics influencing therapist adherence in BED are lacking.

This study sought to investigate therapist adherence of CBT for BED in a prospective multicenter randomized-controlled trial (INTERBED-study; de Zwaan et al., 20112) comparing individual CBT to internet-based guided self-help (GSH-I). The first aim was to evaluate the psychometric properties of a measure created for the assessment of therapist adherence of CBT for BED, the Adherence Control Form (ACF). Based on our assumption of adequate reliability and validity of the ACF, this study's second aim was to investigate

variability in therapist adherence between and within therapists when treating more than one patient in CBT for BED as previous studies pointed to a substantial between- and within-therapist variability (Boswell et al., 2013; Imel et al., 2011). This variability in therapist adherence could, for example, influence dissemination efforts after establishing treatment efficacy in RCTs (McHugh & Barlow, 2012). The third aim was to examine the impact of patient and therapist characteristics on therapist adherence. Fourth, the impact of therapist adherence on therapeutic alliance within CBT for BED was analyzed as associations of therapist adherence and therapeutic alliance were previously reported for mental disorders including eating disorders other than BED (e.g., Loeb et al., 2005).

## METHOD

### PATIENTS

The INTERBED-study was conducted at seven eating disorder outpatient clinics (Germany:  $N = 6$ , Switzerland:  $N = 1$ ) and was approved by all local ethic committees. Patients recruited via local media advertisements between August 2010 and January 2013 were included. Patients had to meet several inclusion criteria: diagnostic criteria for BED according to DSM-IV-TR or subsyndromal BED, age 18 years or older, body mass index between 27 and 40 kg/m<sup>2</sup>, written informed consent of the patient, and availability of internet access. Exclusion criteria were current bulimia nervosa, substance abuse, suicidal ideation, psychotic disorder, bipolar disorder, serious unstable medical problems or conditions that influence weight or eating, ongoing psychotherapy, current intake of antipsychotic or weight-affecting drugs, and pregnancy or lactation. A detailed methodological description of the INTERBED-study can be found in de Zwaan et al. (2012).

The subsample of patients randomized to CBT consisted of  $N = 89$  patients ( $N = 77$  female, 86.5%). Patients had a mean age of 43.14 years ( $SD = 11.81$ ), a mean BMI of 34.37  $\text{kg/m}^2$  ( $SD = 3.88$ ), and  $N = 43$  (48.3%) reported having less than twelve years of education.

The diagnosis of BED and global eating disorder psychopathology were assessed using the *Eating Disorder Examination Interview* (EDE; Fairburn & Cooper, 1993; Hilbert, Tuschen-Caffier, & Ohms, 2004) at baseline (T0), mid-treatment (T1), end of treatment (T2), 6 months-follow-up (T3), and 1.5 year-follow-up (T4). Currently, the 1.5 year-follow-up is being conducted until the end of 2013. The EDE as a semi-structured clinical expert interview has established reliability and validity.

## THERAPISTS

Patients receiving CBT were treated by  $N = 25$  therapists ( $N = 21$  female, 84.0%). All therapists received repeated trainings on the CBT manual throughout the trial (Hilbert & Tuschen-Caffier, 2010). The training sessions lasted between one and three days. Mean age of the therapists was 31.84 years ( $SD = 5.83$ ). Regarding their professional backgrounds,  $N = 21$  (87.0%) were psychologists and  $N = 4$  (13.0%) physicians, most having a background in CBT (psychologists: 100.0%; physicians: 75.0%). The average professional experience encompassed 5.08 years ( $SD = 4.85$ ). Eight therapists were licensed therapists (32.0%),  $N = 13$  (52.0%) were currently enrolled in postgraduate CBT training, and  $N = 4$  (16.0%) were prior to postgraduate CBT training. The average number of previously treated eating disorder patients was 44.04 ( $SD = 107.04$ ; outpatient settings:  $M = 8.93$ ,  $SD = 12.3$ ; day-clinic settings:  $M = 7.28$ ,  $SD = 25.32$ ; inpatient settings:  $M = 26.16$ ,  $SD = 77.31$ ). Therapists received regular on-site supervision, detailed feedback from the therapist adherence ratings via email by AB, and were encouraged to contact the manuals' first author (AH) in case of additional questions.

## TREATMENT

Patients in the CBT condition were offered 20 sessions over four months (with a maximum of six additional weeks; see de Zwaan et al., 2012). Individual CBT was based on the evidence-supported German manual “Binge Eating and Obesity: Cognitive-Behavioral Therapy Manual for Binge Eating Disorder” (Hilbert & Tuschen-Caffier, 2004; Hilbert & Tuschen-Caffier, 2010). The treatment consisted of three phases: (1) initial treatment phase focusing on motivational enhancement (sessions 1-3), (2) intensive treatment phase including modules on eating behavior (sessions 4-8), body image (sessions 9-14), and stress (sessions 15-18), and (3) self-management phase focusing on relapse prevention (sessions 19-20). Modules were selected by the therapist according to symptoms and resources of the patient. Sessions lasted 50 min each; double sessions of 100 min were possible for motivational enhancement, cue exposure to binge food and body image. The session frequency was twice weekly in month 1 and once weekly in months 2 to 4.

## ASSESSMENT

*Therapist variables.* The *Adherence Control Form* (ACF; Brauhardt & Hilbert, unpublished) was developed to assess therapist adherence to the CBT manual. Items were based on the content of the manual (Hilbert & Tuschen-Caffier, 2010) and previously published adherence measures (e. g., Barber, Liese, & Abrams, 2003; McIntosh et al., 2005). The resulting ten items (appropriate organizational setting, focusing on rationale, motivation enhancement, communication techniques, identification of module(s), review of homework, homework assignments, therapist role, balanced proportion of speech, and overall adherence) are rated on a 3-point Likert-scale (0 = *not at all adherent*, 1 = *at least partly adherent*, and 2 = *adherent*) and aggregated to a mean score for each individually rated session with higher scores indicating higher therapist adherence. Based on the mean score, three categories were



defined:  $< 1.00 = \textit{inadequate}$ ,  $1.00 \text{ to } 1.50 = \textit{adequate}$ , and  $> 1.50 = \textit{excellent therapist adherence}$  (based on recommendations by Perepletchikova & Kazdin, 2005). Detailed rater guidelines were developed in order to enhance interrater reliability. As a second general measure of therapist adherence, the *Comparative Psychotherapy Process Scale* (CPPS, Hilsenroth, Blagys, Ackerman, Bonge, & Blais, 2005) was used. The CPPS allows the assessment of two mean scores for distinctive features of cognitive-behavioral (CB) and psychodynamic-interpersonal treatments (PI). The instrument consists of 20 items to be rated on a 7-point Likert-scale (0 = *not at all* to 6 = *extremely characteristic*). Reliability and validity were previously reported. Therapeutic alliance was assessed using the *Working Alliance Inventory* (shortened observer-rated version, WAI-O-S; Andrusyna, Tang, DeRubeis, & Luborsky, 2001). The 12-item instrument is rated on a 7-point Likert-scale (1 = *never* to 7 = *always*). Three subscale sum scores (goal, task, and bond; see Bordin, 1979) and a global sum score are calculated. Previous research demonstrated the instrument's high reliability and validity. The CPPS and the WAI-O-S were translated into German, controlled by a back-translation procedure through a licensed translator.

Measures of therapist adherence and therapeutic alliance were rated based on audio-taped sessions. The main rater (AB) was a doctoral candidate in clinical psychology enrolled in postgraduate CBT training; two other raters had a B.Sc. in Clinical Psychology. For the selection of audiotapes, the treatments were divided into five blocks (block 1: sessions 1-4, block 2: sessions 5-8, block 3: sessions 9-12, block 4: sessions 13-16, and block 5: sessions 17-20). For each patient-therapist dyad, one session of each block was randomly selected leading to a total of  $N = 418$  sessions (25% of all treatment sessions). If a selected session was missing, an adjacent session was rated. Due to  $N = 2$  patients (2.2%) who dropped out immediately after randomization before CBT started, therapist adherence was rated in  $N = 87$  out of 89 dyads. A random subsample of sessions ( $N = 50$ , 12.0%) was rated by two raters to evaluate interrater

reliability. Further, in another random subsample of  $N = 80$  (19.1%) sessions were rated on the ACF and the CPPS subscales to evaluate convergent and divergent validity.

In addition, therapists were asked to complete self-report forms on work-related variables including level of therapist training and years of professional experience.

*Patient variables.* In addition to expert interviews assessing eating disorder symptoms (days with binge eating episodes in the last 28 days), pretreatment predictor variables included (1) sociodemographic variables (age, sex, education), (2) general psychopathology assessed through the sum score of the 21-item *Beck Depression Inventory* (BDI-II; Beck, Steer, & Brown, 1996; Hautzinger, Keller, & Kuehner, 2006), and (3) treatment-related expectations, suitability, and motivation (0 = *not at all* to 10 = *absolutely*; mean score across three items). For the BDI-II, reliability and validity were elsewhere demonstrated, while the form assessing treatment-related variables was constructed for the study.

## STATISTICAL ANALYSES

Regarding psychometric properties of the ACF as our first research aim, Pearson's  $r$  was calculated for corrected item-total-correlations and average inter-item correlation. Cronbach's  $\alpha$  was used as measure of internal consistency. Interrater reliability between two raters was determined with the intraclass correlation coefficient (ICC; Shrout & Fleiss, 1979) and  $ICC \geq .75$  were considered high,  $ICC < .75$  as moderate to poor, and  $ICC < .50$  as unsatisfactory (Portney & Watkins, 2013). Due of the non-normal distribution of the ACF score, Spearman correlation coefficients between the ACF score and CPPS subscales were calculated to determine convergent and discriminant validity.

Multilevel modeling (MLM) was used to examine between- and within-therapist variability of therapist adherence as well as of therapeutic alliance in a nested data set. Nesting included three levels with repeated measurements of therapist adherence (level 1) nested within

patients (level 2), and patients nested within therapists (level 3). To investigate this study's second aim (Model 1), variability between patients treated by the same therapist was accounted for at level 2 (i.e., within-therapist variability, Raudenbush & Bryk, 2002). Therapists had to be excluded if they treated only one patient, resulting in a sample of  $n = 21$  therapists and  $n = 82$  patients. Variability between therapists was accounted for at level 3 (i.e., between-therapist variability). To examine multilevel variability and generalizability, patient and therapist were treated as random effects. To investigate this study's third aim (Model 2), baseline patient and therapist characteristics were included as fixed effects at levels 2 and 3 (as characteristics did not vary over treatment) in a predictor model of therapist adherence. Because of a significant correlation between therapist experience and level of therapist training ( $r = -0.38, p < 0.001$ ), only experience as a continuous variable with greater variability was included in the MLM. Fourth (Model 3), therapist adherence was entered as a fixed effect in a predictor-model of therapeutic alliance. For all models, restricted maximum likelihood estimation was applied and ICCs were computed from the resulting variance components as percentage estimates of variance in the therapist adherence accounted for at each level (Tabachnick & Fidell, 2007).

Significance levels for all analyses were set at a two-tailed  $\alpha < 0.05$ . Effect sizes were interpreted as small ( $0.1 \leq r < 0.3$ ), medium ( $0.3 \leq r < 0.5$ ), or large ( $r \geq 0.5$ ) according to Cohen (1988). Statistical analyses were performed using IBM SPSS Statistics 20.0.

## RESULTS

### EVALUATION OF PSYCHOMETRIC PROPERTIES

For the ACF, corrected item-total correlations ranged from medium to high ( $0.33 \leq r_{it} \leq 0.81$ ), except for the item on therapist role ( $r_{it} = 0.22$ ). Item homogeneity was supported by a mean inter-item correlation of  $r = 0.33$ . Internal consistency was good (Cronbach's  $\alpha = 0.80$ ) and interrater reliability for the ACF score was high (ICC = 0.81,  $p < 0.001$ ).

As a measure of convergent validity, the ACF score and the CB subscale of the CPPS were significantly correlated ( $r_{CB\_ACF} = 0.48, p < 0.001$ ; medium effect). In contrast, as an estimate of discriminant validity, a non-significant correlation between the ACF score and the PI subscale of the CPPS emerged ( $r_{PI\_ACF} = 0.14, p = 0.22$ ).

#### VARIABILITY OF THERAPIST ADHERENCE

Overall, high levels of therapist adherence were found ( $M = 1.69, SD = 0.28$ ). About three quarters of the CBT sessions ( $N = 312, 74.6\%$ ) fulfilled the criteria of excellent therapist adherence (ACF score  $> 1.50$ ). In contrast, only 2.6% ( $N = 11$ ) of all rated CBT sessions had to be classified as containing inadequate levels of therapist adherence (ACF score  $< 1.00$ ).

Indices for fixed and random effects in the null-model of therapist adherence (Model 1) are provided in Table 1. The random between-therapist variance component (level 3) was significantly different from zero ( $p < 0.01$ ), while the random within-variance component (level 2) did not significantly differ from zero ( $p = 0.83$ ). The resulting ICC indicated that there was significant variability between therapists. In contrast, therapist adherence did not vary within therapists.

#### PREDICTORS OF THERAPIST ADHERENCE

After accounting for session number, patient and therapist characteristics as fixed effects in Model 2, the between-therapist variance component remained significantly different from zero, but the ICC was reduced from 0.28 to 0.24 (see Table 2). There were no significant main effects of session number, patient and therapist characteristics (all  $p > 0.05$ ). Thus, therapist adherence did not vary over the course of treatment. Further, therapist adherence was not predicted by patients' symptom severity (i.e., number of objective binge eating episodes over the previous three months), global eating disorder psychopathology (EDE global score),

general psychopathology (BDI-II), treatment expectations or the duration of therapists' professional experience.

#### THERAPIST ADHERENCE PREDICTING THERAPEUTIC ALLIANCE

The ACF score aggregated across all available sessions for each patient-therapist-dyad showed significant correlations with the WAI-O-S subscales and global score aggregated across sessions ( $r_{\text{Task\_ACF}} = .47$ ,  $r_{\text{Bond\_ACF}} = .35$ ,  $r_{\text{Goal\_ACF}} = .35$ , and  $r_{\text{Global\_ACF}} = .37$ , all  $p < .001$ ; medium effects).

After accounting for therapist adherence as a fixed effect in Model 3, the random within-therapist variance component ( $p = 0.53$ ) and the between-therapist variance component of the therapeutic alliance ( $p = 0.12$ ) did not significantly differ from zero (see Table 3). A main effect of therapist adherence was observed, indicating that greater therapist adherence was associated with higher therapeutic alliance.

#### DISCUSSION

This study sought to provide a comprehensive examination of therapist adherence as a putative process factor in CBT for BED within a multicenter RCT comparing CBT to GSH-I. Overall, the ACF as an instrument assessing therapist adherence indicated adequate psychometric properties regarding item characteristics, reliability, and validity. Based on a large number of ratings of audio-taped treatment sessions, excellent levels of therapist adherence to the CBT protocol for BED point to the internal validity of the CBT condition in the INTERBED-study. Nonetheless, significant variability between, but not within therapists was observed. Therapist adherence was not predicted by patient and therapist characteristics. Therapist adherence and therapeutic alliance were found to be moderately associated and, furthermore, therapist adherence predicted the variability in therapeutic alliance.

The psychometric evaluation of the ACF demonstrated good internal consistency and high interrater reliability for the ACF score replicating findings across mental disorders including eating disorders (McIntosh et al., 2005; Weck, Bohn, Ginzburg, & Stangier, 2011). To achieve high reliability, authors consistently recommended raters with adequate clinical experience with the interventions used in the treatment (Barber, Triffleman, & Marmar, 2007; Weck, Hilling, Schermelleh-Engel, Rudari, & Stangier, 2011). Evidence for the convergent and discriminant validity of the ACF was provided by its association with therapist adherence to general CBT elements and its lack of association with psychodynamic-interpersonal elements assessed with the established CPPS (Hilsenroth et al., 2005). This also provides evidence for an adequate treatment differentiation of CBT from other treatment methods (Perepletchikova & Kazdin, 2005). Therefore, the ACF meets the proposed recommendations by Fairburn and Cooper (2011) to adequately assess therapist adherence. Instruments utilized in RCTs as well as in clinical practice should be based on general and specific treatment elements, be reliable and valid, and should follow an implementation protocol. Based on these guidelines, investigations of therapist adherence could facilitate the identification of key elements for successful treatments (Dobson & Singer, 2005; Webb et al., 2010).

Overall, excellent levels of therapist adherence were observed across sessions in this study. However, in accordance with our hypothesis, the average level of therapist adherence was found to significantly vary between therapists. This replicates previous findings of therapist adherence to CBT for eating disorders (Loeb et al., 2005) and panic disorder (Boswell et al., 2013), and motivation enhancement therapy and psychodynamic psychotherapy for substance misuse (Barber et al., 2006; Imel et al., 2011). The between-therapist variability implied that even regular on-site supervision, detailed email feedback on therapists' individual therapist adherence, and additional contacts with the study Co-PI were insufficient to eliminate all differences in therapist adherence between therapists (Barber et al., 2007). Additional cross-

site supervision might have decreased between-therapist variability, but was not realized for economic reasons. Consistent with partial findings from Imel et al. (2011), but in contrast to our hypothesis and Boswell et al.'s (2013) results, variability within therapists' case loads was not observed.

Most of the variability in therapist adherence was accounted for at the session level indicating substantial situational influences. However, therapist adherence did not significantly increase or decrease over the course of treatment pointing to a pronounced stability (Perepletchikova & Kazdin, 2005). This replicates previous findings from Imel et al. (2011), but contrasts decreasing levels of therapist adherence to CBT for panic disorder from Boswell et al. (2013). Therapist adherence was also not predicted by clinical or treatment-related patient characteristics including binge eating frequency, eating disorder and general psychopathology, and treatment expectations. In contrast, symptom severity, motivation, and interpersonal problems accounted for within-therapist variability of therapist adherence in previous research (Boswell et al., 2013; Imel et al., 2011). While these studies used baseline and repeated assessments, we focused on baseline characteristics only. Alongside the investigation of patient characteristics, therapist experience did also not predict therapist adherence, corresponding with previous findings (Brown et al., 2013). However, lower therapist adherence to CBT for eating disorders in clinical practice assessed via self-report was associated with greater therapist experience and increased therapist anxiety (Waller, Stringer, & Meyer, 2012). Overall, more research on the impact of patient and therapist characteristics on therapist adherence is warranted.

Aggregated scores of therapist adherence and therapeutic alliance were moderately but significantly associated and greater therapist adherence also predicted greater therapeutic alliance in a multilevel model. Both findings corroborate with previous research findings (Barber et al., 2008; Loeb et al., 2005). Therefore, in contrast to many clinicians' concerns

(e.g., Addis, Wade, & Hatgis, 1999; Loeb et al., 2005; Kazdin, 2008), therapist adherence to a treatment manual did not compromise the therapeutic alliance. As therapist adherence moderated the therapeutic alliance-outcome relationship (Barber et al., 2006), further research of indirect effects of therapist adherence on CBT outcome for BED is warranted.

Interpretations of the present findings should be based on strengths and limitations of the study. Strengths include the large number of CBT sessions rated by external raters compared to previous RCTs in BN or anorexia nervosa (Loeb et al., 2005; McIntosh et al., 2005). In addition, ACF scores were based on ratings of complete sessions, as lower reliability was demonstrated for ratings of session segments (Weck et al., 2011b). Furthermore, multiple sources of variance were accounted for using a MLM approach (Boswell et al., 2013; Raudenbush & Bryk, 2002). Limitations include that reliability was assessed only across few raters, possibly fostering memory effects for therapists treating more than one patient, hence, affecting subsequent ratings. In addition, raters' individual differences could account for lower reliability (Weck et al., 2011a), so that inclusion of more raters would be desirable. Also important to note, therapist adherence-outcome associations could not be investigated as the INTERBED-study follow-up was only recently completed.

As outlined above, further research on patient and therapist characteristics affecting therapist adherence and the investigation of moderating effects of therapist adherence on the therapeutic alliance-outcome relationship is warranted. In addition, recent research focused on therapist competence as a second major component of treatment integrity rather than therapist adherence as a predictor of outcome (Moncher & Prinz, 1991; Perepletchikova & Kazdin, 2005). Therapist competence refers to the therapist's skillfulness in implementing certain interventions with therapist adherence serving as a prerequisite (e.g., Waltz et al., 1993). However, findings from a previous meta-analysis (Webb et al., 2010) and current investigations can be summarized inconsistent. While Brown et al. (2013) found higher



therapist competence to be associated with improved outcome for anxiety disorders, therapist competence did not predict outcome for panic disorder (Boswell et al., 2013). As concurrent investigations of therapist adherence, therapist competence, and outcome in BED were not yet available, further research is needed.

Regarding clinical implications to establish better therapist adherence and to reduce therapist variability in future RCTs and clinical practice, prolonged, additional or more intense therapist training (Boswell et al., 2013) should be established to achieve high standards of treatment delivery (Fairburn & Cooper, 2011). Especially in the dissemination of evidence-based treatments to clinical settings (Fairburn & Wilson, 2013; Kazdin, 2008), additional therapist training is recommended as overall lower levels of therapist adherence have been observed in this context for mental disorders including eating disorders (i.e., therapist drift; Becker, Zayfert, & Anderson, 2004; Waller et al., 2012). Nonetheless, the same amount of therapist training could still result in differences in the implementation of interventions between therapists. Therefore, ongoing supervision with a clinical expert supervisor is strongly recommended (Boswell et al., 2013; Fairburn & Cooper, 2011). Last, the discussion of interventions with professional peers (i.e., supervision without a supervisor) could also help to achieve higher coherence between therapists and, thus, greater treatment integrity.

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## REFERENCES

- Addis, M. E., Wade, W. A., & Hatgis, C. (1999). Barriers to dissemination of evidence-based practices: Addressing practitioners' concerns about manual-based psychotherapies. *Clinical Psychology: Science and Practice, 6*, 430-441.
- American Psychiatric Association [APA] (2013). *Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5)*. Washington, DC: APA.
- American Psychiatric Association [APA] (2006). *Practice Guideline for the treatment of patients with eating disorders (3rd ed.)*. Washington, DC: APA.
- Andrusyna, T. P., Tang, T. Z., DeRubeis, R. J., & Luborsky, L. (2001). The factor structure of the Working Alliance Inventory in cognitive-behavioral therapy. *Journal of Psychotherapy Practice & Research, 10*(3), 173-178.
- Barber, J. P., Gallop, R., Crits-Christoph, P., Barrett, M. S., Klostermann, S., McCarthy, K. S., & Sharpless, B. A. (2008). The role of the alliance and techniques in predicting outcome of supportive-expressive dynamic therapy for cocaine dependence. *Psychoanalytic Psychology, 25*, 461-482.
- Barber, J. P., Gallop, R., Crits-Christoph, P., Frank, A., Thase, M. E., Weiss, R. D., & Gibbons, M. B. (2006). The role of therapist adherence, therapist competence, and the alliance in predicting outcome of individual drug counseling: Results from the NIDA Collaborative Cocaine Treatment Study. *Psychotherapy Research, 6*, 229-240.
- Barber, J. P., Liese, B. S., & Abrams, M. J. (2003). Development of the Cognitive Therapy Adherence and Competence scale. *Psychotherapy Research, 13*(2), 205-221.
- Barber, J. P., Triffleman, E., & Marmar, C. (2007). Considerations in treatment integrity: Implications and recommendations for PTSD research. *Journal of Traumatic Stress, 20*(5), 793-805.

Beck, A. T., Steer, R. A., & Brown, G. K. (1996). *Beck Depression-Inventory-II (BDI-II)*.

San Antonio: Harcourt Test Services.

Becker, C. B., Zayfert, C., & Anderson, E. (2004). A survey of psychologists' attitudes towards and utilization of exposure therapy for PTSD. *Behaviour Research and Therapy, 42*(3), 277-292.

Bordin, E. S. (1979). The generalizability of the psychoanalytic concept of the working alliance. *Psychotherapy: Theory, Research & Practice, 16*(3), 252-260.

Boswell, J. F., Gallagher, M. W., Sauer-Zavala, S. E., Bullis, J., Gorman, J. M., Shear, M. K., . . . Barlow, D. H. (2013). Patient characteristics and variability in adherence and competence in cognitive-behavioral therapy for panic disorder. *Journal of Consulting and Clinical Psychology, 81*(3), 443-454.

Brown, L. A., Craske, M. G., Glenn, D. E., Stein, M. B., Sullivan, G., Sherbourne, C., . . . Rose, R. D. (2013). CBT competence in novice therapists improves anxiety outcomes. *Depression and Anxiety, 30*(2), 97-115.

Castonguay, L. G., & Holtforth, M. G. (2005). Change in psychotherapy: A plea for no more "nonspecific" and false dichotomy. *Clinical Psychology: Science and Practice, 12*, 198-201.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2. ed.). Hillsdale NJ: Erlbaum.

de Zwaan, M., Herpertz, S., Zipfel, S., Tuschen-Caffier, B., Friederich, H. C., Schmidt, F., . . . Hilbert, A. (2012). INTERBED: internet-based guided self-help for overweight and obese patients with full or subsyndromal binge eating disorder. A multicenter randomized controlled trial. *Trials, 13*, 220.

Dobson, K. S., & Singer, A. R. (2005). Definitional and practical issues in the assessment of treatment integrity. *Clinical Psychology: Science and Practice, 12*(4), 384-387.

- Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorder Examination (12th edition). In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment*. (pp. 317-360). New York, NY US: Guilford Press.
- Fairburn, C. G., & Cooper, Z. (2011). Therapist competence, therapy quality, and therapist training. *Behaviour Research and Therapy*, 49(6-7), 373-378.
- Fairburn, C. G., & Wilson, G. T. (2013). The dissemination and implementation of psychological treatments: Problems and solutions. *International Journal of Eating Disorders*, 46(5), 516-521.
- Hautzinger, M., Keller, F., & Kuehner, C. (2006). *Beck Depressions-Inventar: Revision (BDI-II)* [Beck Depression Inventory] (2nd ed.). Frankfurt: Pearson.
- Hay, P. J., Bacaltchuk, J., Stefano, S., & Kashyap, P. (2009). *Psychological treatments for bulimia nervosa and bingeing*. The Cochrane Library.
- Herpertz S, Herpertz-Dahlmann B, Fichter M, Tuschen-Caffier B, Zeeck A. S3-Leitlinie Diagnostik und Behandlung der Essstörungen [Guidelines for diagnostics and treatments of eating disorders]. Heidelberg: Springer; 2011.
- Hilbert, A., & Tuschen-Caffier, B. (2004). Body image interventions in cognitive-behavioural therapy of binge-eating disorder: A component analysis. *Behaviour Research and Therapy*, 42(11), 1325-1339.
- Hilbert, A., & Tuschen-Caffier, B. (2010). Essanfalle und Adipostas: Ein Manual zur kognitiv-behavioralen Therapie der Binge-Eating-Storung [Binge Eating and Obesity: Cognitive-Behavioral Therapy Manual for Binge Eating Disorder]. Goettingen: Hogrefe.
- Hilbert, A., Tuschen-Caffier, B., & Ohms, M. (2004). Eating Disorder Examination: Deutschsprachige Version des strukturierten Essstorungsinterviews [Eating Disorders

Examination: A German version of the Structured Eating Disorder Interviews].

*Diagnostica*, 50(2), 98-106.

Hilsenroth, M. J., Blagys, M. D., Ackerman, S. J., Bonge, D. R., & Blais, M. A. (2005).

Measuring psychodynamic-interpersonal and cognitive-behavioral techniques:

Development of the Comparative Psychotherapy Process Scale. *Psychotherapy:*

*Theory, Research, Practice, Training*, 42(3), 340-356.

Horvath, A., Del Re, A. C., Flückiger, C., & Symonds, D. (2011). Alliance in individual

psychotherapy. In J. C. Norcorss (Ed.), *Psychotherapy relationships that work* (2nd

ed., pp. 25-69). New York: Oxford University Press.

Imel, Z. E., Baer, J. S., Martino, S., Ball, S. A., & Carroll, K. M. (2011). Mutual influence in

therapist competence and adherence to motivational enhancement therapy. *Drug &*

*Alcohol Dependence*, 115(3), 229-236.

Kazdin, A. E. (2008). Evidence-based treatment and practice: New opportunities to bridge

clinical research and practice, enhance knowledge, and improve patient care. *American*

*psychologist*, 63(3), 146-159.

Loeb, K. L., Wilson, G. T., Labouvie, E., Pratt, E. M., Hayaki, J., Walsh, B. T., . . . Fairburn,

C. G. (2005). Therapeutic alliance and treatment adherence in two interventions for

bulimia nervosa: A study of process and outcome. *Journal of Consulting and Clinical*

*Psychology*, 73(6), 1097-1107.

McHugh, R. K., & Barlow, D. H. (2012). *Dissemination and implementation of evidence-*

*based psychological interventions*. New York, NY: Oxford University Press.

McIntosh, V. V. W., Jordan, J., McKenzie, J. M., Luty, S. E., Carter, F. A., Carter, J. D., . . .

Joyce, P. R. (2005). Measuring therapist adherence in psychotherapy for anorexia

nervosa: Scale adaptation, psychometric properties, and distinguishing

psychotherapies. *Psychotherapy Research*, 15(3), 339-344.

- Moncher, F. M., & Prinz, R. J. (1991). Treatment fidelity in outcome studies. *Clinical Psychology Review, 11*, 247-266.
- Perepletchikova, F., & Kazdin, A. E. (2005). Treatment integrity and therapeutic change: Issues and research recommendations. *Clinical Psychology: Science and Practice, 12*(4), 365-383.
- Perepletchikova, F., Treat, T. A., & Kazdin, A. E. (2007). Treatment integrity in psychotherapy research: Analysis of the studies and examination of the associated factors. *Journal of Consulting and Clinical Psychology, 75*(6), 829-841.
- Portney, L. G., & Watkins, M. P. (2013). *Foundations of Clinical Research: Pearson New International Edition: Applications to Practice*. Upper Saddle River: Pearson.
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2<sup>nd</sup> ed.). Thousand Oaks, CA: Sage.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin, 86*(2), 420-428.
- Tabachnik, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). New York, NY: Pearson.
- Vocks, S., Tuschen-Caffier, B., Pietrowsky, R., Rustenbach, S. J., Kersting, A., & Herpertz, S. (2010). Meta-analysis of the effectiveness of psychological and pharmacological treatments for binge eating disorder. *International Journal of Eating Disorders, 43*(3), 205-217.
- Waller, G., Stringer, H., & Meyer, C. (2012). What cognitive behavioral techniques do therapists report using when delivering cognitive behavioral therapy for eating disorder?. *Journal of Consulting and Clinical Psychology, 30*(1), 171-175.

- Waltz, J., Addis, M. E., Koerner, K., & Jacobson, N. S. (1993). Testing the integrity of a psychotherapy protocol: Assessment of adherence and competence. *Journal of Consulting and Clinical Psychology, 61*(4), 620-630.
- Webb, C. A., DeRubeis, R. J., & Barber, J. P. (2010). Therapist adherence/competence and treatment outcome: A meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*(2), 200-211.
- Weck, F., Bohn, C., Ginzburg, D. M., & Stangier, U. (2011a). Assessment of adherence and competence in cognitive therapy: Comparing session segments with entire sessions. *Psychotherapy Research, 21*(6), 658-669.
- Weck, F., Hilling, C., Schermelleh-Engel, K., Rudari, V., & Stangier, U. (2011b). Reliability of adherence and competence assessment in cognitive behavioral therapy: Influence of clinical experience. *The Journal of Nervous and Mental Disease, 199*(4), 276-279.



## TABLES

Table 1.

Fixed and random effects for the three-level null-model partitioning variability in therapist adherence (Model 1).

| Variable          | Coefficient | SE   | 95% CI           | ICC  |
|-------------------|-------------|------|------------------|------|
| Fixed effects     |             |      |                  |      |
| Intercept         | 1.67***     | 0.04 | [1.58, 1.76]     |      |
| Random effects    |             |      |                  |      |
| Residual          | 0.09***     | 0.01 | [0.07, 0.10]     | 0.71 |
| Within therapist  | < 0.01      | 0.01 | [< 0.001, 11.99] | 0.01 |
| Between therapist | 0.03*       | 0.01 | [0.02, 0.07]     | 0.28 |

*Note.* SE = standard error; CI = confidence interval; ICC = intraclass correlation indicating proportion of variance in therapist adherence at levels 1 to 3.

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ .

Table 2.

Fixed and random effects for the three-level predictor-model of therapist adherence including session in the course of CBT as well as patient and therapist characteristics (Model 2).

| Variable               | Coefficient | SE    | 95% CI          | ICC  |
|------------------------|-------------|-------|-----------------|------|
| <b>Fixed effects</b>   |             |       |                 |      |
| Intercept              | 1.64***     | 0.16  | [1.31, 1.96]    |      |
| Session                | 0.002       | 0.003 | [-0.004, 0.01]  |      |
| <i>Patient</i>         |             |       |                 |      |
| EDE: OBEs              | <0.001      | 0.001 | [-0.003, 0.002] |      |
| EDE Global Score       | 0.01        | 0.03  | [-0.05, 0.06]   |      |
| BDI-II                 | 0.001       | 0.003 | [-0.004, 0.01]  |      |
| Treatment expectations | 0.005       | 0.02  | [-0.03, 0.04]   |      |
| <i>Therapist</i>       |             |       |                 |      |
| Therapist experience   | -0.01       | 0.01  | [-0.03, 0.01]   |      |
| <b>Random effects</b>  |             |       |                 |      |
| Residual               | 0.09***     | 0.01  | [0.07, 0.11]    | 0.74 |
| Within therapist       | 0.002       | 0.01  | [< 0.001, 0.78] | 0.02 |
| Between therapist      | 0.03*       | 0.01  | [0.01, 0.08]    | 0.24 |

Note. SE = standard error; CI = confidence interval; ICC = residual intraclass correlation

indicating proportion of variance in therapist adherence at levels 1 to 3 after fixed effects in

the predictor model; WAI-O-S = Working Alliance Inventory, shortened observer-rated

version; OBEs = objective binge eating episodes; EDE = Eating Disorder Examination

Interview; BDI-II = Beck Depression Inventory

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ .

Table 3.

Fixed and random effects for the three-level predictor-model of therapeutic alliance (WAI-O-S Total Score) from therapist adherence (Model 3).

| Variable          | Coefficient | SE   | 95% CI         | ICC  |
|-------------------|-------------|------|----------------|------|
| Fixed effects     |             |      |                |      |
| Intercept         | 61.72***    | 2.04 | [57.71, 65.73] |      |
| ACF               | 9.39***     | 1.15 | [7.14, 11.65]  |      |
| Random effects    |             |      |                |      |
| Residual          | 48.46***    | 5.62 | [38.60, 60.83] | 0.87 |
| Within therapist  | 3.03        | 4.81 | [0.14, 67.92]  | 0.05 |
| Between therapist | 4.26        | 2.75 | [1.20, 15.10]  | 0.08 |

*Note.* SE = standard error; CI = confidence interval; ICC = intraclass correlation indicating proportion of variance in therapeutic alliance at levels 1 to 3 in the null-model and after fixed effects in the predictor-model; ACF = Adherence Control Form.

\*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ ; †  $p < .10$ .