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RUNNING HEAD: THERAPEUTIC PROCESS IN ED  
ABSTRACT

**Objective:** For eating disorders, a vast number of investigations have demonstrated the efficacy of psychological treatments. However, evidence supporting the impact of therapeutic process aspects on outcome (i.e., process-outcome research) has not been disentangled.

**Method:** Using the Generic Model of Psychotherapy (GMP) to organize various process aspects, a systematic literature search was conducted on psychological treatment studies for anorexia nervosa, bulimia nervosa, binge-eating disorder, and eating disorders not otherwise specified.

**Results:** Improved outcomes resulted for family-based treatment compared to individual treatment, for individual compared to group treatment, booster sessions, and positive patient expectations (GMP contract aspect); for nutritional counseling and exercising but not exposure with response prevention as adjunct interventions (therapeutic operations); for highly motivated patients and, to a lesser extent, for therapeutic alliance (therapeutic bond); as well as for rapid response and longer overall treatment duration (temporal patterns). Regarding other GMP aspects, studies on self-relatedness were completely lacking and in-session impacts were rarely investigated.

**Discussion:** As most studies assessed only a limited number of process aspects, the ability to draw conclusions about their overall impact regarding outcome is rather limited. Therefore, future process-outcome research is needed beyond investigations of treatment efficacy for eating disorders.

*Key words:* psychotherapeutic process; eating disorders; anorexia nervosa; bulimia nervosa; binge-eating disorder

THE THERAPEUTIC PROCESS IN PSYCHOLOGICAL TREATMENTS FOR EATING  
DISORDERS: A SYSTEMATIC REVIEW

Over the past decades, vast evidence has supported the efficacy of psychological treatments (i.e., outcome research). This research informed the publication of comprehensive psychological treatment guidelines of mental disorders, including eating disorders, in the US (American Psychiatric Association [APA]; 1), the UK (National Institute of Clinical Excellence [NICE]; 2), and Germany (Association of the Scientific Medical Societies [AWMF]; 3). These guidelines highlight the importance of the therapeutic alliance as a process aspect in order to achieve better symptom reduction (e.g., 3). However, broader considerations of process aspects contributing to treatment outcome (i.e., process-outcome research) are lagging behind.

Extensive systematic reviews on process aspects and outcome across various mental disorders by Orlinsky et al. (4) led to a comprehensive framework for process-outcome research. Thus, the “Generic Model of Psychotherapy” (GMP) offers “a map to guide the investigation of therapeutic change agents” (5; p. 365). The model contains various process aspects, all of which describe actions and experiences of patients and therapists in their joint interaction within, as well as between, therapeutic sessions. Based on the current literature, the GMP constitutes the only available global model to classify a broad range of process aspects in their relation to outcome. The GMP is composed of three levels (see Figure 1). While the top level describes “inputs” in terms of procedural prerequisites (e.g., the existing health care system, characteristics of patients and therapists), the bottom level encompasses “outputs” in terms of short and long-term outcomes. The mid-level process aspects are hypothesized to contribute to these outcomes. In addition, interactions of process aspects can positively or negatively influence outcome. Overall, Orlinsky et al. (4) described six process aspects within the GMP. First, they proposed the *therapeutic contract* as the organizational

process aspect, defining patients' and therapists' roles as well as the framework for their joint interaction. Second, *therapeutic operations* encompass the technical aspects, including the applied procedural tasks as well as the patient's problem presentation and the therapist's expert understanding of these problems. Third, the *therapeutic bond*, as the interpersonal aspect, represents two rather distinct domains, including the patient's and the therapist's treatment motivation as well as the quality of their interaction (i.e., the therapeutic alliance). The interaction quality further refers to the group cohesion or climate as the qualitative interaction between members in group treatment. Fourth, the intrapersonal aspect of *self-relatedness* is understood as the patient's and therapist's self-experience within activities and relationships (e.g., one's openness or defensiveness). Fifth, the clinical aspect of *in-session impacts* subsumes the patient's and therapist's positive and negative experiences within sessions (e.g., insight or emotional relief as positive realizations and confusion or distress as negative harms). Secondary to this aspect, impacts occurring between sessions based on the in-session impacts are included (i.e., inter-session impacts). Sixth, *temporal patterns*, as the sequential aspect, describe domains of session development and the course of treatment. The first five process aspects are depicted in Figure 1 with arrows corresponding to hypotheses about process-outcome relations. In contrast, temporal patterns cannot be shown, as they represent functions of time and patterns.

Orlinsky et al. (4) emphasized positive as well as negative impacts of process aspects on outcome across various mental disorders. However, to our knowledge, systematic investigations summarizing the process-outcome research regarding psychological treatments of eating disorders, including anorexia nervosa (AN), bulimia nervosa (BN), binge-eating disorder (BED), and eating disorders not otherwise specified (EDNOS), are lacking. Hence, this article sought to systematically review the associations between process aspects and outcomes (i.e., changes in key symptoms of eating disorders) as outlined in the GMP.

## METHOD

Search and study selection

This systematic review was conducted according to the PRISMA guidelines (6). In September 2013, relevant studies were identified using electronic databases (PSYCINFO and MEDLINE). Search terms included key words for all eating disorders, psychological treatments, and process parameters as outlined by Orlinsky et al. (4). Relevant articles were cross-referenced and systematic reviews and meta-analyses (including the psychological treatment guidelines for eating disorders, Cochrane reviews) were examined in order to identify additional studies. Article titles and abstracts were screened and the remaining full-text articles were assessed for eligibility. Figure 2 further illustrates the literature search.

Eligibility criteria

To be included in the present systematic review, studies had to (1) investigate a patient sample with eating disorders (AN, BN, BED, or EDNOS<sup>1</sup>), diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders, third edition or later (DSM; 7) or the International Classification of Diseases, ninth edition or later (ICD; 8; hence, studies had to be published after 1980), (2) contain a description of a psychological treatment, (3) explicitly report at least one process aspect that could be integrated into the scheme of Orlinsky et al. (4), (4) explicitly report at least one outcome (i.e., eating disorder key symptom), (5) have a sample size  $n > 3$  in order to exclude case reports (cf. 9), and (6) had to be published in English or German language. Studies were excluded if they reported qualitative process aspects and/or outcome only or if they included patient samples with other mental disorders as primary diagnoses and eating disorders as associated diagnoses.

The key symptoms for eating disorders assessed within studies at either end of treatment (EOT) or at follow-up (FU) were further operationalized as (a) weight gain for AN (e.g., weight, body mass index [BMI], percent of ideal or expected body weight), (b) binge

frequency for BN and BED, (c) purge frequency for BN, and (d) binge and/or purge frequency for EDNOS. Additionally, composite scores (e.g., Morgan-Russell scores for AN) were considered if they included at least one of the key symptoms above (a-c). Other outcomes included recovery (i.e., sustained remission) and relapse after achieved remission (i.e., recurrence of key symptoms). Based on the consensus of all authors and in accordance with previous publications (e.g., 10, 11), outcome definitions also included remission operationalized as abstinence from key symptoms or achievement of a certain BMI cut-off (usually 17.5kg/m<sup>2</sup>). Secondary aspects of remission (e.g., eating disorder psychopathology within 1 SD of the healthy range) were not accounted for in the present review, as operationalizations varied markedly across studies.

## RESULTS

### Study characteristics

A total of 123 studies met the inclusion criteria comprising a total of  $n = 13,882$  patients (95.7% female), with sample sizes ranging from  $n = 16$  to 2,000 patients ( $MW = 114.11$ ,  $SD = 212.77$ ). Studies focused on BN ( $n = 61$ ), AN ( $n = 52$ ), BED ( $n = 21$ ), and/or EDNOS ( $n = 12$ )<sup>2</sup>. While a majority of the studies included adult patients ( $n = 91$ ), 33 studies focused on adolescents, and four studies investigated both age groups. The most prominent psychological treatments provided were cognitive-behavioral therapy (CBT;  $n = 66$ ), family-based treatment (FBT;  $n = 29$ ), psychodynamic treatment ( $n = 14$ ), interpersonal psychotherapy (IPT;  $n = 9$ ), and self-help programs (SH;  $n = 9$ )<sup>2</sup>. Most studies looked at outpatient treatment ( $n = 97$ ), while 15 studies examined day clinic treatment, and 23 studies examined inpatient treatment. The majority of studies were randomized-controlled trials (RCTs;  $n = 81$ ). Other designs included controlled designs ( $n = 12$ ) and naturalistic designs ( $n = 30$ ). Studies providing FU assessments of patients ( $n = 40$ ) had a mean FU length of 1.75

years ( $SD = 1.48$ ). The mean dropout rate reported across studies was 18.8% ( $SD = 1.8$ ; based on 102 reports; range: 0.0 to 60.7%).

Characteristics and results of each study are summarized in Table 1 of this review.

### Therapeutic contract

A total of  $n = 40$  studies focused on the association between therapeutic contract as the organizational process aspect and outcome, including the three aspects of contractual provisions (i.e., setting, modality, intensity, and booster;  $n = 30$ ), patient role ( $n = 7$ ), and therapist role ( $n = 3$ ). The majority of studies included RCTs ( $n = 35$ ), while only two controlled and three naturalistic investigations were available (see Table 1).

*Treatment setting/modalities/third-party involvement.* The impact of setting on outcome was assessed in  $n = 7$  studies, including one study on adolescents. Studies compared outpatient to inpatient treatment (12, 13), outpatient to day clinic treatment (14), and day clinic to inpatient treatment (15-20). Overall, no consistent differences in outcome (i.e., weight gain, binge/purge frequency, remission) were found between settings and results varied considerably across eating disorder diagnoses (AN, BN, and EDNOS) and time of outcome assessment (i.e., EOT and FU). Comparisons of settings for the treatment of BED were lacking. Conclusions were limited due to high dropout rates reported for inpatient treatment in both adult and adolescent samples (12, 13).

Treatment modalities were investigated in  $n = 6$  studies with adult samples only. Modality refers to the size and composition of therapeutic interactions (i.e., if patients are treated individually or in groups; 4). Across studies, individual treatment resulted in better outcome (i.e., lower binge/purge frequency, higher remission) at EOT and FUs, when compared to group treatment, in five out of six studies on BN, BED, and EDNOS (21-26). The remaining study reported similar outcome for both individual and group modalities (27). Treatments included CBT (21-23, 25), a combination of CBT and motivation enhancement

therapy (MET; 24), or a combination of CBT and IPT (26, 27). Modality comparisons were not available for AN.

Third-party involvement as a second modality aspect was examined in  $n = 11$  studies. All but two investigated adolescent samples. These studies compared the participation of close relatives or spouses and parents to individual treatment. No outcome differences (i.e., weight gain, binge frequency, remission) were found for participation of close relatives or spouses in FBT for adults with AN (28) or for participation of spouses in group CBT for BED (29) and individual treatment. For adolescents with AN and BN, third-party involvement in FBT yielded better outcome (i.e., higher weight gain, Morgan-Russell scores, remission) in five out of eight studies at EOT and FUs (30-37). For the remaining studies, no differences between FBT and individual treatment emerged for AN and BN (35-41). Further, when comparing two versions of FBT in terms of conjoint or separate family sessions, Morgan-Russell scores were comparable (39, 40). To date, research on the efficacy of FBT in adolescents with BED is lacking.

*Treatment intensity/booster sessions.* In regards to aspects of time, examinations of treatment intensity (i.e. number of sessions per week) led to conflicting results. Only one of two studies found a positive association with outcome (i.e., remission) for adults with BN receiving outpatient CBT (42, 43). In contrast, the effect was absent in a large multicenter study of inpatient psychodynamic treatment for AN and BN (44). A second aspect of treatment intensity concerned the provision of booster sessions after a full course of initial treatment. Two out of four studies on adults with BN and BED receiving CBT reported improved outcome (i.e., lower binge frequency and relapse) when compared to patients not receiving additional sessions (45-46). Interestingly, in the remaining two trials, patients with BN did not benefit from booster sessions or did not engage in booster sessions (47, 48). However, the authors argued that “simply telling” (48; p. 549) patients about the availability of boosters might not have been motivating enough to engage in additional treatment.



*Patient role.* Contractual provisions regarding the patient's role were assessed in seven studies, with one containing an adolescent sample. Patients' ratings of treatment suitability as fit for treatment and patient (4) did not predict outcome (i.e., binge/purge frequency, remission) in four studies for adults with BN and BED receiving CBT or IPT (49-51) and adolescents with BN receiving FBT (52). Patients' positive outcome expectations (i.e., expecting to be completely better after treatment; 53) were found to be associated with better outcome (i.e., lower binge/purge frequency, higher remission) for adults with BN in one study but not another (54, 55). Findings were also insignificant for adolescents with BN (52). Further, patients' premature termination of treatment was investigated in direct relation to outcome in only one study and resulted in less weight gain at EOT when compared to patients receiving the full course of treatment (56). Other patient role aspects (e.g., patients' verbal behavior) have not been investigated to date.

*Therapist role.* Few studies were available regarding aspects of the therapist's role ( $n = 3$ ) and all three assessed the association of therapist adherence and outcome in adults with BN. Adherence can be defined as the extent to which an intervention is delivered by a therapist as outlined in the treatment manual or model (57) and is commonly rated by external observers in order to establish experimental validity in RCTs. Overall, adherence to CBT or to psychodynamic treatment protocols was not related to outcome (i.e., purge frequency, remission from purging; 58-60). However, individualized CBT, implying a reduced adherence, led to higher remission from binge eating (58). To date, research regarding adherence-outcome associations for AN and BED, as well as other aspects of the therapist's role (e.g., therapist skills or verbal behavior), is lacking.

### Therapeutic operations

Associations between therapeutic operations as the technical process aspect and outcome were investigated in  $n = 21$  studies, including the three aspects of therapist focus ( $n$

= 3 studies), adjunct exposure with response prevention (ERP;  $n = 7$ ), and other adjunct interventions ( $n = 11$ ). Study designs were predominantly RCTs ( $n = 15$ ), with only three controlled and three naturalistic investigations (see Table 1).

*Therapist focus.* The therapist's focus describes the expert understanding of the patient's problems and the topic that the therapist refers to within the treatment (4). One study directly compared an adjunct, symptom-oriented approach to inpatient psychodynamic treatment without the adjunct approach (61). The remaining two studies examined audio-taped sessions (62) or therapists' self-reports (63). Symptom-oriented approaches consistently led to higher weight gain in psychodynamic inpatient treatment for AN (61, 63). Focusing on interpersonal problems also predicted weight gain, while a self-conceptual focus was negatively associated with outcome (63). Furthermore, a focus on behavioral interventions within CBT for BN resulted in substantial but insignificant symptom reductions (62). Overall, a lack of RCTs including larger sample sizes and studies on BED was evident.

*Therapeutic interventions: Exposure treatments.* ERP, as an adjunct therapeutic technique or operation, was repeatedly investigated in its relation to outcome by directly comparing standard treatment with and without ERP. Overall, findings on adjunct ERP were inconclusive as only three out of seven studies reported an advantage of adjunct ERP as compared to standard treatments. Adjunct ERP to binge and/or purge cues within CBT-related treatments for BN, compared to CBT alone, was associated with improved outcome in two out of five studies (i.e., lower binge/purge frequency, weight gain; 64-67). However, in one of the studies, outcomes did not differ at EOT but at the 5-year FU (67). In contrast, three studies conducted earlier did not yield differences for CBT with and without adjunct ERP (68-70).

A similar comparison of ERP, regarding the fear of weight gain or relaxation as adjuncts, to inpatient treatment of AN resulted in higher remission at FU, but not EOT, when ERP was part of the treatment protocol (71). In BED, ERP to body image cues was compared

to cognitive restructuring as adjuncts to CBT; however, both interventions resulted in similar remission rates (72).

*Other therapeutic interventions.* A limited number of studies examined adjunct interventions other than ERP in eating disorder treatment. Adjunct MET, an approach derived from the treatment of patients with addictions (73), did not result in better outcome (i.e., lower binge/purge frequency, higher weight gain, remission) in two investigations of CBT (74) or inpatient treatment (75) for AN and BN. In contrast, lower binge frequency and higher remission were reported when combining MET and SH for BED compared to SH alone (73). Better outcome (i.e., lower binge frequency, higher remission) was also reported in two of three studies examining adjunct nutritional counseling and exercising with CBT or a newer approach of emotion-focused therapy for BN (76) and BED (46,77). Another study did not report outcome differences in patients with and without adjunct nutritional counseling (78). Other adjunct interventions (e.g., ecological momentary assessment, behavioral instruction) did not differentially affect outcome (79, 80). However, providing feedback in SH resulted in a lower purge frequency but not a lower binge frequency for patients with BN (81). A single investigation on adjunct interventions for adolescents with AN, offering additional contact between parents of recovered adolescents and parents of adolescents with a current diagnosis undergoing FBT, did not report differential weight gain, however, a steeper increase in weight gain was observed (82).

Despite substantial evidence regarding the operations-outcome relationship, no study was identified investigating other GMP process aspects, for example, patients' problem presentation (e.g., focus, behavior, or responsiveness) or other therapist interventions (e.g., self-disclosure, activating resources, support).

Therapeutic bond

A total of  $n = 30$  studies examined the therapeutic bond as the interpersonal process aspect, including the three aspects of motivation ( $n = 16$ ), therapeutic alliance ( $n = 13$ ), and group cohesion/climate ( $n = 4$ )<sup>3</sup>. Studies on motivation included primarily naturalistic studies ( $n = 11$ ), four RCTs, and one controlled study. Alliance-outcome relationships were mostly investigated in RCTs ( $n = 11$ ) and two naturalistic studies. Regarding group cohesion/climate, study designs included two RCTs, one naturalistic study, and one controlled study (see Table 1).

*Motivation.* Motivation to engage in psychological treatments encompasses the level of personal engagement of patient and therapist and is commonly operationalized as readiness to change (83). Regarding patients' self-rated motivation, studies consistently reported better outcome (i.e., lower binge/purge frequency, higher weight gain, remission, recovery) for highly motivated patients when compared to patients with reduced levels of motivation in eight out of nine studies in adults (24, 84-90) as well as in four out of five studies in adolescents (91-94) across various psychological treatments (e.g., CBT, SH, FBT, and IPT) for AN, BN, and EDNOS. Across studies, motivation appeared to be more closely linked to improvements in binge frequency than purge frequency. The remaining studies did not report significant motivation-outcome associations (95-98). Overall, findings varied across outcome (e.g., binge or purge frequency) or time of assessment. The remaining studies did not report significant associations (74, 95-97). In contrast, investigations for BED were lacking. While a substantial number of studies were conducted on patients' motivation, evidence on therapists' motivation is also not available.

*Therapeutic alliance.* Therapeutic alliance is commonly defined as the collaborative and affective bond between therapist and patient (98). Despite a large number of investigations on alliance-outcome associations, findings were widely inconsistent across eating disorder diagnoses, treatments, patient age groups, and time of assessment (e.g., early

vs. mid vs. late treatment; 99). In only four out of ten studies, higher alliance ratings from either patient ratings or external observers predicted better outcome (i.e., lower binge/purge frequency, higher remission) for patients with BN receiving CBT, IPT, or MET (50, 59, 89, 99). Alliance ratings were not related to outcome in other studies on BN (51, 95, 100), BED (49, 101) or adults with AN (102). Investigations on adolescents with AN and BN reported positive alliance-outcome associations in all four conducted studies (52, 103-107). However, findings varied between ratings perspectives from adolescents, mothers, or fathers. Overall, alliance was commonly measured via self-report, while only a minority of studies utilized external observer ratings. Therapist ratings of alliance were not available in any of the included studies.

*Group cohesion/climate.* Group cohesion/climate encompasses the relationship between group members and their sense of cohesion with other patients (108) in addition to the patient-therapist alliance. Cohesion/climate was investigated in four studies with all but one including only adult patients. Findings showed positive associations of cohesion/climate and outcome (i.e., lower binge/purge frequency, higher weight gain, remission) in three studies delivering CBT, IPT, and psychodynamic treatment to BED (49, 109, 110). The remaining study, offering CBT to patients with AN, BN, and EDNOS, did not report positive outcome relations (96). Despite the positive associations for BED, results varied across time of assessment (e.g., early vs. mid vs. late treatment; 109).

In conclusion, the therapeutic bond was extensively investigated. However, other aspects of the bond as outlined in the GMP, for example, the interactive coordination (i.e., how patient and therapist function as a team), expressive attunement (i.e., communication quality), and the affective attitude of patients and therapists have not received any attention in the present studies.

### Self-relatedness

Based on our literature search, we were not able to identify a study investigating the association of patient and/or therapist self-relatedness as the intra-personal process aspect (i.e., the patients' or therapists' inner psychological state during sessions) and outcome.

### In-session and inter-session impacts

Associations of in-session and inter-session impacts and outcome were investigated in a total of four studies with adult patients only. Study designs included one RCT, two controlled studies, and one naturalistic study (see Table 1).

*In-session impacts.* In-session impacts concern the patients' and therapists' positive and negative experiences, thus, resulting in clinically relevant consequences based on the therapeutic operations as well as on the achieved therapeutic bond within treatment sessions (4). Findings were inconsistent within the small number of studies examining in-session impacts in inpatient treatment of AN and BN. While one study found negative emotions to predict negative outcome (i.e., less weight gain) for inpatient treatment of AN (63), another study reported the absence of statistically significant associations for patients with BN and EDNOS receiving CBT and psychodynamic treatment (111). Negative experiences, in terms of more painful challenges in BN, were linked to non-remission. In contrast, positive outcome for BN (i.e., lower binge/purge frequency, higher remission) was predicted by positive in-session impacts, for example, positive outcome expectations (100), experiencing self-efficacy, fewer dysfunctional beliefs, and more positive emotions (111). However, associations varied considerably over the course of treatment (i.e., early vs. mid vs. late treatment; 100).

*Inter-session impacts.* Patients' and therapists' experiences, with respect to each other between sessions (4), were investigated together with in-session impacts in three studies. Frequent or intense inter-session experiences, such as recreating the therapeutic dialogue, predicted greater weight gain in AN (63). In contrast, frequent dialogue recreations resulted in

greater likelihood of non-remission from BN (100). Furthermore, patients with BN thinking about sessions more often (100) and patients with BED exhibiting more positive (e.g., hope and relief) and fewer negative emotions (e.g., lack of emotional distress; 109) showed better outcome (i.e., higher remission) compared to those who did not report these positive inter-session impacts. Again, however, effects varied strongly over the course of treatment (i.e., early vs. mid vs. late treatment; 100, 109).

Despite the initial findings and the postulated occurrence of impacts for both the patient and therapist (4), studies were limited to the patient's experiences. In addition, investigations were also restricted as certain aspects, thus, insight and problem resolution as other process aspects have not been examined. Furthermore, findings should be considered preliminary as most studies included small patient samples.

### Temporal patterns

A total of  $n = 37$  studies examined the relationship between temporal patterns as the sequential process aspect, including the two aspects of symptom change/rapid response ( $n = 19$ ) and treatment dose effects/duration (i.e., time spent in treatment;  $n = 18$ ), and outcome. The majority of studies were RCTs ( $n = 19$ ) and naturalistic studies ( $n = 13$ ). Further, a few controlled studies ( $n = 5$ ) were conducted (see Table 1).

*Symptom change/rapid response.* Symptom change early in treatment or rapid response is commonly defined as binge/purging reduction of 65 to 80% or a steep weight gain within the first four to six weeks of treatment (e.g., 112, 113). A substantial number of studies examined rapid response across various treatments (e.g., CBT, IPT, DBT, and SH) for adults with AN, BN, BED, and EDNOS. Patients classified as rapid responders showed better outcome at EOT (i.e., lower binge/purge frequency, higher weight gain, remission, recovery) when compared to patients not exhibiting these early symptom reductions in 15 out of 15 studies (55, 100, 101, 112-124). Interestingly, results at FU assessments showed more

variation. Rapid responders and non-rapid responders were found to show similar outcome at FU. Thus, authors suggested a delayed treatment response in non-rapid responders (e.g., 101). In addition, rapid response effects on outcome were also found in two out of three studies on adolescents with AN and BN receiving FBT (125, 126), while rapid responders and non-rapid responders achieved comparable remission in the remaining study on AN (127).

*Treatment dose effects/duration.* The overall time spent in treatment can be operationalized in several ways across studies. Dose effects, encompassing the number of sessions attended or the patient's compliance to work on treatment modules in SH programs (e.g., completion of all modules vs. partial completion; 128), were investigated in eight studies. For adults with AN, BN, and BED undergoing outpatient psychological treatments, results were inconsistent as only two out of five studies found positive attendance-outcome associations (29, 128). The remaining studies did not show any outcome differences for patients with higher versus lower attendance (49, 102, 129). Regarding compliance in SH, two out of three studies showed better outcome for adults with AN (129) and BN (131) when more SH modules were worked on. In contrast, patients with higher versus lower compliance did not differ in their outcome in the remaining study on SH for BN (132).

Another aspect of time spent in treatment included the overall duration of commonly open-end treatments. Longer duration positively predicted outcome in four out of four studies on adults with AN, BN, and EDNOS (15, 44, 56, 60). Opposed to this rather consistent finding, longer treatment duration resulted in negative outcome (i.e., less weight gain or lower recovery rates) for adolescents with AN (94, 133). When directly comparing shorter versus longer treatment conditions, studies yielded inconsistent results. While improved outcome was shown for longer CBT for adult patients with BED (123) as well as FBT and SPT for adolescents with AN (134), another study on adolescent AN did not find a significant association (135, 136). A comparison of shorter to longer day clinic treatment (i.e., four vs. five days per week) for adult AN, BN, and EDNOS found higher weight gain for the short



condition, while lower binge frequency and higher remission was achieved in the longer treatment condition (137).

Besides the substantial research supporting a rapid response-outcome relationship, investigations of session developments (e.g., patterns of change) as outlined in the GMP were lacking.

### DISCUSSION

This systematic review compiled the current literature on process-outcome research in psychological treatments for eating disorders. Numerous associations across eating disorder diagnoses and treatments were in support of Orlinsky et al.'s GMP (4). Overall, improved outcome resulted for (1) FBT compared to individual treatment, individual compared to group treatment, booster sessions, and positive patient expectations as aspects of the therapeutic contract, (2) adjunct nutritional counseling and exercising, but not ERP, as aspects of therapeutic operations, (3) patients with high motivation and, to a lesser extent, higher therapeutic alliance as aspects of the therapeutic bond, and (4) rapid response and longer as opposed to shorter overall treatment duration as aspects of the temporal patterns. Multiple further aspects were inconsistently related to outcome. Conversely, findings on self-relatedness were lacking and in-/inter-session impacts were rarely investigated.

Regarding the therapeutic contract, few studies on outpatient, day clinic, and inpatient treatment for AN and BN were available and results were inconsistent. Across various mental disorders, findings were more cohesive and no outcome differences were found in the majority of studies included in the review by Orlinsky et al (4). In contrast to the conclusions of Orlinsky et al. (4), individual treatment modalities for eating disorders were shown to be superior to group treatment. Similarly, recent investigations also found slight advantages for individual treatment in patients with depression (cf. 138, 139). Further, participation of family members in treatment as third-party involvement resulted in better outcome in adolescents

with eating disorders (i.e., FBT), but not in adults. In contrast, similar outcome was reported by Orlinsky et al. (4) for individual treatments when compared to FBT and the participation of spouses in couples therapy. Accordingly, couples therapy and individual CBT and IPT for patients with depression did not differ in terms of outcome either (140). Despite an earlier meta-analysis showing higher session frequencies to be associated with better outcome for BN (141), studies on treatment intensity in the present review were rare and prohibited further conclusions. Conversely, booster sessions positively predicted outcome in the present review and GMP literature (4). However, as stated by Orlinsky et al. (4), intensity and booster sessions might also influence outcome through interactions with other process aspects (e.g., overall treatment duration). Concerning the therapist's role, adherence was not found to be related to outcome in eating disorders. This reflects findings from a meta-analysis across various mental disorders (49). In contrast, modest but overall positive adherence-outcome associations have been reported across a substantial number of studies reviewed by Orlinsky et al. (4) and were also found in recent investigations of treatments for patients with depression (142). While patient-rated suitability of treatment and positive outcome expectations, as aspects of the patient's role, were identified to predict outcome in the GMP literature (4), only patient expectations were positively related to outcome in eating disorders. In addition, high ratings of suitability were shown to predict treatment dropout for BN (143). Overall, studies regarding the contract aspects of setting, patient's role, and therapist's role can be described as lagging behind and more research on eating disorders is needed. This would also allow for further comparisons to the GMP literature and studies on depression, whereas conflicting findings across this research cannot yet be resolved.

With respect to technical therapeutic operations, investigations of the therapist's focus were sparse in the present review. Previously, this has also been pointed out for other mental disorders by Orlinsky et al. (4). Additionally, small sample sizes further limited the findings' validity. A great number of operations-outcome studies investigated the efficacy of adjunct

ERP. However, non-significant outcome differences were found in a majority of publications. In contrast, improved outcome for ERP-based interventions has been reported by Orlinsky et al. (4) and in other recent reviews for anxiety disorders (144, 145). Overall, the lack of outcome differences for ERP in eating disorders might be attributable to substantial variations in the implementation of ERP (i.e., time point and length) that have also been previously underlined (146). Despite the lack of additive effects, adjunct ERP is popular in treatment of BN and BED and has been emphasized in recent treatment concepts (e.g., 147). In contrast to ERP, adjunct nutritional counseling and exercising resulted in improved outcome for BN and BED, though only a small number of studies were conducted. Besides impacts on key symptoms, studies also found improved secondary outcome (e.g., higher weight loss in BED; 78). More research is needed, however, to validate this effect. Despite the initial demonstration of benefits from exercising (e.g., 148), exercising should be introduced carefully in cases of AN and BN as it might be used as inappropriate compensatory behavior and, hence, could sustain the eating disorder. To date, investigations on operations-outcome associations for adjunct interventions for adolescents with eating disorders and other aspects of therapeutic operations (e.g., patient's and therapist's role implementation) are lacking. Regarding role implementation, findings for other mental disorders were inconsistent as pointed out in the GMP literature (4) and thus, might be less promising in enhancing the overall treatment efficacy compared to other process aspects.

A large number of process-outcome studies in eating disorders investigated the interpersonal therapeutic bond aspect concerning the two rather distinct concepts of motivation and therapeutic alliance. For patients with eating disorders, higher motivation to engage in treatment emerged as a robust predictor of outcome in both adults and adolescents. Furthermore, highly motivated patients completed treatments more often, while less motivated patients with eating disorders were more likely to drop out (97). The positive motivation-outcome association receives additional support from current reviews across

various mental disorders (83), including depression and anxiety disorders (e.g., 149). In contrast, consistent findings were reported by Orlinsky et al. (4) as they identified comparable numbers of studies to report either non-significant or positive associations. Despite the investigation in a large number of studies, alliance-outcome findings for adult samples with eating disorders were inconclusive as only about half the studies reported higher alliance ratings to predict improved outcome. Conversely, alliance in FBT repeatedly predicted eating disorder outcome for both adolescents and parents. Further research is needed to validate this effect as few investigations on adolescents were conducted. In contrast to findings for adults with eating disorders, but in line with results for adolescents, the GMP literature and several meta-analyses (e.g., 150, 151), as well as recent investigations in patients with depression (152), identified alliance as a robust predictor in the process-outcome research. However, interactions with symptom changes over the course of treatment were common in BN (51, 54) and depression (153). Within these studies, prior symptom reductions were identified as important prerequisites for subsequent increases of alliance and, hence, outcome at EOT. Regarding cohesion-outcome relations in group treatments for eating disorders, few studies have been conducted which precludes the evaluation of its effects. In turn, reviews (4, 154) and a current meta-analysis (108) across various mental disorders, including depression, reported positive cohesion-outcome associations. Thus, authors argue that positive group cohesion/climate should be established, especially for open group-formats, before new members might be introduced to the group (155).

Surprisingly, no study was identified to investigate the patient's and/or therapist's intrapersonal self-relatedness regarding positive or negative impacts within sessions. In contrast, Orlinsky et al. (4) described a number of self-relational aspects to be associated with outcome across various mental disorders. For example, the patient's openness was identified as a robust outcome predictor within the GMP literature as well as in more recent investigations of depression (156). However, findings on other aspects (e.g., self-congruence,

self-acceptance) were inconclusive. Based on this GMP research, studies in eating disorder treatment should be conducted in the future.

Clinical in-session impacts received rather limited attention within the process-outcome research on eating disorders. In line with findings from Orlinsky et al. (4) and recent investigations of depression (156, 157), the patient's experiences of positive and negative emotions, self-efficacy, and intense reproduction of patient-therapist conversations led to improved outcome in eating disorders. Furthermore, initial evidence suggests that patients experiencing more harms or distress (i.e., low self-esteem, low mastery, and low clarification levels) were more likely to drop out of CBT for BED (158). Interestingly, initial analyses found in-session and inter-session impacts to account for substantial symptom reductions beyond the effects of patient characteristics (e.g., symptom severity, gender, age) or rapid response to treatment in BN (100). In addition, inter-session impacts affected outcome even more than in-session experiences. However, more research is warranted to confirm these effects for patients and also to investigate the therapist's impact on outcome. Regarding therapists, impacts should be considered as they potentially influence psychological well-being and, in consequence, the therapist's treatment performance (4).

Within the past decade, the investigation of associations between temporal patterns and outcome received substantial attention in eating disorders. Rapid response consistently predicted outcome across all eating disorder diagnoses, treatments, and age groups. Thus, rapid response could be considered "the most popular variable in process-outcome research along with global alliance" (4; p. 358). The examination of early symptom changes was primarily initiated by earlier studies on depression (159, 160) and more recent studies continue to find rapid response to be associated with outcome in the treatment of depression (160, 161). In addition, rapid response in patients with eating disorders was shown to account for substantial symptom reductions beyond the variability of symptom reductions accounted for by patients' symptom severity and the overall treatment duration (112-114). In line with

findings for rapid response, both planned treatment duration and patients' attendance/compliance to treatments repeatedly resulted in improved outcome across eating disorder diagnoses and treatments. While longer duration predicted more positive outcome for adults with eating disorders as well as other mental disorders (4), findings for adolescents were inconsistent. Furthermore, longer duration might not be invariably positive (4) as it was previously also related to higher dropout from treatment for BN (141).

### Strengths and limitations

When interpreting the findings of the present review, several strengths and limitations should be taken into account. First, as our aim was to provide a broad overview on the current process-outcome research for eating disorders, inclusion and exclusion criteria were held to a minimum. Thus, we did not include "high quality"-studies only (i.e., RCTs) as they did not always seem appropriate when investigating process aspects. While, for example, settings, modalities, and adjunct interventions could be properly investigated in RCT designs, it does not seem ethical nor feasible to randomize patients to empathic, warm versus insensitive, indifferent therapists (4). A second limitation is the rather strict outcome definitions considering key symptoms only. Effects of process aspects on secondary outcome have also been reported within studies (e.g., eating disorder and associated general psychopathology) but could be not reported due to space limitations.

Regarding the studies in this review, major methodological issues limited the interpretation and generalization of findings. First, the sample sizes of the included studies varied considerably. While most RCTs were sufficiently powered, other studies might have lacked the necessary sample size to detect significant process-outcome associations. In addition, substantial dropout rates were reported across studies, further limiting the interpretation of results. Second, brief treatment descriptions complicated the drawing of valid conclusions for individual psychological treatments. Third, assessment methods varied widely

across studies ranging from single item self-reports (e.g., to assess patients' motivation), reliable and valid self-report or observer-ratings (e.g., Working Alliance Inventory to assess alliance [WAI]; 162) to clinical expert interviews to assess key symptoms of eating disorders. Various rating perspectives across process and outcome variables within one study could have further increased the variance of findings and the comparison between studies.

### Directions for future research

While a substantial number of studies investigated the efficacy of psychological treatments for eating disorders, only a minority of these studies included investigations of process-outcome associations. Hence, more process-outcome research in psychological treatment of eating disorders is generally warranted. As indicated in this review (cf. findings on alliance), process aspects differentially influenced outcome for adolescents and adults. However, research regarding the efficacy of psychological treatments for adolescents with eating disorders is currently limited. Thus, future investigations should focus simultaneously on the establishment of treatment efficacy and process aspects. Recently developed internet-based, guided SH represents another area of future process-outcome research (e.g., alliance; 163, 164). So far, positive alliance-outcome relations have already been demonstrated for other mental disorders (e.g., 165, 166).

Regarding various methodological aspects of the process-outcome research, process-outcome research within efficacy studies can be based on repeated collection of process reports from patients and therapists. However, researchers might be reluctant to do so in order to minimize additional effort for both patients and therapists participating in their studies. Researchers could minimize these additional efforts by utilizing gold-standard external observer ratings (4) as was commonly done to investigate adherence and alliance. However, substantial expertise is needed to produce reliable and valid ratings of process aspects based on analyses of audio- or videotaped sessions (167). Nevertheless, these analyses could

facilitate the assessment of several process aspects at the same time (e.g., therapists' adherence and competence, alliance, self-relatedness, in-session impacts). Observer based ratings of process aspects would further allow determining joint impacts as well as interactions of several process aspects on outcome (e.g., 100).

Besides the general consideration of process research in future clinical trials, additional research venues should concern the inclusion of more male patients in treatments studies for eating disorders as they were found to be underrepresented in the current review (less than 5%). Further, researchers should apply reliable and valid measures to assess process aspects. So far, improvements of measurement validity appear to be necessary in certain areas (e.g., single items to assess expectations and motivation).

### Clinical Implications

General recommendations for psychological treatments of patients with eating disorders have been provided by international guidelines (1-3). These guidelines have focused primarily on the process aspect of therapeutic alliance to achieve symptom reductions, while broader process consideration appears to be lacking. Hence, based on this review, several implications for clinical practice can be derived regarding contractual provisions of treatment; for example, FBT and individual treatments appear to be preferable treatments as better outcome was reported. During treatment, in order to improve outcome, therapists should try to intervene if they perceive a lack of motivation or a break in the patient-therapist alliance. Furthermore, therapists should aim for early symptom reductions. Based on the importance of rapid response, authors proposed triage algorithms for cases of BN (114): if patients do not rapidly respond to implemented first-line treatment within a defined time period (i.e., patients do not meet a proposed cut-off of sufficient symptom reduction), the therapist would be advised to change his/her approach and provide an alternative treatment. Further research is



necessary to establish evidence-based cut-offs regarding time periods and symptom reductions that can be used for individual treatment decisions.

Overall, the current evidence on process-outcome associations is limited. Additional research is needed to allow for more precise conclusions regarding the “ingredients” of efficacious psychological treatments.

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Footnotes

<sup>1</sup> As EDNOS no longer exists as a diagnostic category in the DSM-5, it was included based on its description in previous versions of the DSM. Criteria for EDNOS, generally describing patients with sub-clinical levels of eating disorders, might vary across included studies given the authors' individual EDNOS criteria.

<sup>2</sup> Regarding the eating disorder diagnoses and the psychological treatments, studies do not add up to  $n = 126$  as studies could have included patient samples with more than one eating disorder diagnosis or more than one treatment condition.

<sup>3</sup> Studies do not add up to  $n = 30$  as three studies investigated patients' motivation and therapeutic alliance or group cohesion (49, 89, 95).

## Tables

Table 1. Summary of study results on process-outcome associations grouped by process aspects of the GMP.

Author(s)	Sample(s)	Design	Treatment(s)	Process variable(s)	Outcome variable(s)	Result(s)
<b>1. THERAPEUTIC CONTRACT</b>						
<i>Setting / modality</i>						sign: $n = 14$ / ns: $n = 10$
Ball & Mitchell (2004)	AN ( $n = 25$ )	RCT	CBT, FBT	FBT vs. ind	weight gain	ns
					binge/purge frequency	ns
Chen et al. (2003)	BN ( $n = 60$ )	RCT	CBT	ind vs. group	remission	ind > group; FU(3/6m): ns
Crisp et al. (1991)	AN ( $n = 90$ )	RCT	CBT, FBT	out vs. in	weight gain	ns
Dare et al. (2001)	AN ( $n = 84$ )	RCT	FBT, PA, CAT	FBT vs. ind	M-R score, weight gain, remission	ns
Devlin et al. (2005a, b)	BED ( $n = 116$ )	RCT	CBT	ind+group vs. group	binge frequency, remission	ind+group > group



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Eisler et al. (2000, 2007)	AN ( <i>n</i> = 40)	RCT	FBT	conjoint vs. separated FBT	M-R scores	ns
Godart et al. (2012)	AN ( <i>n</i> = 60)	RCT	FBT, TAU	TAU+FBT vs. TAU	weight gain, M-R scores	FBT+TAU > TAU
Gorin et al. (2003)	BED ( <i>n</i> = 94)	RCT	CBT	spouse involvement	remission, binge frequency	ns
Gowers et al. (2007)	AN ( <i>n</i> = 170)	RCT	CBT, TAU	out vs. in	weight gain, recovery	ns
Katzman et al. (2010)	BN, EDNOS ( <i>n</i> = 225)	RCT	CBT, MET	ind vs. group	binge frequency	ns
	AN, BN,				purge frequency	ind > group
Kong (2005)	EDNOS ( <i>n</i> = 50)	RCT	CBT	day vs. out	weight gain	day > out
					binge/purge frequency	day > out
Le Grange et al. (1992)	AN ( <i>n</i> = 18)	RCT	FBT, SPT	FBT vs. ind	weight gain	Ns
Le Grange et al. (2007)	BN ( <i>n</i> = 80)	RCT	FBT, SPT	FBT vs. ind	remission	FBT > ind

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					partial remission	ns
					full remission	ns; FU(6m/1y): FBT > ind
Lock et al. (2010)	AN ( $n = 121$ )	RCT	FBT, AFT	FBT vs. ind	partial remission	FBT > ind; FU(6m/1y): ns
Nevonen & Broberg (2005)	EDNOS ( $n = 35$ )	RCT	CBT, IPT	ind vs. group	remission, recovery	ns
Nevonen & Broberg (2006)	BN ( $n = 86$ )	RCT	CBT, IPT	ind vs. group	binge/purge frequency	ind > group
Ricca et al. (2010)	BED ( $n = 144$ )	RCT	CBT	ind vs. group	recovery	ind > group; FU (3y): ns
Richard (2005)	AN, BN ( $n = 2.000$ )	nat	no info available	day vs. in	remission	AN: ns; BN: day > in
Robin et al. (1994)	AN ( $n = 24$ )	RCT	FBT, PD	FBT vs. ind	full remission	ns
					partial remission	FBT > ind; FU(1y): ns
Robin et al. (1999)	AN ( $n = 41$ )	RCT	FBT, PD	FBT vs. ind	full remission	ns

THERAPEUTIC PROCESS IN ED

Russell et al. (1987); Dare et al. (1990); Eisler et al. (1997)	AN, BN ( $n = 80$ )	RCT	FBT, SPT	FBT vs. ind	partial remission M-R scores, weight gain, remission	FBT > ind; FU(1y): ns ns; early onset AN: FBT > ind
Zeeck et al. (2004)	BN ( $n = 36$ )	con	PD	day vs. in	full/partial remission	ns
Zeeck et al. (2006)	AN ( $n = 36$ )	con	PD	day vs. in	weight gain, remission binge/purge	in > day
Zeeck et al. (2009a, b; 2011)	BN ( $n = 55$ )	RCT	PD	day vs. in	frequency, remission recovery	ns; FU (1y): ns FU (3y): day > in
<i>Intensity / booster</i>						sign: $n = 3$ / ns: $n = 2$
Eldredge et al. (1997)	BED ( $n = 46$ )	RCT	CBT	booster	binge frequency	pos
Kächele et al. (2001)	AN, BN ( $n = 1171$ )	nat	PD	intensity	recovery	ns

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Mitchell et al. (1993); Crosby et al. (1993)	BN ( <i>n</i> = 143)	RCT	CBT	intensity	remission	pos
Mitchell et al. (2004)	BN ( <i>n</i> = 57)	RCT	CBT	booster	- - -	not applicable
Pendleton et al. (2002)	BED ( <i>n</i> = 88)	RCT	CBT	booster	binge frequency	pos
Pyle et al. (1990)	BN ( <i>n</i> = 68)	RCT	CBT	booster	relapse	ns

*Patient role* sign: *n* = 2 / ns: *n* = 5

Hilbert et al. (2007)	BED ( <i>n</i> = 162)	RCT	CBT, IPT	suitability	remission	ns
Jones et al. (2007)	AN ( <i>n</i> = 34)	nat	CBT	termination	weight gain	pos
McFarlane et al. (2005)	BN ( <i>n</i> = 76)	RCT	CBT	expectations	binge/purge frequency	ns
Mussell et al. (2000)	BN ( <i>n</i> = 143)	RCT	CBT	expectations	remission	pos
Wilson et al. (1999)	BN ( <i>n</i> = 92)	RCT	CBT, SPT	suitability	remission	ns
Wilson et al. (2002)	BN ( <i>n</i> = 220)	RCT	CBT, IPT	suitability	remission	ns
Zaitsoff et al. (2008)	BN ( <i>n</i> = 80)	RCT	FBT, SPT	suitability, expectations	binge/purge frequency	ns

*Therapist role* sign: *n* = 1 / ns: *n* = 2

					binge/purge frequency,	ns
Ghaderi (2006)	BN ( <i>n</i> = 50)	RCT	CBT	adherence (manual vs. ind)	remission from purging	
					remission from bingeing	ind > manual
Loeb et al. (2005)	BN ( <i>n</i> = 110)	RCT	CBT	adherence	purge frequency	ns
Thompson-Brenner & Westen (2005)	BN ( <i>n</i> = 145)	RCT	CBT, PD	adherence	binge/purge frequency	ns

**2. THERAPEUTIC OPERATIONS**

<i>Focus</i>						sign: <i>n</i> = 2 / ns: <i>n</i> = 1
Herzog et al. (1996)	AN ( <i>n</i> = 34)	con	PD	symptom-oriented	weight gain	pos
Spangler et al. (2004)	BN ( <i>n</i> = 56)	RCT	CBT	behavioral	purge frequency	ns
Zeeck & Hartmann (2005)	AN ( <i>n</i> = 38)	nat	PD	symptom-oriented		pos
				interpersonal	weight gain	pos
				self-conceptual		neg

<i>Exposure with Response Prevention (ERP)</i>						sign: <i>n</i> = 3 / ns: <i>n</i> = 4
Agras et al. (1989)	BN ( <i>n</i> = 77)	RCT	CBT	CBT+ERP vs. CBT	purge frequency remission	ns ns; FU(6m): CBT > CBT+ERP
Bulik et al. (1998); Carter et al. (2003); McIntosh et al. (2011)	BN ( <i>n</i> = 135)	RCT	CBT	CBT+ERP vs. CBT+Relax	remission, recovery	ns; FU(3y): ns; FU (5y): ERP > Relax
Goldfarb et al. (1987)	AN ( <i>n</i> = 18)	RCT	SPT	in+ERP vs. in+Relax vs. in	weight gain remission	ns ns; FU (1.5y): relax > ERP, ind
Hilbert & Tuschen- Caffier (2004)	BED ( <i>n</i> = 28)	RCT	CBT	CBT+ERP vs. CBT+CR	remission	ns
Leitenberg et al. (1988)	BN ( <i>n</i> = 47)	RCT	CBT	CBT+ERPs vs. CBT	purge frequency	ns
Wilson et al. (1986)	BN ( <i>n</i> = 17)	RCT	CBT	CR+ERP vs. CR	binge/purge frequency	ns

Wilson et al. (1991)	BN ( $n = 22$ )	RCT	CBT	CR+ERP vs. CR	binge/purge frequency	ns
<i>Other Therapeutic Interventions</i>						sign: $n = 5$ / ns: $n = 6$
Allen et al. (2012)	AN, BN ( $n = 95$ )	con	CBT, MET	MET+CBT vs. CBT	weight gain, purge frequency	ns
Cassin et al. (2008)	BED ( $n = 108$ )	RCT	SH, MET	MET+SH vs. SH	binge frequency, remission	MET+SH > SH
Compare et al. (2013)	BED ( $n = 189$ )	nat	EFT	EFT+nutr vs. EFT vs. nutr	remission	EFT+nutr > EFT, nutr
Dean et al. (2008)	AN, BN ( $n = 42$ )	con	MET, TAU	MET+TAU vs. TAU	weight gain, binge/purge frequency	ns
Hsu et al. (2001)	BN ( $n = 100$ )	RCT	CT	CT+nutr vs. CT vs. nutr	binge/purge frequency remission	ns CT+nutr, CT > nutr

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Le Grange et al. (2002)	BED ( <i>n</i> = 44)	RCT	CBT	CBT+EMA vs. CBT	binge frequency, remission	ns
Masheb et al. (2011)	BED ( <i>n</i> = 50)	RCT	CBT	CBT+nutr vs. CBT	remission	ns
Pendleton et al. (2002)	BED ( <i>n</i> = 88)	RCT	CBT	CBT+exercise vs. CBT	binge frequency	CBT+exercise > CBT
Rhodes et al. (2008)	AN ( <i>n</i> = 20)	RCT	FBT	FBT consultations	recovery	ns
Schmidt et al. (2006)	BN ( <i>n</i> = 61)	RCT	SH	SH+Feedback vs. SH	binge frequency, purge frequency	ns, SH+Feedback > SH
Yates & Sambrailo (1984)	BN ( <i>n</i> = 24)	nat	CBT	CBT+instr vs. CBT	binge/purge frequency	ns

**3. THERAPEUTIC BOND**

<i>Motivation</i>						sign: <i>n</i> = 12 / ns: <i>n</i> = 4
Allen et al. (2012)	AN, BN ( <i>n</i> = 95)	con	CBT, MET	motivation	binge frequency	ns
Ametller et al. (2005)	AN ( <i>n</i> = 70)	nat	CBT, FBT	motivation	weight gain	pos
Bell & Hodder (2001)	BN ( <i>n</i> = 40)	nat	SH	motivation	binge frequency	pos



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					purge frequency	ns
Bewell & Carter (2008)	AN ( $n = 159$ )	nat	no info available	motivation	weight gain	pos
Castro-Fornieles et al. (2011)	BN ( $n = 40$ )	nat	CBT	motivation	binge frequency	pos
					purge frequency	ns
Crino & Djokvucic (2010)	AN, BN, EDNOS ( $n =$ 36)	nat	CBT	motivation	weight gain, binge/purge frequency	ns
Franko (1997)	BN ( $n = 16$ )	nat	CBT	motivation	binge frequency, remission	pos
Gowers & Smyth (2004)	AN ( $n = 42$ )	nat	CBT	motivation	weight gain	pos
Katzman et al. (2010)	BN ( $n = 225$ )	RCT	CBT, MET	motivation	binge frequency	pos
					purge frequency	ns
Mander et al. (2013)	AN ( $n = 39$ )	nat	CBT	motivation	weight gain	ns

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Mansour et al. (2012)	BN ( <i>n</i> = 155)	nat	combined CBT, IPT, DBT etc.	motivation	binge frequency purge frequency	pos ns
McHugh (2007)	AN ( <i>n</i> = 65)	nat	combined, including FBT	motivation	recovery	pos
Steele et al. (2011)	BN ( <i>n</i> = 87)	RCT	SH	motivation	binge frequency purge frequency	pos; FU: ns ns
Treasure et al. (1999)	BN ( <i>n</i> = 125)	RCT	CBT, MET	motivation	Binge/purge frequency	pos
Wade et al. (2009)	AN ( <i>n</i> = 33)	nat	CBT, MET	motivation	weight gain	ns
Wolk & Devlin (2001)	BN ( <i>n</i> = 110)	RCT	CBT, IPT	motivation	remission	IPT: pos; CBT: ns
<i>Therapeutic Alliance</i>						sign: <i>n</i> = 8 / ns: <i>n</i> = 5
Brown et al. (2013)	AN ( <i>n</i> = 65)	nat	CBT	alliance	weight gain	ns
Constantino et al. (2005)	BN ( <i>n</i> = 220)	RCT	CBT, IPT	alliance	purge frequency	CBT: early, mid: pos; late: ns; IPT: mid: pos; early, late: ns
Ellison et al. (2012)	AN ( <i>n</i> = 59)	RCT	FBT	alliance	weight gain	mother: pos; father: neg

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Forsberg et al. (2013a, b)	AN ( $n = 38/78$ )	RCT	FBT	alliance	full remission partial remission recovery	ns pos ns
Hartmann et al. (2010)	BN ( $n = 55$ )	RCT	PD	alliance	remission	ns
Hilbert et al. (2007)	BED ( $n = 162$ )	RCT	CBT, IPT	alliance	remission	ns
Isserlin & Couturier (2012)	AN ( $n = 143$ )	nat	FBT	alliance	remission	adolescent: ns; parent: pos
Lock et al. (2008); Zaitsoff et al. (2008)	BN ( $n = 80$ )	RCT	FBT, SPT	alliance	binge/purge frequency, remission	FBT: ns; SPT: pos
Loeb et al. (2005)	BN ( $n = 110$ )	RCT	CBT	alliance	purge frequency	early: pos; mid, late: ns
Munsch et al. (2012)	BED ( $n = 52$ )	RCT	CBT	alliance	binge frequency, remission	ns
Treasure et al. (1999)	BN ( $n = 125$ )	RCT	CBT, MET	alliance	binge/purge frequency	pos



Castonguay et al. (1998)	BED ( $n = 75$ )	con	CBT	pos. emotions	remission	early, mid: pos; late: ns
				neg. emotions		early: neg; mid, late: ns
				neg. experiences		neg
Hartmann et al. (2010)	BN ( $n = 55$ )	RCT	PD	pos. expectations	remission	pos
				recreating dialogue		neg
				intensity		pos
				self-efficacy		pos
Hoffart et al. (2010)	BN, EDNOS ( $n = 39$ )	nat	CBT, PD	dysfunctional	binge/purge frequency	neg
				beliefs		
				pos. emotions	pos	
				neg. emotions	ns	
Zeeck & Hartmann (2005)	AN ( $n = 38$ )	con	PD	neg. emotions	weight gain	neg
				recreating dialogue		pos

## 6. TEMPORAL PATTERNS

*Symptom Change / Rapid Response*

sign:  $n = 18$  / ns:  $n = 1$

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Agras et al. (2000); Fairburn et al. (2004)	BN ( <i>n</i> = 220)	RCT	CBT, IPT	rapid response	remission	pos
Doyle et al. (2010)	AN ( <i>n</i> = 65)	con	FBT	rapid response	remission	pos
Grilo & Masheb (2007)	BED ( <i>n</i> = 50)	RCT	SH	rapid response	remission	pos; FU: ns
Grilo et al. (2006)	BED ( <i>n</i> = 108)	RCT	CBT	rapid response	remission, recovery	pos
Grilo et al. (2012)	BED ( <i>n</i> = 90)	RCT	CBT	rapid response	remission	pos ; FU: ns
Forsberg et al. (2013b)	AN ( <i>n</i> = 78)	RCT	FBT	rapid response	recovery	pos
Hartmann et al. (2007)	AN ( <i>n</i> = 85)	nat	PD	rapid response	weight gain	pos
Hartmann et al. (2010)	BN ( <i>n</i> = 55)	RCT	PD	rapid response	remission	pos
Le Grange et al. (2008) Lock et al. (2008)	BN ( <i>n</i> = 80)	RCT	FBT, SPT	rapid response	remission	pos
Le Grange et al. (2012)	AN ( <i>n</i> = 121)	RCT	FBT, AFT	rapid response	remission	ns
Lund et al. (2009)	AN ( <i>n</i> = 79)	nat	no info available	rate of weight gain	weight gain	pos
Masheb & Grilo (2007)	BED ( <i>n</i> = 75)	RCT	SH	rapid response	binge frequency	pos
Munsch et al. (2012)	BED ( <i>n</i> = 52)	RCT	CBT	rapid response	binge frequency remission	pos ns

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Olmsted et al. (1996)	BN ( <i>n</i> = 166)	nat	CBT	rapid response	relapse	pos
	AN, BN,					
Raykos et al. (2013)	EDNOS ( <i>n</i> = 105)	nat	CBT	rapid response	remission	pos
Safer & Joyce (2011)	BED ( <i>n</i> = 101)	RCT	DBT	rapid response	remission	pos
Schlup et al. (2011)	BED ( <i>n</i> = 76)	con	CBT	rapid response	binge frequency	short: pos; long: ns
Tagay et al. (2010)	AN ( <i>n</i> = 121)	nat	no info available	longer and greater initial weight loss	weight gain	pos
Wilson et al. (2002)	BN ( <i>n</i> = 220)	RCT	CBT, IPT	rapid response	binge/purge frequency	pos

*Dose Effects / Duration* sign: *n* = 13 / ns: *n* = 5

Brown et al. (2013)	AN ( <i>n</i> = 65)	nat	CBT	attendance	weight gain	ns
Fichter et al. (2012)	AN ( <i>n</i> = 258)	RCT	CBT	compliance	weight gain	pos
Gorin et al. (2003)	BED ( <i>n</i> = 94)	RCT	CBT	attendance	binge frequency	pos
Gowers et al. (1994)	AN ( <i>n</i> = 20)	RCT	no info available	attendance	M-R scores	pos
Hilbert et al. (2007)	BED ( <i>n</i> = 162)	RCT	CBT, IPT	attendance	remission	ns

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	AN, BN,					
Jones et al. (2007)	EDNOS ( $n = 34$ )	nat	CBT	duration	weight gain	pos
Kächele et al. (2001)	AN, BN ( $n = 1.171$ )	nat	PD	duration	recovery	pos
Le Grange et al. (2005)	AN ( $n = 45$ )	nat	FBT, SPT	short vs. long	weight gain	long > short
Lock & Litt (2003)	AN ( $n = 44$ )	nat	FBT	duration	weight gain	neg
Lock et al. (2005)	AN ( $n = 86$ )	RCT	FBT, AFT	short vs. long	weight gain	ns
Lock et al. (2006)						
McHugh (2007)	AN ( $n = 65$ )	nat	combined including FBT	duration	recovery	neg
					weight gain	4 > 5
Olmsted et al. (2003)	AN, BN, EDNOS ( $n = 756$ )	con	CBT	day 4 vs. 5	binge frequency, remission	5 > 4
					purge frequency	ns



	AN, BN,						
Richard (2005)	EDNOS ( $n = 2.000$ )	nat	no info available	duration	remission	pos; FU: ns	
Schlup et al. (2011)	BED ( $n = 76$ )	con	CBT	short vs. long	binge frequency remission	ns long > short; FU: ns	
Thiels et al. (2001)	BN ( $n = 31$ )	con	SH	compliance	remission	ns	
Thompson-Brenner & Westen (2005)	BN ( $n = 145$ )	nat	CBT, PD	duration	remission	pos	
Troop et al. (1996)	BN ( $n = 55$ )	RCT	SH	compliance	remission	pos	
Wilfley et al. (1993)	BN ( $n = 56$ )	RCT	CBT	attendance	binge frequency	ns	

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*Note.* AN = anorexia nervosa; BN = bulimia nervosa; BED= binge-eating disorder; EDNOS = eating disorder not otherwise specified; RCT = randomized-controlled trial; nat = naturalistic study; con = controlled study; TAU = treatment as usual; FBT = family-based treatment; CBT = cognitive-behavioral therapy; CT = cognitive therapy; CR = cognitive restructuring; SPT = supportive psychotherapy; AFT = adolescent-focused therapy; IPT = interpersonal psychotherapy; MET = motivation enhancement therapy; EFT = emotion-focused therapy; PD = psychodynamic therapy; PA = psychoanalytical therapy; CAT = cognitive-analytical therapy; SH = self-help program; out = outpatient treatment; in = inpatient treatment; day = day clinic treatment; ind = individual treatment; group = group treatment; relax = relaxation; nutr =

nutritional counseling; instr = instruction; EMA = ecological momentary assessment; M-R scores = Morgan-Russell scores; FU = follow-up; m = month; y = year(s); early = early phase of treatment; mid = mid-treatment phase; late = late phase of treatment; sign = significant association between process and (at least one) outcome variable; ns = non-significant process-outcome association; pos = positive impact on outcome; neg = negative impact on outcome.

Figure Captions

Figure 1. The psychotherapeutic process simplified from the General Model of Psychotherapy (GMP) by Orlinsky et al. (2004).

Figure 2. PRISMA flow chart for identification and screening of relevant studies.

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