The role of treatment delivery factors in exposure-based cognitive behavioral therapy for panic disorder with agoraphobia

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ABSTRACT

Treatment delivery factors (i.e., therapist adherence, therapist competence, and therapeutic alliance) are considered to be important for cognitive behavioral therapy (CBT) for panic disorder and agoraphobia (PD/AG). In the current study, four independent raters conducted process evaluations based on 168 two-hour videotapes of 84 patients with PD/AG treated with exposure-based CBT. Two raters evaluated patients' interpersonal behavior in Session 1. Two raters evaluated treatment delivery factors in Session 6, in which therapists provided the rationale for conducting exposure exercises. At the 6-month follow-up, therapists' adherence (r=0.54) and therapeutic alliance (r=0.31) were significant predictors of changes in agoraphobic avoidance behavior; therapist competence was not associated with treatment outcomes. Patients' interpersonal behavior in Session 1 was a significant predictor of the therapeutic alliance in Session 6 (r=0.17). The findings demonstrate that treatment delivery factors, particularly therapist adherence, are relevant to the long-term success of CBT for PD/AG.

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1. Introduction

Research has demonstrated that exposure-based interventions are highly effective in treating panic disorder and agoraphobia (PD/AG; e.g., Fava et al., 2001; Sánchez-Meca, Rosa-Alcázar, Martin-Martínez, & Gómez-Conesa, 2010). Evidence indicates that exposure exercises in particular are an important strategy for improvement (Ito et al., 2001; Lang, Helbig-Lang, Petermann, 2009; Öst, Thulin, & Ramnerö, 2004; Ruhland & Margraf, 2001). Thereby, patient behavior during exposure exercises (e.g., safety behavior or avoidance behavior) influences the success of treatment (Sloan & Telch, 2001; Telch & Lancaster, 2012). Thus, the method employed to deliver the rationale for exposure exercises may be an important factor for the success of treatment because this delivery may influence how a patient behaves during exposure exercises. Critical treatment delivery factors include therapist adherence, therapist competence, and therapeutic alliance (Dimidjian & Hollon, 2011).

Therapist adherence refers to the extent to which a therapist follows the treatment manual when delivering interventions. Therapist competence describes the therapist’s skill level in delivering treatment and includes the therapist’s consideration of and response to relevant contextual variables (Waltz, Addis, Koerner, & Jacobson, 1993). Therapist adherence and competence are rarely investigated as potential predictors of the outcome of treatment for anxiety disorders (Perepletchikova, Treat, & Kazdin, 2007).

For PD/AG, only few previous studies have investigated the importance of therapist adherence and competence for treatment...
outcomes (Boswell et al., 2013; Haug et al., 2016; Huppert et al., 2001; Huppert, Barlow, Gorman, Shear, & Woods, 2006). Two of these investigations (Huppert et al., 2001, 2006) were based on a large treatment study that compared cognitive behavioral therapy (CBT), imipramine, and the combination of the two treatments in patients with panic disorder without agoraphobia or with mild agoraphobia (N = 312; Barlow, Gorman, Shear, & Woods, 2000).

In the first process analysis performed by Huppert et al. (2001), therapist adherence and competence in the treatment of 186 selected patients were evaluated. Trained raters used one global 7-point item to evaluate therapist adherence (ranging from not done to extensively covered) and therapist competence (ranging from clearly inadequate to excellent). In total, 330 videotapes were assessed to evaluate therapist adherence, and 526 videotapes were analyzed to evaluate therapist competence. The authors stated that the raters reached a high level of reliability prior to rating sessions, but no further information about the reliability of the conducted ratings was provided. Unexpectedly, no differences in the levels of adherence and competence were found for therapists whose patients exhibited above- and below-average treatment outcomes.

The second process analysis performed by Huppert et al. (2006) assessed 320 videotapes to evaluate therapist adherence (therapist competence was not investigated). In addressing a limitation of their previous study, the authors chose not to use a single global adherence item and evaluated the level of therapist adherence with 7–15 items (the item number was dependent on the evaluated treatment session). The raters were trained in the use of the rating scales, but this study did not evaluate the reliability of the conducted ratings. Again, the results indicated no significant relationships between therapist adherence and therapy outcomes.

A relevant study conducted by Boswell et al. (2013) considered patients with panic disorder with and without agoraphobia (N = 276). These authors analyzed 495 randomly selected audiotapes to evaluate therapist adherence and competence. In that study, therapist adherence and competence were both assessed with one global item. The adherence item varied in dependency from the observed session (response format: 0% to 100%). The competence item reads as follows: Overall, how effectively did the therapist accomplish the goal of this part of the session? The competence item was answered using a 6-point scale ranging from 0 (did not attempt) to 5 (excellently). The adherence item (ICC = 0.80) and the competence item (ICC = 0.77) demonstrated adequate reliability. This study also found no significant relationships between therapist adherence and outcomes or between therapist competence and outcomes.

In summary, three large previous studies have provided no evidence that therapist adherence or therapist competence is important in the treatment of panic disorder or PD/AG. However, an important restriction is that most of the previous studies evaluated adherence and competence based on only a single item. Moreover, for two of the three studies, it is unclear whether adherence and competence were assessed reliably. One can question whether a single item can be used to adequately assess complex factors such as therapist adherence and competence. Scale scores, which include several items, would allow researchers to consider several aspects of therapist adherence and competence and thus complete a more comprehensive assessment of these factors, potentially leading to significant adherence-outcome and/or competence-outcome relationships. Recent findings from a smaller study, which used a more comprehensive scale to evaluate therapist adherence/competence (Haug et al., 2016), are in line with these considerations. In that study, the treatment delivery factors of CBT administered to 31 patients with panic disorder were evaluated with the revised version of the Cognitive Therapy Adherence and Competence Scale (including 18 items; Barber, Liese, & Abrams, 2003). The authors found strong relationships between therapist adherence/competence and treatment outcome (r = 0.48; Haug et al., 2016). However, the raters of therapist adherence/competence were not completely independent, potentially influencing the rating process.

One further relevant aspect of the three larger studies (Boswell et al., 2013; Huppert et al., 2001, 2006) is that the evaluated therapy sessions were selected randomly. A positive aspect of this approach is that different aspects of the treatment were considered in the evaluation of therapists’ adherence and competence. However, this approach ignores the possibility that specific aspects of the treatment are especially relevant for therapy success. For the treatment of PD/AG, the provision of the rationale for exposure can be considered as an essential therapeutic process for treatment success. Thus, therapist adherence and competence should be especially relevant during this process.

The therapeutic alliance refers to the quality of the relationship between the therapist and the patient. In a large meta-analysis that considered more than 14,000 treatments, the correlation between therapeutic alliance and therapy outcome was r = 0.275 (Horvath, Del Re, Flückiger, & Symonds, 2011). Research examining the treatment of PD/AG has reported inconsistent findings regarding the alliance-outcome relationship. Some studies have found significant relationships between the therapeutic alliance and therapy outcomes (e.g., Haug et al., 2016; Huppert et al., 2014), whereas other studies have failed to find a significant relationship (e.g., Casey, Oei, & Newcombe, 2005; Rammerö & Öst, 2007; Weiss, Kiviy, & Huppert, 2013). Therefore, further research is necessary to clarify the role of the therapeutic alliance in the treatment of PD/AG.

The generic model of psychotherapy (Orlinsky, 2009; Orlinsky, Rønnestad, & Willutzki, 2004) postulates interactions between treatment delivery factors (i.e., therapist adherence, therapist competence, and therapeutic alliance) and patients’ interpersonal behavior. Research has also provided empirical evidence of the interaction between patients’ interpersonal behavior and treatment delivery factors. In a recent study, the association between patients’ interpersonal behavior (i.e., patients’ behavioral resistance) and the implementation of CBT for panic disorder was investigated (Zickgraf et al., 2015). The study revealed a relationship between patients’ behavioral resistance and therapist adherence; a higher level of patient resistance was associated with a lower level of therapist adherence. Similar relationships between therapeutic competence and patients’ interpersonal behavior were found in a study that investigated interpersonal therapy for depression (Foley, O’Malley, Rounsaville, Prusoff, & Weissman, 1987). In that study, a higher level of patient hostility was associated with a lower level of therapist competence. Boswell et al. (2013) found that a higher level of patient interpersonal aggression was associated with reductions in therapist adherence and competence. Therefore, it is important to consider patients’ interpersonal behavior in the investigation of treatment delivery factors.

The current study aimed to investigate the role of treatment delivery factors (i.e., therapist adherence, therapist competence, and therapeutic alliance) in exposure-based CBT for PD/AG. Accordingly, we focused on therapists’ provision of a rationale for exposure exercises because this process was considered to be especially important for treatment success. Additionally, we investigated the impact of patients’ interpersonal behaviors on treatment delivery factors.

We hypothesized that treatment delivery factors would be significantly related to therapy outcomes. Specifically, we proposed that stronger therapist adherence, therapist competence, and therapeutic alliance would be associated with better treatment outcomes. Moreover, we hypothesized that patients’ problematic interpersonal behavior would have negative effects on the treatment delivery factors (i.e., therapist adherence, therapist com-
petence, and therapeutic alliance). Fig. 1 shows a conceptual model of our process analyses based on our hypotheses.

2. Method

2.1. Study design

The current study is a secondary analysis of a multicenter randomized controlled trial treating patients with PD/AG (registered under NCT01323556; Lang, 2014). The main study aimed to compare two variants of exposure-based CBT (exposure in vivo without intercognitive exposure [E] vs. exposure in vivo plus intercognitive exposure [E+IE]). The inclusion criteria were (a) age between 18 and 65 years, (b) primary diagnosis of a PD/AG according to the Diagnostic and Statistical Manual (DSM-IV-TR; American Psychiatric Association, 2000), and (c) a score of ≥4 on the Clinical Global Impression Scale (CGI; Guy, 1976). The exclusion criteria were (a) comorbid psychotic or bipolar I disorder (according to DSM-IV-TR), (b) current alcohol dependency or current criterion of or dependence on benzodiazepine or other psychoactive substances, (c) current suicidal intent, (d) borderline personality disorder, (e) concurrent ongoing psychotherapeutic or psychopharmacological treatment, and (f) physician-verified contraindications of exposure therapy (i.e., severe cardiovascular, renal, or neurological diseases). Altogether, 125 patients who fulfilled the inclusion criteria participated in the main study. Assessments were conducted at pre-treatment, post-treatment, and 6-month follow-up. In the main study, no evidence that E+IE was superior to E was found. Furthermore, we found no significant differences in our process measures (i.e., adherence, competence, alliance, and interpersonal behavior) between E and E+IE.

For the current study, we randomly selected a subsample of 84 (67.2%) patients for the process analyses (half from E and half from E+IE). All of these patients participated in at least the first and sixth therapy sessions, which serve as the basis for the process analyses in the current study.

2.2. Participants

2.2.1. Patients

The mean age of the 84 patients was 33.90 years (SD = 10.04; range = 19–60), and 53 (63.10%) patients were female. Fifty-six (66.66%) of the patients had a comorbid disorder, and the average number of disorders was 2.23 (SD = 1.33). All patients had a primary diagnosis of PD/AG. The most frequently reported comorbid disorders were anxiety disorders (33.82%) and affective disorders (17.65%). The patients of the current sample did not differ from those who were excluded (n = 40) in terms of sex (χ²(1) = 1.07; p = 0.32), age (F(1,123) = 1.27; p = 0.26), or the number of disorders (F(1,123) = 1.17; p = 0.28).

2.2.2. Therapists

Thirty-four therapists treated the 84 patients. Therapists had an average age of 28.53 years (SD = 2.9 years; range: 25–37), and 27 (79.41%) of the therapists were female. All therapists had a master’s degree in clinical psychology and had an average of 2.43 (SD = 1.69; range: 4–79 months) years of clinical experience. On average, each therapist treated 2.47 (SD = 1.5; range: 1–7) patients in the current study. All therapists were trained in the treatment approach via a 3-day workshop and were regularly supervised by licensed and experienced supervisors. Therapists were allowed to participate in the current study only if they were able to demonstrate adherence to selected parts of the treatment manual in a role-play situation (i.e., the adherent implementation of a mental experiment).

2.2.3. Raters

Process ratings were provided by four raters (two female and two male raters), all of whom were master’s-level clinical psychologists (three were licensed psychotherapists, and one was near the completion of his/her psychotherapy training). The raters had an average of 6.50 years (SD = 3.11; range: 4–11) of clinical experience. All raters were trained in the treatment of PD/AG and had practical experience treating patients with PD/AG. The raters completed a 9-h training course on how to use the process rating scales. The raters were given no information regarding the patients’ treatment outcomes.

2.3. Treatments

Both treatment conditions included 12 sessions within a nine-week period. In the follow-up, two booster sessions were conducted with an 8-week interval between sessions. The duration of each session was 100 min, with the exception of Session 6 and the exposure sessions, which could be longer. The therapy rationale focused on exposure-based interventions. According to the treatment manual (see Lang, Helbig-Lang, Westphal, Gloster, & Wittchen, 2012), the first session aimed to provide patients with an understanding of the forthcoming treatment and with infor-
mation on fear, panic, agoraphobia, and the development of panic disorders. During the treatment, the therapists were expected to establish an individual vicious cycle of panic together with their patients.

Sessions 2–5 consisted of an individualized behavioral analysis of the patient’s symptoms and fear-avoidance and safety behaviors as well as the implementation of interoceptive exposure exercises (e.g., running or spinning).

The main topic of Session 6 was coping with fear in specific situations. Therefore, a hierarchy of feared situations was used. The major strategy employed to attain this goal was a “thought experiment” (i.e., a constructed imagined situation that should explain the rationale of exposure) in which the patient was asked to imagine being in a feared situation (e.g., being in a plane) without engaging in avoidance or safety-seeking behavior. The therapist described features of the feared situation in detail (e.g., narrow cabin with sticky air, no other passengers) and kept the situation open-ended (e.g., “you do not know where the flight is going or how long it will last”). After setting up the thought experiment, the therapist repeatedly assessed the patient’s imagined fear response (e.g., cognitions, bodily symptoms) in this situation. The therapist continued to describe the situation, and the patient was guided to consider how fear would develop over time when there was no way of avoiding the situation or fear-related symptoms and cognitions. In most cases, patients assumed at the beginning of the experiment that their fear would rapidly increase to a maximum. The therapist eliminated any fatal consequences that patients might assume (e.g., “I will die from a heart attack”) and asked patients to consider the course of fear when fatal consequences would not occur and the situation could not be escaped. Typically, patients assumed that their fear must subside after being in a situation for a long period of time. At the end of the thought experiment, patients were asked to derive the core principles of exposure therapy from their perspective: Entering a feared situation without the possibility to escape or avoid it and fear will subside over time. In a final step, the execution of prospective exposure in vivo exercises was discussed in detail with the patient.

After the patient agreed to the exposure treatment, Sessions 7–12 primarily consisted of a standardized (crowded bus ride) and three personalized individual in vivo exposure exercises administered by the therapist. In the E condition, the patients were instructed to observe and tolerate each symptom of anxiety during the exercise, and patients in the E+IE condition were additionally instructed to implement interoceptive exposure during exercises.

Both booster sessions focused on the review of treatment progress and instructed patients to continue to perform exposure exercises. In addition to the interventions implemented in the therapy sessions, homework was assigned.

2.4. Process measures

2.4.1. Adherence assessment

Therapist adherence was evaluated using the Adherence Scale for Exposure Therapy (AS-ET; Grikscheit et al., 2015). The AS-ET includes 12 items that evaluate therapist adherence to the sixth session of the treatment manual: (1) agenda, (2) homework review, (3) implementation of interoceptive exposure exercises, (4) review of interoceptive exposure exercises, (5) information about exposure and habituation, (6) establishment of an anxiety stimulus hierarchy, (7) information about the consequences of avoidance behavior, (8) introduction and preparation of a mental experiment regarding exposure, (9) the mental experiment, (10) conclusions drawn from the mental experiment, (11) information on the exposure exercises, and (12) homework assignment.

The items were rated on a four-point scale (0 = no adherence, 1 = low adherence, 2 = moderate adherence, and 3 = high adherence). In the current study, very high intrarater reliability (ICC(2,2) = 0.93; p < 0.001) was found for the mean AS-ET score.

2.4.2. Competence assessment

Therapist competence was assessed with the Cognitive Therapy Scale (CTS; Young & Beck, 1980; German version: Weck, Grikscheit, Höfling, & Stangier, 2014; Weck, Hautzinger, Heidenreich, & Stangier, 2010; Weck, Hilling, Schermelleh-Engel, Rudar, & Stangier, 2011), which is the most well-established scale for measuring therapist competence in administering CBT (Kazantzis, 2003). The German version of the CTS consists of 14 items: (1) agenda setting, (2) dealing with problems/questions/objections, (3) clarity of communication, (4) pacing and efficient use of time, (5) interpersonal effectiveness, (6) resource activation, (7) reviewing previously set homework, (8) using feedback and summaries, (9) guided discovery, (10) focus on central cognitions and behavior, (11) rationale, (12) selecting appropriate strategies, (13) appropriate implementation of techniques, and (14) assigning homework.

Moreover, we developed a competence scale that addresses specific therapeutic competencies regarding the implementation of exposure-specific interventions (CTS-ET; Grikscheit et al., 2015). The CTS-ET includes three items: (1) implementation of interoceptive exposure, (2) implementation of mental exercises, and (3) provision of the rationale for exposure. The response format of the CTS and the CTS-ET is a seven-point rating scale (0 = poor, 1 = barely adequate, 2 = mediocre, 3 = satisfactory, 4 = good, 5 = very good, and 6 = excellent). In the current study, high levels of interrater reliability were found for the mean scores of the CTS (ICC(2,2) = 0.93; p < 0.001) and the CTS-ET (ICC(2,2) = 0.88; p < 0.001).

2.4.3. Therapeutic alliance

The therapeutic alliance was evaluated using the Helping Alliance Questionnaire (HAQ; Luborsky, 1984; German version: Bassler, Potratz, & Krauthauser, 1995), which assesses the collaborative and affective bond between a therapist and a patient. The current study used the HAQ-R, which is a rater version of the HAQ that includes the 11 items of the HAQ that are reworded (Richtberg, Jakob, Höfling, & Weck, 2016). For example, Item 9 of the HAQ-R reads as follows: “I believe the patient is working together with the therapist in a joint effort.” The response format of the HAQ-R is a 6-point rating scale ranging from 1 (strongly disagree) to 6 (strongly agree). In the current study, the intrarater reliability of the mean HAQ-R score was high (ICC(2,2) = 0.79; p < 0.001).

2.4.4. Interpersonal behavior

The Assessment Form of Patient Interpersonal Behavior (AFPIB; Richtberg et al., 2016) was used to evaluate interpersonal behavior. The AFPIB includes 10 items that evaluate patients’ in-session interpersonal behaviors that positively/negatively affect the therapeutic process. The items of the AFPIB assess (1) cordiality/pleasanness, (2) attentive listening, (3) reciprocal communication, (4) patience, (5) positive expectation, (6) open reporting, (7) trying new interventions, (8) activity, (9) emotional involvement, and (10) showing interest. The AFPIB has a five-point rating format (0–4). Point 4 includes a detailed description of positive patient behavior (e.g., reciprocal communication) and point 0 describes negative patient behavior in detail (e.g., difficulty limiting speaking time). Point 2 includes a detailed description of the neutral category, and Points 1 and 3 represent patient behavior that falls between the behaviors described. In the current study, the intrarater reliability of the mean score of the AFPIB was satisfactory (ICC(2,2) = 0.71; p < 0.001).

2.5. Measures of general psychopathology and outcomes

The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983; German version: Franke, 2000) was used to assess gen-
eral psychopathology. The BSI includes the following subscales: somatization, obsessive–compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The current study used the mean score of the BSI, which is a measure of general psychopathology. In the current study, the internal consistency of the BSI was Cronbach’s α = 0.93.

For the evaluation of treatment outcomes, two established self-report measures of PD/AG were used. The Panic and Agoraphobia Scale (PAS; Bandelow, 2000) was used to evaluate the severity of panic attacks, anticipatory anxiety, agoraphobic avoidance, health concerns, and functional impairment. In the current study, the internal consistency of the PAS was Cronbach’s α = 0.88. The Mobility Inventory (MI: Chambless et al., 1985) assessed agoraphobic avoidance. The current study used the version of the MI that evaluates agoraphobic avoidance regarding being alone. The internal consistency of the MI was Cronbach’s α = 0.95.

2.6. Procedure

Fig. 1 shows the evaluation process employed in the current study. Before treatment, sociodemographic (age and gender) and psychopathological characteristics (the number of diagnoses and the BSI sum score) were assessed. In the first session, the patients’ interpersonal behavior (AFPIB) was assessed by two raters (Raters 1 and 2). In the sixth session, therapist adherence (AS-ET), competence (CTS, CTS-ET), and alliance (HAQ-R) were assessed by two other raters (Raters 3 and 4). The patients’ outcome measures (PAS and MI) were assessed after the 12th session (post) and at the 6-month follow-up. The outcome measures were transformed into difference measures by subtracting, e.g., the PAS pre-treatment score from the PAS follow-up score (pre-follow-up).

2.7. Statistical analysis

Of the 84 patients, 70 (83.3%) completed the post-treatment assessment, and 59 (70.2%) completed the follow-up assessment. The intention-to-treat (ITT) method (with the last observations carried forward) was used to handle missing data. A priori power analyses were conducted using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007). To detect moderate correlations (≥ 0.30) between the treatment delivery factors and outcomes at a power of 1−β = 0.80 with an α of 0.05, a sample of at least 84 participants is needed.

2.7.1. Interrater reliability

The levels of interrater reliability were analyzed using intraclass correlation coefficients (ICCs) with Model 2 and two raters (ICC2,1; see Shrout & Fleiss, 1979). A 95% confidence interval was used to determine statistical significance.

2.7.2. Path analysis

A path analysis model was specified in accordance with Fig. 1. As criterion measures, the difference scores for the PAS and the MI were specified for both post-treatment and follow-up. Variables were centered before difference scores were specified to avoid biases caused by raw scores. Correlations between these outcome measures were set free. The mediating variables were the process variables measured in Session 6, such as therapist adherence (AS-ET), competence (CTS, CTS-ET), and alliance (HAQ-R), and the patient’s interpersonal behavior (AFPIB) rated in Session 1. The process variables in Session 6 were correlated with each other. The predictor variables were age, gender, the number of diagnoses, and the BSI sum score at pre-treatment. Significant paths were examined to identify differences between treatment conditions.

The path analysis was performed using Mplus (Version 7; Muthén & Muthén, 2012) and the maximum likelihood estima-

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<th>Table 1</th>
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<td>Process ratings of patients’ interpersonal behavior, therapist adherence, therapist competence, and therapeutic alliance in Sessions 1 and 6 (N = 84).</td>
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<tr>
<td>Session 1 (Raters 1 and 2)</td>
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<td>Session 6 (Raters 3 and 4)</td>
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Note: AFPIB = Assessment Form of Patient Interpersonal Behavior; AS-ET = Adherence Scale for Exposure Therapy; CTS = Cognitive Therapy Scale; CTS-ET = Cognitive Therapy Scale (adapted for exposure therapy); HAQ-R = Helping Alliance Questionnaire (rater version).”

3. Results

Table 1 shows the means, standard deviations, and ranges of the process measures for Sessions 1 and 6. The patients’ interpersonal behavior in Session 1 was relatively unproblematic. Only three (3.6%) patients exhibited an AFPIB mean score <2, which indicated generally negative interpersonal behavior. Furthermore, the therapists demonstrated a high level of adherence in the sixth session. All therapists demonstrated at least moderate adherence overall. The path analysis model presented in Fig. 2 yielded a good model fit (χ² = 17.43, df = 15, RMSEA = 0.04, CFI = 0.99, SRMR = 0.06). Regarding the predictor variables, only the number of diagnoses had a moderate influence on the patients’ interpersonal behavior (AFPIB). A greater number of diagnoses was associated with more problematic interpersonal behaviors of patients.

Patients’ interpersonal behavior (AFPIB) had a small influence only on the process variable of therapeutic alliance (HAQ-R) and not on the other process variables (AS-ET, CTS, and CTS-ET). Less problematic interpersonal behavior was associated with a stronger therapeutic alliance.

The correlations between the process variables in Session 6 were all substantial (0.63 < r < 0.86). Finally, both therapist adherence (AS-ET) and the therapeutic alliance (HAQ-R) showed moderate to large effects on change in agoraphobic avoidance behavior (MI) at follow-up. Stronger therapist adherence and alliance were associated with better treatment outcomes at follow-up. No other criterion variable was affected by any of the process variables (AS-ET, CTS, CTS-ET, and HAQ-R). The correlations between the criterion variables were all moderate to large (0.42 < r < 0.81). The treatment conditions (E vs. E+IE) did not exhibit significant differences in the aforementioned effects (Δ χ² = 3.85, Δ df = 1).

4. Discussion

In the current study, we investigated the role of treatment delivery factors (i.e., therapist adherence, therapist competence, and
therapeutic alliance) in exposure-based CBT for PD/AG. In line with our hypothesis, two of the investigated treatment delivery factors (i.e., therapist adherence and therapeutic alliance) were significant predictors of therapy outcomes at the 6-month follow-up. However, relevant relationships between treatment delivery factors and therapy outcome were found only for the outcome measure of avoidance behavior (i.e., the MI) at follow-up. Contrary to our hypothesis, therapist competence was not a significant predictor of therapy outcomes. Unexpectedly, patients’ interpersonal behavior was not significantly related to therapist adherence or therapist competence and was only slightly related to therapeutic alliance ($r = 0.17$).

In contrast to previous studies (Boswell et al., 2013; Casey et al., 2005; Huppert et al., 2001, 2006; Ramrød & Øst, 2007; Weiss et al., 2013), we found significant relationships between treatment delivery factors and therapy outcomes in CBT for PD/AG. Therapist adherence ($r = 0.54$) and therapeutic alliance ($r = 0.31$) were significantly related to changes in agoraphobic avoidance behavior at the 6-month follow-up. One explanation for the differences in the results of the current study and those of previous studies is the use of different evaluation methods (e.g., the use of single items vs. comprehensive and reliable measures). This explanation is in accordance with the study of Haug et al. (2016), who used a comprehensive measure and also found significant relationships between treatment delivery factors and therapy outcome. Moreover, in contrast to previous studies, we considered therapy outcomes simultaneously at post-treatment and 6-month follow-up in our process analyses. By considering both assessment times, we found that treatment delivery factors were particularly important at the 6-month follow-up. Our findings are consistent with the results obtained by Brown et al. (2013), who found similar results for the competence-outcome relationship in CBT for various anxiety disorders. In their study, the competence-outcome relationship was more relevant at 12-month ($r = 0.15$) and 18-month follow-ups ($r = 0.22$) than at post-treatment ($r = 0.01$). Notably, the treatment delivery factors in CBT for PD/AG are particularly relevant in the long term, as the study findings indicate that treatment delivery factors may play an important role in not only immediate treatment outcomes. The finding that treatment delivery factors and therapy outcome are significantly associated only at follow-up and not at post-treatment might be influenced by our methodological approach. In our path analysis model, we were able to model the strong intercorrelations of all outcome measures at post-treatment and at 6-month follow-up simultaneously in one analysis. This procedure is favored over sequential or single analyses.

Therapist adherence predicted a change only in the outcome measure of avoidance behavior (i.e., the MI) and not in the broader outcome measure assessing the severity of panic attacks, anticipatory anxiety, health concerns, and functional impairment (i.e., the PAS). A possible explanation for this finding is that we evaluated therapist adherence in the sixth session. In Session 6, the therapists implemented the rationale for exposure exercises, which is especially important in overcoming avoidance behavior (Golster et al., 2011). Therapist adherence to the administration of other interventions might be more important for addressing other issues (e.g., psychoeducation to address health concerns). Therefore, the delivery of very specific interventions might influence changes in highly specific outcomes (see Weck, Richtberg, Esch, Hofling, & Stangier, 2013).

In our study, therapist adherence, but not therapist competence, was important for treatment outcomes. Notably, adherence and outcome were strongly correlated. This finding contradicts a recent meta-analysis that found a significant competence-outcome relationship ($r = 0.24$) but no significant adherence-outcome relationship ($r = 0.06$) in CBT (Zarafonitis-Müller, Kuhr, & Bechdolf, 2014). However, the meta-analysis considered only one study that investigated the role of therapist adherence in CBT for panic disorder (Huppert et al., 2006). Specific treatment delivery factors such as therapist competence could be especially important for CBT for specific disorders. The meta-analysis findings of Zarafonitis-Müller et al., who demonstrated the importance of therapist competence for CBT for depression ($r = 0.38$; see also Webb, DeRubeis, & Barber, 2010), are consistent with this consideration. Therefore, therapist competence could be more important for the treatment of depression, and therapist adherence may be more important for PD/AG treatment. Moreover, our study investigated a very specific therapeutic approach (i.e., exposure-based CBT) to treating PD/AG. The treatment was highly standardized by a detailed treatment manual (Lang et al., 2012). Thus, the level of therapist adherence was very high. Because of the high levels of standardization and therapist adherence, therapist competence might be less relevant for changes in therapy outcomes. Consistent with this consideration, highly standardized internet-based treatments with minimal therapist guidance have demonstrated high efficacy despite the minor role played by the therapist (Palmqvist, Carlbring, & Andersson, 2007). Therefore, therapist competence may be more important for less standardized approaches.

Because our study was based on a correlational design, the causality of the adherence-outcome relationship (as well as of the alliance-outcome relationship) is unclear. On the one hand, therapist adherence could have positively affected patient improvement. This perspective underlines the importance of adhering to the exposure-based approach to achieve treatment success. On the other hand, improvements in patient symptoms could make

**Fig. 2.** Completely standardized solution for the path analysis model. Correlations between the process measures in Session 6 and correlations between the criteria variables were omitted for ease of presentation. AFPIB = Assessment Form of Patient Interpersonal Behavior; AS-ET = Adherence Scale for Exposure Therapy; CTS = Cognitive Therapy Scale; CTS-ET = Cognitive Therapy Scale (adapted for exposure therapy); HAQ = Helping Alliance Questionnaire (rater version); MI = Mobility Inventory; PAS = Panic and Agoraphobia Scale.
it easier to ensure treatment adherence. Accordingly, therapist adherence would be only a consequence and not a cause of treatment success. Only an experimental, and not a correlational design, would allow us to address the issue of causality (see Perepletchikova, & Kazdin, 2005).

The assessment of specific competencies for exposure-based CBT (evaluated by the CTS-ET) did not improve the prediction of therapy outcomes compared with the assessment of general competencies (evaluated by the CTS). Moreover, the CTS-ET and the CTS were highly correlated ($r = 0.84$). Therefore, the necessity of such an assessment of specific competencies may be questioned. Thus, a generic approach (using the CTS) seems sufficient.

Patients’ interpersonal behavior was less relevant in delivering CBT than we expected. Only a small correlation with therapeutic alliance was found. It is desirable for patients’ problematic interpersonal behavior to not have a negative effect on treatment delivery, but our findings contradict the results of previous studies (Boswell et al., 2013; Zickgraf et al., 2015). However, the patients in our study showed relatively uncomplicated interpersonal behavior. Patients’ interpersonal behavior can be assumed to be more important for the delivery of treatment when it is more problematic. In our study, interpersonal behavior was assessed with a measure (i.e., the APPIB) that also evaluates a considerable amount of state variance (Richtberg, Höfling, & Weck, 2015). In comparison, Boswell et al.’s study used a trait measure to assess interpersonal characteristics. This difference could also explain the different findings of the studies. In general, the effect of interpersonal behavior on the therapeutic alliance is understandable because this alliance is strongly affected by both therapist and patient behaviors, whereas therapist adherence and competence are more dependent on the therapist’s behavior.

Several limitations of our study should be discussed. First, only therapists who were able to demonstrate adherence in a role-play setting were chosen for the current study. Moreover, the therapists were intensively trained and closely supervised. For this reason, the therapists demonstrated a high level of adherence. Correlations between treatment delivery factors and therapy outcomes are less likely when the variance in treatment delivery factors is restricted. Therefore, it is remarkable that we found such high correlations between therapist adherence and the MI at follow-up. However, the lack of a correlation between therapist adherence and the PAS might also be influenced by the restricted variance in therapists’ behavior. Thus, it is also important to investigate the role of delivery factors in CBT for PD/AG in settings that are more naturalistic and with greater variance in therapist behavior (see Haug et al., 2016). Moreover, we must also consider the possibility that the findings are caused by specific characteristics of our sample. Therefore, future studies must be conducted to ensure the generalizability of the findings.

Second, in our study, only one therapy session was considered for the evaluation of therapists’ adherence and competence. One can question whether this small snapshot of therapist behavior is sufficient for assessing therapist adherence and competence. For example, in cognitive therapy for cocaine dependence, five therapy sessions were necessary to create a stable score of therapist adherence and competence (Dennhag, Gibbons, Barber, Gallop, & Crits-Christoph, 2012). However, in the current study, treatment sessions lasted 100 min; therefore, raters received a larger view of therapists’ behaviors. Moreover, the selected treatment session was not chosen randomly; rather, it was based on an a priori hypothesis. We considered the provision of the rationale for exposure to be an essential therapeutic process for treatment success. Therefore, therapist adherence and competence demonstrated only in the sixth treatment session were evaluated in the current study. However, a score of therapist adherence and competence aggregated over several treatment sessions may be more relevant for treatment success.

Third, our study had satisfactory power ($1-\beta = 0.80$) to identify significant relationships of moderate magnitude ($r \geq 0.30$); however, for correlations of a lower magnitude (e.g., $r = 0.20$), the level of statistical power was unsatisfactory (e.g., $1-\beta = 0.45$; Faul et al., 2007). In larger samples, smaller correlations between therapist competence and therapy outcomes would be detectable; however, weaker relationships are less relevant for clinical practice.

Fourth, we considered only a 6-month follow-up. One may question whether delivery factors are also relevant at subsequent follow-up times. Therefore, the role of treatment delivery factors in CBT for PD/AG should also be investigated with longer follow-up intervals. Moreover, consistent with previous studies (Brown et al., 2013), therapist competence might be determined to be relevant for therapy outcomes by considering a longer follow-up period.

In contrast to most previous studies, our study showed that treatment delivery factors are relevant to the outcomes of exposure-based CBT for PD/AG. Methodological improvements in the assessment of delivery factors and the consideration of follow-up assessments might explain our findings. In particular, therapist adherence might play an important role in the long-term success of CBT for PD/AG and should therefore be strongly considered in this type of therapy. However, further experimental studies are necessary to allow a causal interpretation of the adherence-outcome relationship. In such a randomized controlled study, patients with PD/AG should be randomized to CBT conditions that differ only in their level of therapist adherence. Moreover, in the current study, we focused on the relationship between treatment delivery factors and treatment outcome in general. However, more specific analyses of the relationship between treatment delivery factors and specific outcome variables (e.g., patients’ homework compliance, patients’ behavior in exposure sessions) can be performed. Although such analyses are beyond the scope of the current study, future research should consider these relationships.

Funding/support

This research was supported by Grant WE 4654/4-2 from the German Research Foundation. Moreover, this work was based on the German multicenter trial “Mechanisms of CBT-treatment effects in patients with panic disorder and panic disorder with agoraphobia: The role of interoceptive exposure and fear augmentation (MCBT-PDAS),” The multicenter trial is funded by the German Federal Ministry of Education and Research (BMBF, 01GV0614) as part of the larger BMBF Psychotherapy Research Funding Initiative Improving the Treatment of Panic Disorder. The RCT was approved by the Ethics Committee of the German Psychological Society (DGPs, AH11.2009). The study was registered with the NCT01323556.

Centers of the multicenter trial

Principal investigators (PI) with respective areas of concentration of the MCBT-PDAS are Alfons Hamm (Greifswald: PI for Psychophysiology); Thomas Lang (Bremen: Study Director for the Randomized Clinical Trial (RCT) and Manual Development); Alexander L. Gerlach (Münster: PI for Panic Subtypes); Georg W. Alpers (Mannheim: PI for Ambulatory Assessment); Christiane Pané-Farré (Greifswald: PI for Psychophysiology and Panic Disorder); Tilo Kircher (Marburg: PI for Functional Neuroimaging), and Jürgen Deckert (Würzburg: PI for Genetics). Additional site directors of the RCT component of the program are Winfried Rief (Marburg) and Paul Pauli (Würzburg).
Centers of the research network
Volker Arolt (Münster: Overall Network Coordination), Hans-Ulrich Wittchen (Dresden), and Andreas Ströhle (Berlin).

Data access and responsibility
All principle investigators take responsibility for the integrity of the respective study data and their components. All authors and coauthors had full access to all study data. Data analysis and manuscript preparation were completed by the authors and coauthors of this article, who take responsibility for their accuracy and content.

Acknowledgements and staff members by site
Bremen (coordinating center for the multicenter trial): Veronika Bamann, Sandra Cammin, Sarah Czilik, Kira Geisler, Sylvia Helbig-Lang, Kirsten Helmes, Anne Kordt, Tanja Leonhard, Mila Plett-Perelshteyn, Christian Soltau, Juliane Sülz, Maxie von Auer; Greifswald (coordinating site for psychophysiology): Annett Hoffmann, Jan Richter; Mannheim (coordinating center for ambulatory assessment): Christoph Biwer, Elisabeth Borgmann, Antje Gerdes, Otto Martin, Kristina Steinbach, Bettina Stemmler, Andrew White; Marburg (coordinating center for functional neuroimaging): Tobias Feilinger, Andreas Jansen, Nikita Jegan, Carsten Konrad, Marion Mickel, Silke Rusch, Katrin Schlöterer, Benjamin Straube, Mareike Stumpenhorst, Katrin Wambach, Yunbo Yang; Münster (coordinating site for panic subtypes): Susanne Kettler, Anna Vossbeck-Elsebusch; Würzburg Psychiatry Department (coordinating center for genetics): Carola Gagel, Andreas Reif, Heike Weber; Würzburg Psychology Department: Almut Friedl-Huber, Harald Krebs, Caroline Ott, Nina Steinhauser; Additional support was provided by the coordinating center for clinical studies in Dresden (KKs Dresden): Marko Käppler.

Role of funding source
The funding organizations had no role in the design or implementation of the study; the collection, analysis, or interpretation of the data; or the preparation, review, or approval of the manuscript.

References


