# The Patient Perspective on Therapeutic Change: The Investigation of Associations Between Stages of Change and General Mechanisms of Change in Psychotherapy Research

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In this study, we explored intersections between two influential integrative frameworks in psychotherapy research. Specifically, we analyzed associations between stages of change from Prochaska's transtheoretical model and general mechanisms of change from Grawe's psychological therapy in a longitudinal design. Our central hypothesis, which we could derive from theoretical concepts of both frameworks, was as follows: Experiential change mechanisms (*emotional bond*, *problem actuation*, and *clarification of meaning*) should be especially relevant in early stages of change (*precontemplation* and *contemplation*), and behavioral change mechanisms (*resource activation*, *mastery*, and *agreement on collaboration*) should be especially relevant in late stages of change (*action* and *maintenance*). Therefore, 253 inpatients completed the University of Rhode Island Change Assessment, short version (URICA-S), the Scale for the Multiperspective Assessment of General Change Mechanisms in Psychotherapy (SACiP), and diverse outcome measures in early, middle, and late stages of psychotherapy. Cross-lagged panel analyses and multilevel analyses partially supported our hypothesis and revealed trends for interactive effects between change mechanisms and stages of change in outcome prediction. More specifically, our results suggest that experiences of both experiential and behavioral change mechanisms predicted increases in the *action* stage of change. *Contemplation* predicted increases in behavioral change mechanisms experiences. Clinical implications of these findings are discussed.

*Keywords:* transtheoretical model, psychological therapy, stages of change, processes of change

Promising new psychotherapy research paradigms define common factors to combine different therapeutic systems (Grawe, 2004; Orlinsky, 2009; Prochaska & DiClemente, 1983; Prochaska & Prochaska, 2010). The central assumption of the transtheoretical model (TTM) is that therapeutic interventions should be matched to the motivational stage of the patient (Prochaska & DiClemente, 1983; Prochaska & Prochaska, 2010). The TTM categorizes five

distinct stages of change: (a) the *precontemplation* stage, where patients have no intention for therapeutic change; (b) the *contemplation* stage, where patients are thinking about therapeutic change, but are ambivalent; (c) the *preparation* stage, where patients are committed to change; (d) the *action* stage, where patients actively work on their problem; and (e) the *maintenance* stage, where patients focus on relapse prevention. The TTM claims that patients move through the stages of change in a spiral pattern (Prochaska & Norcross, 2010). Further, the TTM conceptualizes 10 processes of change as consequences of therapeutic interventions. The processes of change are defined as covert or overt activities of the individual to alter emotion, thinking, behavior, or relationships related to specific problems (Prochaska & Norcross, 2010). These processes of change form two main categories. Those fostering more awareness of the problem, like *consciousness raising* or *self-reevaluation*, are categorized as experiential processes of change. Those fostering active work on the problem, like *contingency management* and *stimulus control*, are categorized as behavioral processes of change (Prochaska & Norcross, 2010). A detailed categorization of the processes of change is presented in Table 1. Experiential processes of change should be especially relevant in early stages of change (*precontemplation*, *contemplation*, and *preparation*), whereas behavioral processes of change should be especially relevant

in late stages of change (*action*, *maintenance*; Prochaska & Prochaska, 2010). A meta-analysis integrating studies across different health problems (substance abuse, health behavior, psychological problems, etc.) confirms this hypothesis with mean effect sizes (*d*) of ~.70 for variation in experiential processes by stage and of .80 for variation in behavioral processes by stage (Norcross, Krebs, & Prochaska, 2011).

The most frequently used instrument to measure the stages of change in psychotherapy research is the University of Rhode Island Change Assessment (URICA; McConnaughy, Prochaska, & Velicer, 1983). Its four subscales consist of eight items each and measure *precontemplation*, *contemplation*, *action*, and *maintenance*. Quite a number of studies demonstrate its' validity (e.g., DiClemente & Hughes, 1990; Dozois, Westra, Collins, Fung, & Garry, 2004; McConnaughy, DiClemente, Prochaska, & Velicer, 1989; Polaschek, Anstiss, & Wilson, 2010). A meta-analysis revealed a mean effect size of *d* = .46 for the link between URICA stages of change and outcome in psychotherapy research (Norcross et al., 2011). A short-version (URICA-S), with four items per subscale, has been validated (Mander et al., 2012).

## Grawe's Psychological Therapy

Grawe derived five general mechanisms of change from broad empirical data in his psychological therapy: (a) *Resource activation* re-

Table 1

*Categorization of Transtheoretical Processes of Change and Associations to Grawe's Mechanisms of Change*

| Processes of change from the transtheoretical model | | | Mechanisms of change from psychological therapy |
|---|---|---|---|
| Experiential processes of change | Consciousness raising Environmental reevaluation Self-reevaluation Social liberation | Are important for experiences of | Clarification of meaning |
| | Dramatic relief | Same as | Problem actuation |
| Behavioral processes of change | Counterconditioning Contingency management Stimulus control | Are important for experiences of | Mastery |
| | Helping relationships Self-liberation | Are aspects of | Resource activation |

fers to the purposeful use of the patient's individual abilities for therapeutic change. (b) *Problem actuation* implies actual emotional experiences of one's problem in therapy sessions. (c) *Mastery* refers to the learning of concrete strategies to cope with problem situations. (d) *Clarification of meaning* implies the realization of (un)conscious motives of one's own behavior. Finally, (e) the *therapeutic alliance* reflects the quality of the relationship between therapist and patient (Grawe, 1995, 1997, 1999, 2004; Grawe, Donati, & Bernauer, 1994). Mechanisms of change can be assessed with the Scale for the Multiperspective Assessment of General Change Mechanisms in Psychotherapy (SACiP; Mander, et al., 2013a). Its six subscales reflect Grawe's change mechanisms, with the therapeutic alliance mechanism operationalized into two subscales representing Bordin's (1979) *emotional bond* and goals and tasks (*agreement on collaboration*) components of the alliance. Several empirical studies investigated different clinically relevant aspects of the Grawe mechanisms of change: The link between change mechanisms and outcome has been investigated (Flückiger, Grosse Holtforth, Znoj, Caspar, & Wampold, 2013; Zeeck & Hartmann, 2005; Znoj et al., 2010), interactions between mechanisms of change and experimental activations of mechanisms of change have been explored (Flückiger & Grosse Holtforth, 2008; Gassmann & Grawe, 2006) and session-by-session dynamics have been evaluated (Lutz et al., 2013; Smith & Grawe, 2005; Tschitsaz-Stucki & Lutz, 2009).

## Associations Between the Transtheoretical Model and Psychological Therapy

Several hundred studies investigated the stages of change construct in various problem types (Prochaska & Norcross, 2010; Robinson & Vail, 2012), and several studies analyzed stages of change and processes of change associations in the field of physical activity (Hutchison, Breckon, & Johnston, 2009; Marshall & Biddle, 2001), but there are only few studies analyzing the associations of stages of change with specific therapeutic processes in psychotherapy research (Norcross et al., 2011). Further, most studies concerning aspects of the TTM have been conducted in a cross-sectional design and there is a lack of longitudinal studies (Hall & Rossi, 2008). Grawe's common factor

concept, which derived the above mentioned general mechanisms of change from thousands of empirical results of psychotherapy research, is widespread in German speaking countries, and has been recognized internationally lately (Caspar, 2010; Caspar et al., 2010). Further, Grawe (1995, 1997) postulated that his psychological therapy should be continually revised to incorporate and reflect the latest empirical findings and that investigations of new concepts are important to advance his approach. Complementing earlier evidence and addressing the above mentioned research gaps concerning the TTM, and further following the Grawe research tradition of continually revising his approach, the aim of this study was to empirically investigate an intersection between Prochaska's transtheoretical model and Grawe's psychological therapy, to combine those two influential theoretical frameworks. Specifically, our aim was, first, to identify indicators of heuristic rules of how to focus on the activation of different change mechanisms in different stages of change to optimize therapeutic outcome. Second, this also might help to reduce conceptual redundancy, an important issue that has been outlined in the literature on pursuing a unifying paradigm for psychotherapy (e.g., Anchin, 2008).

Meaningful theoretical associations between Prochaska's stages of change and Grawe's mechanisms of change can be derived from both theories: Obviously, Prochaska's processes of change are very similar concepts to Grawe's general mechanisms of change. Specific associations between the two concepts are depicted in Table 1. While the TTM processes of change are more general concepts concerning behavior change and are not operationalized for specific problem fields (Hutchison et al., 2009), Grawe's mechanisms of change have been specifically formulated for the field of psychotherapy research, as they have been derived from an empirical analyses of thousands of findings in psychotherapy research (Grawe, 1995). Therefore, Grawe's mechanisms of change might be the more appropriate constructs when assessing associations of stages of change with therapeutic processes, a research gap that, as mentioned above, has been outlined by several authors (e.g., Norcross et al., 2011).

*Problem actuation* and *clarification of meaning* foster getting more awareness of the prob-

lem. Hence, according to the TTM, they can be conceptualized as experiential processes of change. *Resource activation* and *mastery* foster active work on the problem. They can be conceptualized as behavioral processes of change (for further details see Mander, 2012). Turning to Bordin's concept of the therapeutic alliance, *emotional bond* implies the formation of a trustful relationship between patient and therapist as a basis for the patient to open up. This might serve as an important precondition for the activation of experiential processes of change. Agreement on collaboration, which includes Bordin's two dimensions of working on common goals and tasks, is an important precondition to successfully impart behavioral processes of change, as therapist and patient have to work on mutually agreed upon goals to activate new mastery strategies.

Further, both paradigms postulate specific associations between motivation and intervention. Considering the TTM, meta-analyses concerning health behavior reveal, as we have outlined above, that the experiential processes of change seem to be especially important in the *precontemplation* and *contemplation stages* and behavioral processes of change seem to be especially important in the *action* and *maintenance stages* (Norcross et al., 2011; Rosen, 2000). Grawe (2004) cites the Rubicon Model from Heckhausen, Gollwitzer, and Weinert (1987) and postulates that in the early *motivational phases* of *choosing*, psychodynamic or *motivational clarification* interventions should be the adequate therapeutic strategies. In the later *volitional phases*, behavior therapeutic or *mastery* interventions should be the adequate therapeutic strategies.

Hence, as is depicted in Figure 1, we hypothesized that experiential change mechanisms,

which is *emotional bond*, *problem actuation*, and *clarification of meaning* should be especially relevant in early stages of change, and that behavioral change mechanisms, that is *resource activation*, *mastery*, and *agreement on collaboration* should be especially relevant in late stages of change. Additionally, we tested the clinical relevance of the association between the two constructs by investigating outcome associations of stages and mechanisms of change interactions. As most studies analyzing associations between stages of change and other constructs have been conducted in a cross-sectional approach (Hall & Rossi, 2008), we framed our study in a longitudinal design to better understand the development of these associations across the course of treatment.

## Method

### Subjects

The participants in this study were 296 inpatients. Patients were treated at an inpatient unit as they suffered from severe psychopathology and, thus, could not be effectively treated in an outpatient setting. Specific inclusion criteria were a main diagnosis of a major depressive episode, a somatoform disorder or an eating disorder in the Structured Clinical Interview for *Diagnostic and Statistical Manual for Mental Disorders-Fourth Edition* (*DSM–IV*), German version (SKID-I; Wittchen, Wunderlich, Gruschwitz, & Zaudig, 1997). General exclusion criteria were as follows: (a) an age below 18 or above 59 years, (b) insufficient German language skills, and (c) psychotic or substance-related disorder. Comorbidities of an anxiety or a depressive disorder were no limitation to enter the study. Drop-outs reduced the number of

| Precontemplation | Contemplation | Action | Maintenance |
|---|---|---|---|
| Emotional bond | | Resource activation | |
| Problem actuation | | Mastery | |
| Clarification of meaning | | Agreement on collaboration | |

*Figure 1.* Hypothesized association of stages of change and general mechanisms of change.

usable data sets from 296 at $t_0$ to 253 at $t_1$, to 220 at $t_2$ and to 202 at $t_3$. No significant differences between these subgroups were found regarding either their demographic or descriptive composition. The characteristics of the completer sample are provided in Table 2.

## Measures

**SACiP and URICA-S.** Each patient completed the short-version of the University of Rhode Island Change Assessment (Mander et al., 2012). It consists of 16 items rated on a scale from 0 (*very untrue*) to 4 (*very true*) and measures four stages of change (*precontemplation*, *contemplation*, *action*, and *maintenance*) with four items per subscale. The measure showed an excellent factor structure, with $.52 \leq \lambda \leq .86$ acceptable to excellent internal consistencies, with $.61 \leq \alpha \leq .85$, an excellent convergent validity, with $.83 \leq r \leq .96$ associations with the long-form of the URICA, and acceptable construct validity, with scale-outcome correlations between $.14 \leq r \leq .42$.

Each patient and their individual therapist completed the SACiP (Mander, et al., 2013b). It consists of 21 items rated on a scale from 0 (*very untrue*) to 4 (*very true*) and measures six general mechanisms of change: *Resource activation*, *problem actuation*, *mastery*, *clarification of meaning*, *emotional bond*, and *agreement on collaboration*. It refers to individual therapy only. Further, all items of the patient and therapist version are correspondingly formulated. The measure showed an excellent factor structure, with $.52 \leq \lambda \leq .85$, good to excellent internal consistencies, with $.71 \leq \alpha \leq .90$, and construct validity, with significant outcome predictions, as demonstrated by mixed effects models.

**Outcome measures.** The German version of the Symptom-Checklist-90-Revised (SCL-90-R; Derogatis & Lazarus, 1994) is a measure of general symptom severity. It consists of 11 subscales, with 90 items on a 5-stepped scale. It showed excellent internal consistencies, with $.79 \leq \alpha \leq .89$ and good retest-reliabilities, with $.69 \leq r \leq .92$, and acceptable construct validity, with scale-outcome correlations between $.27 \leq r \leq .81$.

The Beck Depression Inventory (BDI; Beck, Steer, & Brown, 1996; Hautzinger, Bailer, Worall, & Keller, 1994) is a screening instrument for depression derived from the criteria of the *DSM–IV* (American Psychiatric Association, 2000). It consists of 21 items on a 4-stepped scale. It revealed an internal consistency of $\alpha = .88$, a split-half-reliability of $r = .72$, a retest-reliability of $r = .75$, and convergent validities of $.71 \leq r \leq .89$.

The Quick Inventory of Depressive Symptomatology (QIDS; Rush et al., 2003) is another screening instrument for depression derived from the criteria of the *DSM–IV* (American Psychiatric Association, 2000). It consists of 16 items on a 4-stepped scale. It revealed an excellent internal consistency, with $\alpha = .86$, and an excellent convergent validity, with a correlation of $r = .86$ with the BDI.

The Screening for Somatoform Disorders (SOMS; Rief, Hiller, & Heuser, 1997) is a screening instrument for somatoform disorders derived from the criteria of the *DSM–IV* (American Psychiatric Association, 2000). It consists of 68 items on a 7-stepped scale. It revealed an excellent internal consistency, with $\alpha = .87$, a retest-reliability of $r = .85$, and a convergent validity with a correlation of $r = .50$ with the SCL-90–R.

The Eating Disorder Inventory (EDI-2; Paul & Thiel, 2005) is a screening instrument for eating disorders. It consists of 11 subscales with 91 items on a 6-stepped scale. It showed an excellent internal consistency, with $\alpha = .96$ for

Table 2
*Demographic and Descriptive Data of Study Completers*

| N (%) | Total |
| --- | --- |
| Sample | 253 |
| Male | 82 (32.4) |
| Age mean (*SD*) | 41.3 (13.8) |
| Married | 123 (48.6) |
| A-level degree | 65 (25.7) |
| Formal professional qualification | 163 (64.5) |
| Employed | 94 (37.2) |
| Major depression | 69 (27.3) |
| Recurrent depression | 34 (13.4) |
| Somatization disorder | 15 (6.0) |
| Undifferentiated somatoform disorder | 29 (11.5) |
| Pain disorder | 46 (18.2) |
| Anorexia nervosa | 34 (13.4) |
| Bulimia nervosa | 8 (3.2) |
| Eating disorder, not otherwise specified | 18 (7.1) |

the whole scale, and $.79 \leq \alpha \leq .89$ for the subscales, as well as a retest-reliability of $r = .88$.

**Treatment and study-design.** All patients completed a 6 to 10 week inpatient treatment in the Department of Psychosomatic Medicine and Psychotherapy of Tuebingen University, Germany. They received individual therapy, group therapy, art therapy, and music therapy two times a week. Individual therapy was conducted two times a week. Patients received a minimum of 12 and a maximum of 20 treatment sessions. The mean of treatment sessions were 14 ($SD = 1.12$) sessions. Therapists were 30 psychotherapists with at least 1 year of experience. Twenty-four therapists were female. Psychotherapy comprised a cognitive–behavioral therapy (CBT) with supplementary interpersonal psychotherapeutic (IPT) elements in the tradition of Weissman, Markowitz, and Klerman (2000). The German version we applied has been offered by Schramm (2009). Typical examples of CBT interventions in our clinic are cognitive restructuring of maladaptive core beliefs and applied behavior analyses. Typical examples of IPT interventions in our clinic are treatments of role transitions and of conflicts in significant relationships.

All patients were assessed with the SCID-I to diagnose psychiatric disorders. Patients were allocated to three different groups according to their main diagnosis: a depressive, somatoform, and eating disorder sample. Each disorder group received three outcome measures, two instruments measuring general symptomatology and one disorder specific measure: The SCL-90-R as a measure of general symptom severity and the QIDS as a measure of general depressiveness were administered to all patients. Additionally, the patients with depression completed the BDI. The SOMS was administered to the somatoform group. The eating disorder sample completed the EDI-2.

All patients were assessed at baseline ($t_0$), after the fourth individual therapy session ($t_1$), after the 8th session ($t_2$), and after the last session ($t_3$), respectively. All instruments measuring clinical symptomatology were administered at all four measuring times. Each patient and individual therapist completed the SACiP. It was administered starting with $t_1$ so that patient and therapist had time to become acquainted with each other before the measure-

ment of change mechanisms was begun. As our aim was to analyze associations between SACiP change mechanisms and URICA-S stages of change, both measures were administered at the same measuring times. Consequently, both the SACiP and the URICA were completed at $t_1$, $t_2$, and $t_3$. The initial SCID-I assessment was conducted by three PhD-students who completed a university based training. They were regularly supervised by a university affiliated expert. The local ethics committee of the medical faculty approved the study protocol.

## Statistical Analysis

**Correlations and cross-lagged panels.** To identify significant associations between change mechanisms and stages of change, we first of all calculated a series of correlation analyses. As there were no significant results from therapist perspective for any of the change mechanisms, for parsimonious reasons, we report on the results from patient perspective only. Reasons for the nonsignificant results from therapist perspective are discussed. As we identified significant associations of *contemplation* and *action* to the six mechanisms of change, we applied in-line with the recommendations of Pantalon et al. (2002), the *contemplation* score as a representative of an early stage of change and the *action* score as a representative of a late stage of change. Further, to test our above mentioned central hypothesis, we calculated an experiential change mechanisms (ECM) score, defined as the mean score of the *emotional bond*, *problem actuation*, and *clarification of meaning* subscales of the SACiP. We also calculated a behavioral change mechanisms (BCM) score, defined as the mean score of the *resource activation*, *agreement on collaboration*, and *mastery* subscales of the SACiP. With these four resulting variables, we applied, in-line with the recommendations of Byrne (2010) and Finkel (1995), four cross-lagged panel designs, to assess the predictive value of ECM on *contemplation* and *action* and vice versa, and further to assess the predictive value of BCM on *contemplation* and *action* and vice versa. In-line with the theory derived hypothesis mentioned in the introduction section, our statistical hypothesis states that ECM significantly predict *contemplation* and BCM significantly predict *action*. No significant effects of stages of change on

either ECM or BCM should occur. The general path model for the cross-lagged-panel models is depicted in Figure 2. To further cover the results with another independent statistical approach, we also applied multiple linear regression analyses with autoregressor control for each of the possible predictive associations of stages and mechanisms of change.

**Multilevel modeling.** Further, to analyze clinical relevance of stages of change and mechanisms of change associations, we examined predictive effects on therapy outcome. In case that the associations of stages of change and mechanisms of change should be relevant for outcome prediction, an interactive effect between the two variables should be outcome predictive.

To avoid potential $\alpha$ errors by a reduction of data, for our further analyses, we applied the *committed action* (CA) composite score (Pantalon, Nich, Franckforter, & Carroll, 2002). This score is calculated by subtracting the *contemplation* score, which is seen as a measure of ambivalence, from the *action* score. Consequently, the CA score includes both the *contemplation* and *action* scores. The CA score has proven to be a highly relevant predictor of outcome in psychotherapy research and is considered to be an excellent global measure repre-

senting patients readiness for therapeutic change (Mander et al., 2012; Soler et al., 2008). Hence, lower CA scores represent earlier stages of change and higher CA scores represent later stages of change.

As the structure of our data set is nested, we applied a multilevel modeling approach to investigate the interactive effects of mechanisms of change and stages of change, of measuring time and of perspective (patient vs. therapist) on outcome. Therefore, in-line with former studies (Mander et al., 2013a; Mander et al., 2012), we calculated a global outcome score, defined as the mean score of the three z-standardized outcome scores for each disorder group. The reduction of data by means of the global outcome score aimed at minimizing potential alpha-errors. We applied the multilevel approach in line with the recommendations of Heck, Thomas, and Tabata (2010) as well as Field (2009). We computed a series of multilevel models, that is, one model for each of the general change mechanism factors. As a measure of patient's motivational readiness for therapeutic change we applied the CA-score. As the dependent variable, we used the global outcome score. The models included two levels: (a) Level 1: patients nested within therapists, and
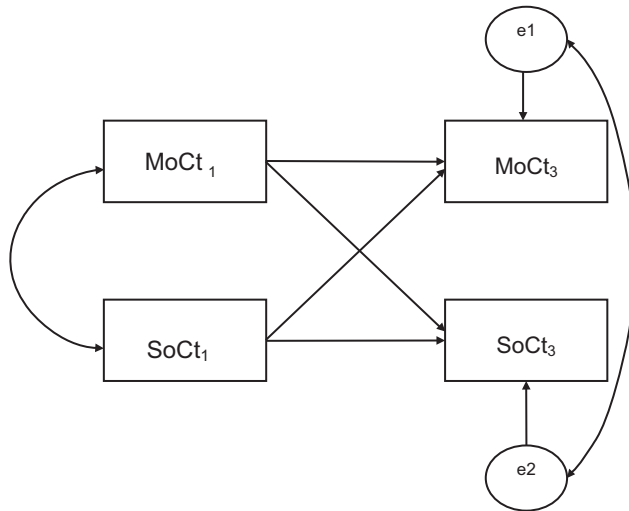


*Figure 2.* Cross-lagged panel path model for the predictive effects of mechanisms of change mechanisms on stages of change and vice versa. $t_1/t_3$ = after fourth/last therapy session; MoC = mechanisms of change from patient perspective, SoC = stages of change; e1-e2 = error variables.

(b) Level 2: therapists. For all models, we used the global outcome score as the dependent variable.

*Model 1.* In a baseline model, at Level 1 (the patient level), we modeled the interactive effect between mechanisms of change and the CA-score to test our central hypothesis. Further, we modeled perspective (patients vs. therapist), measuring time and global outcome at baseline as fixed effects. At Level 2 (the therapist level), we further modeled therapists (intercepts) and mechanisms of change (slopes) as random effects.

*Model 2.* In a second approach, we tested whether the interactive effects remained significant when other variables where included in the model. At Level 1 (the patient level), we modeled mechanisms of change, the CA-score, perspective (patient vs. therapist), measuring time and global outcome at baseline as fixed effects. To test our central hypothesis, we further modeled interactions between mechanisms of change and the CA-score. At Level 2 (the therapist level), we further modeled therapists (intercepts) and mechanisms of change (slopes) as random effects. All statistical analyses were conducted using SPSS 20 (Chicago, IL).

# Results

## Correlations and Cross-Lagged Panels

The correlation analyses revealed, as can be seen in Table 3, significant associations of *contemplation* and *action* at all three measuring times. There were significant correlations between *contemplation* and all change mechanisms at $t_1$, but only significant associations to *clarification of meaning* and *agreement on collaboration* at $t_3$. The correlation intensity between *action* and mechanisms of change increased across the course of therapy concerning the three BCM.

Turning to the results of the regression analyses, results of both the multiple linear regression and the cross-lagged panel approaches were conceptually identical. Hence, for parsimonious reasons, we report on the results of the latter method only. No significant effect of experiential change mechanisms on *contemplation* or vice versa occurred (all $b \leq .05$, all $ps \geq .527$, compare Table 4, Model 1). The cross-lagged panel model for *contemplation* and behavioral change mechanisms indicated a significant predictive effect of the *contemplation* stage on behavioral change mechanisms ($b =$

Table 3
*Correlations Between Stages of Change and Mechanisms of Change From Patient Perspective at the Three Measuring Times*

| | Emotional bond | Problem actuation | Resource activation | Clarification of meaning | Agreement on collaboration | Mastery |
|---|---|---|---|---|---|---|
| Stages of change and mechanisms of change correlations at $t_1$ ($N = 250$) | | | | | | |
| Precontemplation | −.07 | .00 | .04 | −.08 | −.11 | −.03 |
| Contemplation | .25** | .23** | .15* | .22** | .19** | .17** |
| Action | .23** | .08 | .27** | .31** | .31** | .32** |
| Maintenance | .00 | .13* | .16* | .21* | .15* | .15* |
| Stages of change and mechanisms of change correlations at $t_2$ ($N = 192$) | | | | | | |
| Precontemplation | −.26** | −.02 | −.09 | −.17* | −.13 | .14 |
| Contemplation | .24* | .18* | .11 | .13 | .28** | .12 |
| Action | .34** | .20* | .37** | .38** | .42** | .37** |
| Maintenance | .12 | .13 | .13 | .11 | .19* | .05 |
| Stages of change and mechanisms of change correlations at $t_3$ ($N = 186$) | | | | | | |
| Precontemplation | −.08 | −.04 | −.06 | −.14 | −.18* | −.11 |
| Contemplation | .03 | .02 | .13 | .20** | .33** | .13 |
| Action | .31** | .16* | .49** | .35** | .48** | .52** |
| Maintenance | .04 | .10 | .07 | .11 | .19** | .02 |

*Note.* $t_1/t_2/t_3$ = after fourth/eighth/last therapy session.
* $p < .05$.   ** $p < .01$.   *** $p < .001$.

Table 4

*Standardized Coefficients of the Four Cross-Lagged-Panel Models Analyzing Associations Between Mechanisms of Change and Stages of Change*

|  | β | *SE* | *p* |
|---|---|---|---|
| **Model 1: Contemplation and experiential change mechanisms (*df* = 10)** | | | |
| $ECM_{t1} \rightarrow ECM_{t3}$ | .43*** | .07 | <.001 |
| $C_{t1} \rightarrow C_{t3}$ | .52*** | .07 | <.001 |
| $ECM_{t1} \rightarrow C_{t3}$ | .04 | .07 | .601 |
| $C_{t1} \rightarrow ECM_{t3}$ | .05 | .07 | .527 |
| **Model 2: Contemplation and behavioral change mechanisms (*df* = 10)** | | | |
| $BCM_{t1} \rightarrow BCM_{t3}$ | .45*** | .07 | <.001 |
| $C_{t1} \rightarrow C_{t3}$ | .52*** | .06 | <.001 |
| $BCM_{t1} \rightarrow C_{t3}$ | .04 | .06 | .593 |
| $C_{t1} \rightarrow BCM_{t3}$ | .15* | .08 | .025 |
| **Model 3: Action and experiential change mechanisms (*df* = 10)** | | | |
| $ECM_{t1} \rightarrow ECM_{t3}$ | .41*** | .07 | <.001 |
| $A_{t1} \rightarrow A_{t3}$ | .48*** | .06 | <.001 |
| $ECM_{t1} \rightarrow A_{t3}$ | .13* | .07 | .044 |
| $A_{t1} \rightarrow ECM_{t3}$ | .09 | .06 | .216 |
| **Model 4: Action and behavioral change mechanisms (*df* = 10)** | | | |
| $BCM_{t1} \rightarrow BCM_{t3}$ | .43*** | .07 | <.001 |
| $A_{t1} \rightarrow A_{t3}$ | .46*** | .07 | <.001 |
| $BCM_{t1} \rightarrow A_{t3}$ | .16* | .06 | .019 |
| $A_{t1} \rightarrow BCM_{t3}$ | .13 | .07 | .061 |

*Note.* ECM = experiential mechanisms of change; BCM = behavioral mechanisms of change; C = contemplation; A = action; $t_1/t_3$ = after fourth/last therapy session.
* $p < .05$.    ** $p < .01$.    *** $p < .001$.

.15, *p*s < .05), but no vice versa effect occurred ($b = .04$, $p = .593$, compare Table 4, Model 2). The model analyzing the predictive associations between *action* and experiential change mechanisms revealed a significant predictive effect of experiential change mechanisms on action ($b = .13$, *p*s < .05), but no significant vice versa effect ($b = .09$, all $p = .216$, compare Table 2, Model 3). Further, the model concerning the associations between *action* and behavioral change mechanisms indicated a significant predictive effect of behavioral change mechanisms on the *action* stage ($b = .16$, $p < .05$), but only a marginally positive predictive vice versa effect, that is a marginal effect of *action* on behavioral change mechanisms ($b = .13$, $p = .061$, compare Table 4, Model 4). Finally, as

there were significant associations of *maintenance* and mechanisms of change at $t_1$ in the correlation analyses, we also calculated predictive models for this stage of change, but no significant effect for *maintenance* occurred in any of the multiple linear regression or cross-lagged panel models when controlled for the autoregressor (all $b \leq .09$, all $ps \geq .145$). The general cross-lagged panel model is depicted in Figure 2.

## Multilevel Modeling

The variance in intercepts across therapists for all six mechanisms of change was as follows: for *emotional bond*, var($u_{0j}$) = 7.90, $\chi^2(1) = 59.25$, $p < .01$; for *problem actuation*, var($u_{0j}$) = 8.15, $\chi^2(1) = 59.61$, $p < .01$; for *resource activation*, var($u_{0j}$) = 8.42, $\chi^2(1) = 62.63$, $p < .01$; for *clarification of meaning*, var($u_{0j}$) = 7.75, $\chi^2(1) = 58.29$, $p < .01$, for *agreement on collaboration*, var($u_{0j}$) = 8.69, $\chi^2(1) = 61.09$, $p < .01$.; and for *mastery*, var($u_{0j}$) = 9.00, $\chi^2(1) = 63.53$, $p < .01$. The slopes did not vary across therapists, all var($u_{1j}$) < .1, $\chi^2(1) < 1.00$, $p > .10$. The slopes and intercepts did not significantly covary, all var($u_{1j}$) $\leq 0.04$, $\chi^2(1) \leq 0.20$, $p > .10$. Thus, differential effects of therapists can be assumed. Further, there were no significant interactive effects from therapist perspective observable. Hence, for parsimonious reasons, we report on the results from patient perspective, only.

**Model 1.**    *Emotional bond* significantly interacted with CA, $F(1, 232) = 5.69$, $p < .05$. *Problem actuation* significantly interacted with CA, $F(1, 232) = 7.12$, $p < .01$. *Resource activation* significantly interacted with CA, $F(1, 232) = 4.65$, $p < .05$. *Clarification of meaning* significantly interacted with CA, $F(1, 232) = 5.12$, $p < .05$. *Agreement on collaboration* significantly interacted with CA, $F(1, 232) = 5.13$, $p < .05$. *Mastery* did not interact with CA, $F(1, 232) = 2.16$, $p = .143$.

**Model 2.**    *Emotional bond* significantly predicted global outcome, $F(1, 227.56) = 10.90$, $p < .001$. There was a marginally significant interaction between *emotional bond* and CA, $F(1, 231.80) = 3.94$, $p = .063$. There were no other significant effects in the model, all $Fs \leq 0.90$, $p \geq .35$. *Problem actuation* significantly interacted with CA, $F(1, 232) = 7.37$, $p < .01$. There were no other significant effects in the

model, all $Fs \leq 0.64$, $p \geq .42$. *Resource activation* significantly predicted global outcome, $F(1, 231.98) = 14.43$, $p < .001$. There were no other significant effects in the model, all $Fs \leq 1.77$, $p \geq .19$. *Clarification of meaning* significantly predicted global outcome, $F(1, 230.92) = 13.23$, $p < .001$. There was a marginally significant interaction between *clarification of meaning* and CA, $F(1, 230.29) = 3.00$, $p = .087$. *Agreement on collaboration* significantly predicted global outcome, $F(1, 231.00) = 9.17$, $p < .01$. There was a marginally significant interaction between *agreement on collaboration* and CA, $F(1, 231.00) = 2.74$, $p = .099$. There were no other significant effects in the model, all $Fs \leq 0.29$, $p \geq .590$. *Mastery* significantly predicted global outcome, $F(1, 229.50) = 16.12$, $p < .001$. There were no other significant effects in the model, all $Fs \leq 0.43$, $p \geq .51$. There was no significant effect of measuring time for any of the change mechanisms. Regression coefficients of the significant estimates of the six multilevel models are depicted in Table 5.

## Discussion

In this study, we examined intersections between stages of change from Prochaska's transtheoretical model and general mechanisms of change from Grawe's psychological therapy. We hypothesized that experiential change mechanisms (ECM: *emotional bond*, *problem actuation*, and *clarification of meaning*) should be especially relevant in early stages of change and that behavioral change mechanisms (BCM: *resource activation*, *mastery*, and *agreement on collaboration*) should be especially relevant in late stages of change. Further, we tested whether the associations between change mechanisms and stages of change are clinically relevant by investigating the outcome predictive effects of the interaction term between the two variables. Therefore, questionnaires measuring stages of change, general mechanisms of change and clinical symptomatology were administered to inpatients and their individual therapists.

### Test of the Central Hypothesis

No significant effects from therapist perspective occurred, hence, in the following section, we first of all discuss the significant findings from patient perspective. As the correlation analyses revealed significant associations of *contemplation* and *action* at all three measuring times, we operationalized in-line with earlier studies (Pantalon et al., 2002), high scores in *contemplation* as an indicator of an early stage

Table 5
*Regression Coefficients of the (Marginally) Significant Estimates of the Multilevel Models*

| Model | b | SE b | 95% CI | p |
|---|---|---|---|---|
| Model 1 | | | | |
| Emotional bond/CA interaction | −.04 | .018 | −.08, −.01 | <.05 |
| Problem actuation/CA interaction | −.06 | .02 | −.11, −.02 | <.01 |
| Resource activation/CA interaction | −.06 | .03 | −.12, −.01 | <.05 |
| Clarification of meaning/CA interaction | −.06 | .03 | −.11, −.01 | <.05 |
| Agreement on collaboration/CA interaction | −.05 | .02 | −.09, −.01 | <.05 |
| Mastery/CA interaction | −.04 | .03 | −.10, .01 | .14 |
| Model 2 | | | | |
| Emotional bond | −.19 | .06 | −.30, −.08 | <.001 |
| Emotional bond/CA interaction | −.03 | .017 | −.07, .00 | .063 |
| Problem actuation/CA interaction | −.06 | .02 | −.11, −.02 | <.01 |
| Resource activation | −.19 | .05 | −.29, −.09 | <.001 |
| Clarification of meaning | −.18 | .05 | −.27, −.08 | <.001 |
| Clarification of meaning/CA interaction | −.04 | .03 | −.09, .01 | .087 |
| Agreement on collaboration | −.16 | .05 | −.26, −.06 | <.01 |
| Agreement on collaboration/CA interaction | −.04 | .02 | −.08, .01 | .099 |
| Mastery | −.17 | .04 | −.26, −.09 | <.001 |

*Note.* $b$ = unstandardized regression coefficient; CI = confidence interval.

of change and high values in *action* as an indicator of a late stage of change. We then tested our central hypothesis. Therefore, we applied multiple linear regression as well as cross-lagged panel analyses. Results of both approaches were conceptually identical and indicated as shown below.

*Contemplation* at the beginning of therapy significantly predicted BCM at the end of therapy, but had no predictive effect on ECM. Neither ECM nor BCM at therapy entrance had a predictive effect on *contemplation* at discharge. Hence, possibly, patients high in *contemplation* tend to experience larger amounts of BCM as a consequence of their motivational experiences in this stage of change. This makes intuitive sense, as the *contemplation* stage is dominated by ambivalence (Prochaska & Norcross, 2010), and patients in this stage need to experience BCM, which imply the activation of individual strengths of the patients and strategies to learn to cope with problem situations (Grawe, 2004; Mander, et al., 2013b), to reduce ambivalence and to move on in the change cycle. Further, these results complement earlier evidence that demonstrated in patients with anorexia and patients with mixed psychiatric diagnoses that *contemplation* at an early stage in therapy was a significant predictor of positive therapeutic alliance at the end of therapy (Derisley & Reynolds, 2000; Mander, et al., 2013b). Hence, increases in *contemplation* could imply an increased readiness of the patient for experiences in specific change mechanisms. Consequently, our results indicate that therapists should concentrate on motivational interventions to induce *contemplation* in patients who are in early stages of change before focusing on specific mechanisms of change.

ECM as well as BCM at the beginning of therapy significantly predicted *action* at the end of therapy. *Action* at therapy entrance had no significant effect on either ECM or BCM at discharge. Hence, in contrast to our theory derived central hypothesis (Grawe, 2004; Rosen, 2000), ECM as well as BCM were especially important for patients in later stages of change, as they both lead to an increase of *action* motivation across the course of therapy. Possibly, patients in later stages of change show more openness for therapeutic interventions as a consequence of their higher motivational readiness to change. Consequently, they could experience

stronger activations of all mechanisms of change. Additionally, the effect could be explained by the complex interplay of mechanisms of change, as they are highly intercorrelated (Flückiger, Regli, Zwahlen, Hostettler, & Caspar, 2010) and in consideration of the fact that ECM imply experiences of *emotional bond* in the therapeutic alliance and of *problem actuation*, which have been identified as necessary preconditions for the activation of the other mechanisms of change (Gassmann & Grawe, 2006; Grawe, 2004).

## Prediction of Therapeutic Outcome

To better understand the clinical relevance of the above mentioned empirical associations between stages of change and mechanisms of change, we tested for the predictive effect of interactions between stages of change and mechanisms of change on therapy outcome. As the CA score is created by the difference of *action* minus *contemplation*, we applied this comparative index as a global measure of motivational readiness in the outcome prediction analyses. Early stages of change where operationalized by lower values in CA, later stages of change where operationalized by higher values in CA. In Model 1, all mechanisms of change except for *mastery* significantly interacted with the CA-score in the prediction of therapeutic outcome. In Model 2, when other relevant variables where added to the model, only trends for interactive effects were observable for all change mechanisms except for *resource activation* and *mastery* concerning outcome prediction. Hence, the positive association of change mechanisms with therapeutic outcome was increased when patients expressed higher readiness for therapeutic change, which is, when they are in later stages of change. These predictive effects of stages of change and mechanisms of change interactions underline the importance of the above mentioned effects in the cross-lagged panel designs, as they highlight the relevance of the findings in outcome prediction.

## Clinical Implications of the Study

The associations discovered here between change mechanisms and stages of change might be beneficial for future research targeting to optimize the implementation of specific change processes. Our results might inspire new theo-

retical conceptions concerning specific adaptations of therapeutic interventions on the patient's needs, as this has been outlined by the authors of both frameworks to be of high clinical relevance (Grawe, 2004; Prochaska, 2000). Specifically, the causal chain of events might be as follows: *Contemplation* motivates patients to explore BCM. BCM as well as ECM might help to further increase *action* motivation. Hence, it first of all might be of importance not to focus specifically on the activation of change mechanisms, but rather to specifically concentrate on inducing *contemplation* in patients with specific motivational interventions, like the ones that have been developed in the motivational interviewing approach (Miller & Rollnick, 1991), before further change mechanisms are more specifically explored, as *contemplation* fosters the experience of BCM. Then, when patients are in the *action* stage, it might be of importance that therapists especially engage in activating all mechanisms of change so that patients further can increase their *action* motivation. Future studies should analyze more specific clinical implication by means of video based microprocess analyses of stages of change and mechanisms of change in experimental designs. More specifically, the URICA-S and measures of clinical symptomatology could be administered at the beginning and end of therapy. According to the patient's URICA-S motivational readiness to change at therapy entrance, therapists could be instructed to focus more on ECM or BCM. Change mechanisms could be assessed with the already existing observer based microprocess change mechanisms analysis method (von Consbruch et al., 2013), in addition to the application of the patient and therapist-version of the SACiP. Consequently, by additionally introducing a control group in which therapist focus on ECM or BCM vice versa to the experimental group and a treatment as usual group, researchers should analyze whether the here identified results could be replicated in this more sophisticated design and whether instructing therapists to focus on specific change mechanisms depending on the patients stage of change does improve therapeutic outcome. Of additional importance, our results are a first indicator that the focus on different facets of the therapeutic alliance at different stages of change might help to optimize the alliance's contribution to the process of change. More specifically, it could be

especially important to focus on the *emotional bond* as a component of ECM to help patients in early stages of change and on *agreement on collaboration* as a component of BCM to help patients in late stages of change. This is important to notice as the robust associations of a positive therapeutic alliance and treatment outcome has been demonstrated in several studies (e.g., Castonguay & Beutler, 2006; Orlinsky, Ronnestad, & Willutzki, 2004).

## Limitations of the Study

Our study had several limitations as discussed hereafter. First, the reasons for the absent significant effects from therapist perspective remain unclear. It might be assumed that the patient's perception of change mechanisms has a more profound influence on changes in the motivational change cycle, as it is the patient and not the therapist who is in a specific stage of change. Further, it is important to note that patients and therapists reveal relatively discrepant ratings when assessing therapeutic processes (Flückiger et al., 2013; Tryon, Blackwell, & Hammel, 2007). Although the reasoning behind those differences in perception remains unclear and still is a matter of future investigations, these discrepant ratings might elucidate the absent effect of stages of change and mechanism of change association from therapist perspective. To more specifically understand this phenomenon, future studies should conceptualize a detailed framework to analyze it, including therapist interviews concerning the reasoning for their evaluation of change mechanisms and other qualitative methods. Second, in the more complex Model 2 of the outcome analyses, only trends for interactive effects between change mechanisms and stages of change were observable. However, it is important to note that our study was carried out in a naturalistic design where no specific manipulations of change mechanisms or stages of change have been performed. Hence, future studies implementing specific interventions targeting change mechanisms and stages of change might produce stronger interactive effects on therapeutic outcome. Third, we only investigated inpatients with Axis I disorders. This might interfere with the generalizability of our results to other psychotherapy settings and patient groups. Specifically, different findings

might be obtained with inpatients that are being treated specifically for severe Axis II personality disorders, which offer distinct treatment challenges that may have differential implications for the nature of associations between the stages and mechanisms of change. Fourth, the calculation of ECM and BCM is not based on prior empirical investigations that offer construct validity of the measures but based on the theory derived rationale described in the introduction of our manuscript. There is no data, to our knowledge, concerning construct validity of ECM and BCM as we were the first to analyze associations between psychological therapy and the TTM. Consequently, the results of our study could be interpreted as a first indicator of the construct validity of ECM and BCM. Fifth, given that patients received additional group therapies, it remains unclear to what extent effects of these other facets of the inpatient intervention interacted with the individual psychotherapy across the course of the inpatient treatment to influence results obtained on the different outcome measures. Additionally, the variable length of stay, medication, and the intense therapeutic milieu might have influenced outcome. Consequently, our study should be replicated in an outpatient setting where patients receive individual therapy only and where further all of these variables are controlled for. Sixth, our study design did not imply a control group. Hence, future studies should address this limitation by the application of an experimental study design such as the one that has been outlined above. Finally, it has to be mentioned that it is complicated to study how psychotherapy promotes change in an inpatient setting, as it leads to changes not always in harmony with the patient's natural environment. More specifically, the inpatient therapeutic milieu to some extent precedes psychological changes, as for example can be seen in the better food intake of patients with anorexia nervosa (AN) as a consequence of the application of a structured nutrition program. In their natural environment, AN patients might not have access to such programs and as a consequence, the therapeutic change might not remain stable and might possibly be attributed to the inpatient setting and not to real therapeutic changes of the patient.

## Conclusions

In summary, experiences of *contemplation* predicted a stronger activation of BCM. Additionally, both experiences of ECM and BCM predicted increases in the *action* motivational stage of change. This underlines the importance to first of all induce *contemplation* in patients in early stages of change by for example, a motivational interviewing approach when in therapy and further highlights the significance of activating specific change mechanisms when patients are in the *action* stage. Future studies should analyze these effects more specifically by implementing video based microprocess analyses and by means of experimental designs.

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