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# Skill use mediates the within-person effect of the alliance on session-to-session changes in anxiety and depression in the Unified Protocol

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ABSTRACT

*Objective:* Both the therapeutic alliance and the specific skills taught in treatment are thought to contribute to change in cognitive-behavior therapy (CBT), but it is unclear if or how these processes influence each other and outcomes in treatment. We tested the hypothesis that the degree to which patients used CBT skills would mediate the relation between the alliance and session-to-session changes in anxiety and depression.

*Method:* Adult participants ($N = 70$; $M_{age} = 33.74$, 67% female, 70% White) with emotional disorders were randomized to receive 6 or 12 sessions of the Unified Protocol. Before each session, participants reported anxiety and depression severity and past-week skillfulness. After each session, participants rated the strength of the alliance. We tested whether greater within-person skillfulness mediated the relation between within-person alliance strength and session-to-session changes in anxiety and depression.

*Results:* Skillfulness significantly mediated the effect of the alliance on session-to-session changes in anxiety, $ab = -.02$, $p = .04$, and depression, $ab = -.02$, $p = .02$, such that a stronger alliance predicted greater next-session skillfulness, which predicted session-to-session decreases in anxiety and depression. When alliance subscales were examined separately, the strongest effect was observed for agreement on therapy tasks.

*Conclusions:* Improvements in the alliance may facilitate skill use and indirectly predict reductions in anxiety and depression through skill use in CBT. We encourage research on how to enhance both the alliance and skillfulness in CBT.

The working alliance is one of the most well-studied constructs in psychotherapy research, representing the collaborative relationship that develops between patients and therapists in treatment [1]. This relationship has been operationalized as the combination of three related but distinct components: agreement between patients and therapists on the overarching goals of the treatment; agreement between patients and therapists on the specific tasks that will be used in treatment to achieve those goals; and an emotional bond consisting of mutual respect and liking between patients and therapists [2]. Patients who develop a stronger working alliance with their therapists tend to demonstrate better treatment outcomes across a range of psychotherapies (e.g., $r = .20$ in cognitive-behavior therapy [CBT]) and disorders (e.g., *r*s:.24–.26 for patients with anxiety and depressive disorders) than patients with a weaker alliance [1]. Of course, these alliance-outcome relations reflect between-person differences (i.e., patients who have a stronger alliance with their therapist demonstrate better outcomes than patients with a weaker alliance). However, between-person differences do not necessarily characterize within-person effects [3,4]. To address this concern, researchers have begun to examine how within-person changes in the alliance are related to subsequent changes in treatment outcomes to

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more clearly specify change processes [5].

Within-person effects characterize how the strength of a patient's working alliance deviates from their personal average at any given session. These deviations can be used to predict subsequent symptom changes from one session to the next. In an individual patient meta-analysis using data from 17 clinical trials, within-person improvements in the alliance predicted session-to-session improvements in internalizing symptoms (e.g., depression, anxiety, posttraumatic stress, and eating disorder symptoms; $\beta = -.07$), although these effects were weaker among patients with more severe symptoms [6]. Of note, these within-person effects of the alliance on symptoms held even when adjusting for patient characteristics (e.g., demographics, symptom severity) and concurrent treatment processes (e.g., therapist competence, homework compliance; [7].

As such, within-person fluctuations in the alliance have been described as involved in the process of change related to symptom reduction, either directly [8,7,6] or by facilitating other processes. In CBT, for instance, these other processes may include adaptive skills to regulate emotions and cope with symptoms [9-11]. There is accumulating evidence that adaptive skill use is an active element driving symptom reduction in CBT interventions [12,13]. For example, improvement in cognitive skills has been linked to larger reductions in depressive symptoms in both traditional and internet-delivered CBT [14, 15]. Similarly, more frequent use of dialectical behavior therapy (DBT) skills partially explained the greater symptom improvement observed in a DBT skills group compared to a non-skills-based treatment (an activities-based support group; [16]. Further, more effective daily DBT skill use was related to less intense daily anxiety and depression among patients receiving DBT skills training [17].

How people use skills, that is, their degree of skillfulness, can encompass several dimensions, including how well patients understand the skills taught (i.e., skill knowledge), how often patients use skills (i.e., skill frequency), how well patients use skills in line with how they were taught (i.e., skill quality), how well these skill lead to desired outcomes (i.e., skill effectiveness), and the variety and type of unique skills used [13]. Each of these dimensions offers distinct insights. For instance, improvements in skill knowledge have uniquely predicted session-to-session reductions in anxiety in transdiagnostic CBT [18]. More frequent use of CBT and DBT skills has also predicted reductions in anxiety whereas more frequent use of adaptive and behavioral skills has predicted reductions in depression in inpatient and outpatient CBT-based treatments [19,18,20,21]. Finally, higher quality cognitive skills have also mediated changes in depressive symptoms in internet-delivered CBT [15].

Here, we distinguish therapy procedures (e.g., completing worksheets) from skills themselves (e.g., practicing new ways of thinking and behaving) and the cognitive, behavioral, or physiological processes of change that result from skill use [22]. Different therapy procedures may facilitate the same skill use (e.g., completing cognitive restructuring worksheets, talking through cognitive restructuring with someone else, thinking it through on one's own), leading to particular cognitive, behavioral, or physiological processes of change [23]. We thus conceptualize the aspects of skillfulness and skill use described above as the active elements promoting processes of change, encompassing both received and applied elements in Cohen et al.'s [12] framework.

As a modular, transdiagnostic, and disseminable CBT, the Unified Protocol for Transdiagnostic Treatment of Emotional Disorders (UP; [9] is a particularly useful treatment in which to study the effects of the alliance and CBT skills. The UP includes five core skill modules designed to teach psychoeducation/self-monitoring, cognitive, behavioral, mindfulness, and interoceptive exposure skills in the context of a strong working alliance. In the UP, greater within-person skillfulness across all modules predicted session-to-session improvements in anxiety and depression [18] and the use of a wider variety of skills predicted improvements in loneliness [24]. Patients who used mindfulness techniques more often in the UP demonstrated reduced global clinical severity [25] and anxiety [26], and when patients used alternative action skills more frequently than normal, they reported session-to-session reductions in depression [18]. Because the UP can treat a range of emotional disorders [27], the effects of the alliance and skillfulness may be more likely to generalize to a wider range of conditions.

CBT therapists often view the alliance as "the context within which [CBT] techniques may be effectively employed" [28]. Hill [29] specified that these effects may unfold reciprocally over treatment with early-session alliance ratings predicting later use of therapy techniques, which further strengthens the alliance. In the only study to our knowledge to directly test this question, greater within-person frequency of emotion regulation skill use mediated the effect of a stronger within-person working alliance on session-to-session reductions in depression symptoms in internet-based psychodynamic and cognitive-behavior therapy for adolescent patients with depression [30]. The UP has been associated with improvements in the working alliance [18,31], but a stronger alliance did not directly predict between- or within-person changes in anxiety or depression [18]. However, given these theoretical models of indirect effects of the working alliance through skillfulness and the more direct role of skillfulness in the UP, it is possible that a stronger within-person alliance does predict changes in anxiety and depression but is mediated through skillfulness.

## Current study

In the current study, we tested whether greater within-person skillfulness between sessions *t*–1 and *t* mediated the relation between the alliance at session *t*–1 and changes in anxiety and depression from session *t*–1 to *t*. We hypothesized that a stronger within-person working alliance would predict greater next-session skillfulness and that greater next-session skillfulness would predict session-to-session reductions in anxiety and depression. Because the working alliance can be operationalized as the combination of three components (i.e., agreement on tasks, goals, and the emotional bond), we also explored if each of these three components was involved in similarly-sized indirect effects on changes in anxiety and depression through skillfulness in separate models.

## Method

### *Participants*

The full sample included 70 treatment-seeking participants who were at least 18 years old and met the criteria for at least one DSM-5 [32] anxiety, depressive, or related disorder: panic disorder (PD), generalized anxiety disorder (GAD), social anxiety disorder (SAD), obsessive-compulsive disorder (OCD), posttraumatic stress disorder (PTSD), major depressive disorder (MDD), or persistent depressive disorder (PDD). Participants ranged in age from 19 to 63 ($M = 33.74$, $SD = 12.64$), and were predominantly female (67.1%) and White (70.0%). A majority were single/never married (34.3%), although 23 participants (32.9%) were currently married. Most participants identified as heterosexual or straight (74.3%). All participants had completed high school or general education development (GED). Of these, 24.3% had also completed some college ($n = 17$), 34.3% had earned a bachelor's degree ($n = 24$), and 25.7% had earned an advanced degree ($n = 18$). The most common primary diagnoses at baseline were generalized anxiety disorder (GAD; $n = 45$; 64.3%), social anxiety disorder (SAD; $n = 35$; 50%), and major depressive disorder (MDD; $n = 35$; 50%). However, most participants ($n = 57$; 81.4%) met criteria for more than one diagnosis. Participants with symptoms or diagnoses that required acute care or hospitalization were excluded. Specifically, exclusion criteria were: (a) mania within the past year, (b) imminent suicide risk, (c) current substance use disorder requiring greater than outpatient levels of care, and (d) psychosis. Participants who had received at least five sessions of CBT within the past five years were also excluded.

*Measures*

***Demographics***

Participants provided basic demographic information. This information included age, racial background, education level, sexual orientation, and marital status.

***Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders***

The Diagnostic Interview for Anxiety, Mood, and Obsessive-Compulsive and Related Neuropsychiatric Disorders (DIAMOND; [33] is a semi-structured diagnostic interview for *DSM-5* disorders. The DIAMOND was administered by advanced graduate students certified in the DIAMOND at baseline to determine eligibility. Assessors demonstrated excellent reliability on categorical ratings of clinically significant diagnoses (Krippendorff's αs:.91–1.00; median = 1.00).

***Overall Anxiety Severity and Impairment Scale***

The Overall Anxiety Severity and Impairment Scale (OASIS; [34] is a five-item self-report questionnaire designed to assess severity and impairment due to anxiety over the prior week with unique anchors for each item. In the current sample, OASIS items demonstrated good internal consistency across all twelve sessions (McDonald's ωs:.79−.89).

***Overall Depression Severity and Impairment Scale***

The Overall Depression Severity and Impairment Scale (ODSIS; [35] is a five-item self-report questionnaire designed to assess severity and impairment due to depression over the prior week with unique anchors for each item. In the current sample, ODSIS items demonstrated excellent internal consistency across all twelve sessions (ωs:.92−.95).

***Dimensions of Skillfulness and Use Scale***

The Dimensions of Skillfulness and Use Scale (DSUS; [18] is a four-item self-report measure designed to assess the quality and frequency of skill use in the past week, as measured by: how well participants understood the skills taught in the last session, how often participants used the skills taught in the last session, how well participants thought they used the skills (regardless of outcome), and how successfully participants used the skills taught in the last session (i.e., did skill use lead to desired outcomes). In the current sample, DSUS items demonstrated good to excellent internal consistency across sessions 2–12 (ωs:.76 −.91).

***Working Alliance Inventory – Short Revised***

The Working Alliance Inventory – Short Revised (WAI-SR; [36] is a 12-item self-report inventory designed to measure patient perceptions of the working alliance with their therapist. Items are rated from 1 (*seldom*) to 5 (*always*). The WAI has three subscales designed to assess agreement between the patient and therapist on the tasks of therapy (Task subscale), agreement on goals of therapy (Goals subscale), and development of an emotional bond (Bond subscale). In the current sample, WAI-SR items demonstrated excellent internal consistency across all sessions (ωs:.91 −.96), while Task subscale (ωs:.80 −.92), Goals subscale (ωs:.85 −.97), and Bond subscale items (ωs:.83 −.96) demonstrated good to excellent internal consistency across all sessions.

*Study procedures*

This was a secondary data analysis of a sequential multiple assignment randomized trial (SMART; [37], which was designed to determine (a) the feasibility and efficacy of sequencing the core UP modules based on participants' strengths or deficits and (b) whether terminating treatment prior to delivering the full package would show comparable results to the full treatment. Participants were recruited from the state of Kentucky. Study procedures were explained to participants and informed consent was collected prior to baseline assessment. Trained assessors conducted all baseline assessments prior to treatment to determine participants' eligibility. Eligible participants were first randomized to receive either standard or personalized sequences of the core UP modules. UP modules were delivered in 50–60 min, individual weekly sessions. All study therapists were certified in the UP and adherence to the treatment protocol was high [37]. A second randomization took place between the fifth and sixth sessions in which participants were assigned to receive either Brief (i.e., six sessions) or Full treatment (i.e., 12 sessions). For a more detailed explanation of study procedures, see Sauer-Zavala et al. [37].

Participants completed the OASIS, ODSIS, and DSUS no more than 24 h before each weekly therapy session. After each therapy session, participants filled out the WAI-SR. These measures were sent by patients' therapists and managed by Research Electronic Data Capture (REDCap) tools hosted at the University of Kentucky [38,39]. REDCap is a secure, web-based software platform designed to support data capture for research studies. All study procedures were approved by the local university Institutional Review Board.

*Analytic approach*

We first examined demographic characteristics of the sample, as well as the relations among demographic characteristics and our primary variables of interest. We calculated between-person correlations among demographics and variables of interest using SPSS version 27.0 (IBM [40]. We then calculated within-person correlations among the primary variables of interest using the *rmcorr* package (Version 0.3.0; Bakdash and Marusich, [41]) in R (Version 4.2.0; R Core Team, [42]). We used multilevel modeling to examine changes over time across the study for our primary variables of interest. We used the *nlme* package [43] in R, entering session number as a predictor of each primary outcome (i.e., alliance total and subscale scores, skillfulness, anxiety, and depression) in separate models using all available session data and modeling random intercepts and slopes.

To test if skillfulness mediated the within-person relations between alliance and session-to-session changes in anxiety and depression, we used the MLmed macro in SPSS [44]. MLmed disaggregates between-from within-person variance to compute within-person indirect effects, using Monte Carlo estimation to calculate confidence intervals around these effects with restricted maximum likelihood estimation (REML) and random intercepts. We tested the indirect effects on changes in anxiety and depression, respectively, in two separate models. We entered alliance at session *t*–1 as the focal predictor (*a* path), skillfulness between session *t*–1 and *t* as the mediator (*b* path), and anxiety (or depression) at session *t* as the outcome (Fig. 1). We included anxiety (or depression) at session *t*–1 as a covariate to examine residualized session-to-session changes in these outcomes. In line with Wang and Maxwell's [45] recommendations, we also included session number as a covariate to detrend the data.

To enhance our power and use all available data, we focused our primary analyses on all available sessions. Based on intraclass correlation coefficients of.40 for OASIS scores and.60 for ODSIS scores, with up to 11 observations per participant, we had > 80% power to detect standardized mediation effects of.03–.06 [46].

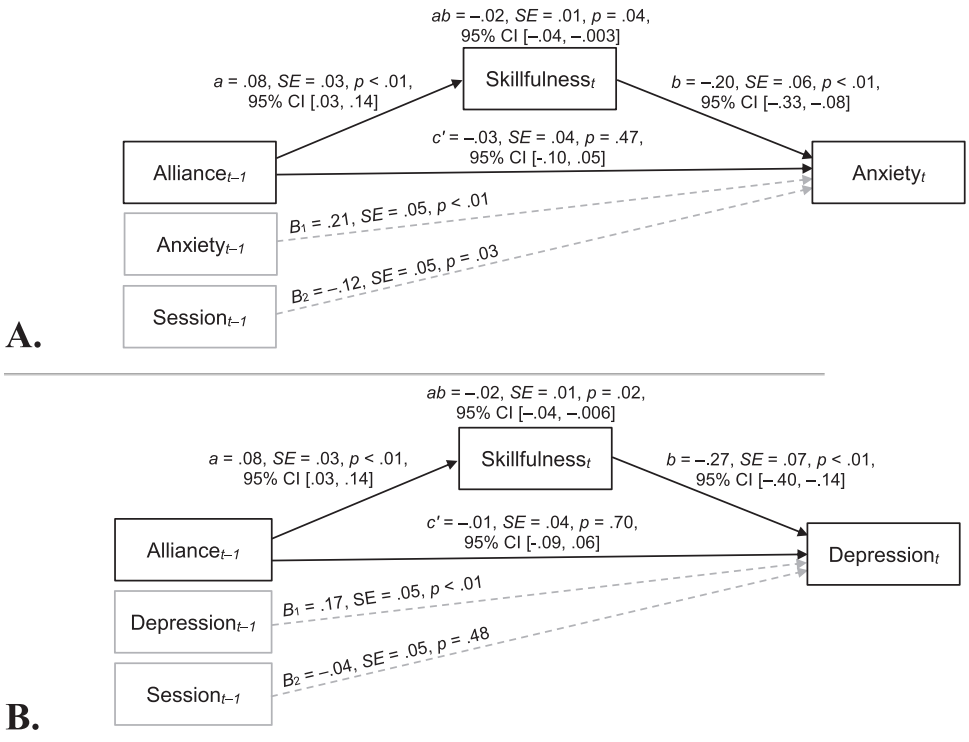


**Fig. 1.** Skillfulness mediates the relations between working alliance and changes in anxiety and depression.

Because the WAI-SR includes three subscales representing specific aspects of the alliance, we conducted exploratory analyses using these subscales to examine if specific aspects of the alliance contributed to relatively stronger or weaker indirect effects. We replaced the total alliance score in each model above with one of the subscale scores at *t*–1 (i.e., Task, Goals, or Bond), using all other model specifications as above. Thus, we conducted six exploratory within-person mediation models, examining each of the three WAI subscales as predictors of changes in anxiety and depression, respectively.

## Results

### *Correlations and changes over time*

Between-persons, patients who exhibited greater average skillfulness tended to identify as White and heterosexual, and report higher annual income, but fewer years of education, than those who exhibited lower average skillfulness, *r*s: –.16 – .13, *p*s < .05 (Table 1). Patients who reported a stronger alliance tended to be younger and not single, identify as female and White, and report fewer years of education than those who reported a weaker alliance, *r*s: –.37 – .12, *p*s < .05. Patients who reported greater average anxiety tended to be older, identify as non-White, and report fewer years of education and lower annual income than those who reported lower average anxiety, *r*s: –.18 – .21, *p*s < .05. Finally, patients who reported greater average depression tended to be older and not single, identify as male, and report lower annual income than those who reported lower average depression, *r*s: –.34 – .19, *p*s < .05.

Greater within-person skillfulness, *r*s: –.25 - –.23, *p*s < .01, and alliance, *r*s: –.24 - –.13, *p*s < .01, were significantly associated with lower anxiety and depression (Table 1). Greater within-person skillfulness was significantly associated with greater alliance total and subscale scores, exhibiting medium-sized associations, *r*s:.32–.48, *p*s < .01. Between-persons, skillfulness and the alliance total and subscale scores exhibited small-sized, negative, significant relations with depression, *r*s: –.25 - –.09, *p*s < .05, and all measures except the WAI-Bond subscale exhibited small-sized, negative, and significant relations with anxiety, *r*s: –.20 - –.15, *p*s < .01. Between-persons, skillfulness exhibited large, positive, and significant correlations with the alliance and all subscales, *r*s:.50 – .66, *p*s < .01, except the Bond subscale, with which it demonstrated a small-to-medium sized correlation, $r = .28$, $p < .01$. Lastly, the alliance and all its subscales demonstrated significant large-sized between-person intercorrelations: *r*s:.54 – .92, *p*s < .01.

Despite a numerical increase after session 2, skillfulness did not increase significantly, $B = .08$, $SE = .05$, $p = .07$, 95% CI [–.008,.17], $d = .43$. By contrast, total alliance, $B = .86$, $SE = .11$, $p < .01$, 95% CI [.65, 1.08], $d = 1.12$, as well as the Task, $B = .31$, $SE = .03$, $p < .01$, 95% CI [.25,.38], $d = 1.19$; Bond, $B = .26$, $SE = .04$, $p < .01$, 95% CI [.18,.34], $d = .94$; and Goals subscales, $B = .25$, $SE = .04$, $p < .01$, 95% CI [.16,.33], $d = .73$, significantly increased across sessions, and anxiety, $B = –.21$, $SE = .06$, $p < .01$, 95% CI [–.33, –.10], $d = –.60$, and depression, $B = –.21$, $SE = .06$, $p < .01$, 95% CI [–.36, –.11], $d = –.47$, significantly decreased across all available sessions.

### *Testing the indirect effect of the alliance through skillfulness on changes in anxiety*

The indirect effect of the working alliance through skillfulness on session-to-session changes in anxiety was significant, $ab = –.02$, $SE = .01$, $p = .04$, 95% CI [–.04, –.003] (Fig. 1A). Specifically, a stronger within-person alliance predicted greater within-person skillfulness, $a = .08$, $SE = .03$, $p < .01$, 95% CI [.03,.14], $R^2 = .02$, and greater within-person skillfulness predicted session-to-session decreases in anxiety, $b = –.20$, $SE = .06$, $p < .01$, 95% CI [–.33, –.08], $R^2 = .03$.[8]

When examining the subscales of the working alliance, the indirect effect of agreement on the tasks of therapy (Task subscale) through skillfulness on session-to-session changes in anxiety was significant, $ab_{task} = –.04$, $SE = .02$, $p = .04$, 95% CI [–.08, –.01]. Greater within-

[8] 8In response to reviewer suggestions, we also tested the indirect effect of skillfulness before session t through the working alliance after session t on session-to-session changes in anxiety from session t to t + 1. This indirect effect was not significant, ab = –.01, SE = .01, p = .49, 95% CI [–.04,.02] (Fig. 1A, Supplemental Online Materials).

**Table 1**
Summary statistics and between- and within-person correlations among demographics and variables of interest.

| Variable | *M* (*SD*), median, or *n* (%) | 1 | 2† | 3† | 4† | 5† | 6† | 7† | 8 | 9 | 9a | 9b | 9c | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age (years) | 33.74 (12.64) | | | | | | | | | | | | | | |
| 2. Gender (female)† | 47 (67.1%) | .14 * * | | | | | | | | | | | | | |
| 3. Race (White)† | 49 (70.0%) | -.11 * * | -.10 * * | | | | | | | | | | | | |
| 4. Annual income† | $50,000-$74,999 | .02 | -.11 * * | -.05 | | | | | | | | | | | |
| 5. Education level† | Undergraduate degree | .48 * * | .18 * * | .01 | .03 | | | | | | | | | | |
| 6. Marital status† | Single (34.3%) | -.17 * * | .10 * * | .11 * * | -.03 | -.27 * * | | | | | | | | | |
| 7. Sexual orientation (heterosexual)† | 52 (74.3%) | -.36 * * | .06 | .04 | -.14 * * | -.43 * * | .20 * * | | | | | | | | |
| 8. Skillfulness | 4.97 (2.15) | -.02 | -.04 | -.16 * * | .13 * * | -.08 * | .01 | -.09 * | | .46 * * | .32 * * | .48 * * | .37 * * | -.23 * * | -.25 * * |
| 9. Alliance | 47.62 (8.43) | -.18 * * | -.30 * * | -.17 * * | -.03 | -.37 * * | .12 * * | < .01 | .55 * * | | .89 * * | .87 * * | .85 * * | -.19 * * | -.24 * * |
| 9a. Goal subscale | 16.68 (3.31) | -.13 * * | -.31 * * | -.18 * * | -.06 | -.30 * * | .05 | < .01 | .50 * * | .92 * * | | .63 * * | .69 * * | -.13 * * | -.16 * * |
| 9b. Task subscale | 14.44 (3.52) | -.14 * * | -.26 * * | -.15 * * | < .01 | -.35 * * | .17 * * | .01 | .66 * * | .90 * * | .82 * * | | .57 * * | -.15 * * | -.24 * * |
| 9c. Bond subscale | 16.49 (3.00) | -.20 * * | -.23 * * | -.21 * * | -.03 | -.35 * * | .13 * * | .03 | .28 * * | .82 * * | .64 * * | .54 * * | | -.21 * * | -.22 * * |
| 10. Anxiety | 8.53 (3.53) | .21 * * | -.06 | .18 * * | -.18 * * | -.09 * | .07 | .06 | -.20 * * | -.15 * * | -.16 * * | -.20 * * | -.04 | | .46 * * |
| 11. Depression | 7.49 (4.78) | .19 * * | .17 * * | .07 | -.34 * * | -.03 | .08 * | .12 * * | -.09 * | -.18 * * | -.09 * * | -.13 * * | -.25 * * | .60 * * | |

*Note.* Between-person correlations are below the diagonal; within-person correlations are above. Gender: female = 0, male = 1. Race: White = 0, not White = 1. Marital status: 0 = Single/never married, 1 = Not single/never married. Sexual orientation: 0 = heterosexual, 1 = not heterosexual. Skillfulness = Dimensions of Skillfulness and Use Scale. Alliance = Working Alliance Inventory – Short Revised. Goals subscale = Working Alliance Inventory – Goals subscale. Task subscale = Working Alliance Inventory – Task subscale. Bond subscale = Working Alliance Inventory –Bond subscale. Anxiety = Overall Anxiety Severity and Impairment Scale. Depression = Overall Depression Severity and Impairment Scale.
†Correlations involving dichotomous or ordinal variables are Spearman's correlations.
*$p < .05$, * * $p < .01$.

person task agreement predicted greater within-person skillfulness, $a_{task} = .18$, $SE = .06$, $p < .01$, 95% CI [.05,.30], $R^2 = .02$, and greater within-person skillfulness predicted session-to-session decreases in anxiety, $b_{task} = –.20$, $SE = .06$, $p < .01$, 95% CI [–.33, –.08], $R^2 = .03$.

The indirect effect of the emotional bond (Bond subscale) through skillfulness on session-to-session changes in anxiety was not significant, although the Monte Carlo confidence intervals did not include zero, $ab_{bond} = –.04$, $SE = .02$, $p = .06$, 95% CI [–.09, –.01]. Specifically, stronger within-person emotional bonds predicted greater within-person skillfulness, $a_{bond} = .20$, $SE = .08$, $p = .02$, 95% CI [.04,.36], $R^2 = .01$, and greater within-person skillfulness predicted session-to-session decreases in anxiety, $b_{bond} = –.20$, $SE = .06$, $p < .01$, 95% CI [–.33, –.07], $R^2 = .03$.

The indirect effect of the agreement on goals of therapy (Goals subscale) through skillfulness on session-to-session changes in anxiety was not significant, although the Monte Carlo confidence intervals did not include zero, $ab_{goals} = –.03$, $SE = .02$, $p = .09$, 95% CI [–.07, –.0004]. Specifically, greater within-person goal agreement predicted greater within-person skillfulness, $a_{goals} = .14$, $SE = .07$, $p = .04$, 95% CI [.004,.28], $R^2 = .01$, and greater within-person skillfulness predicted session-to-session decreases in anxiety, $b_{goals} = –.21$, $SE = .06$, $p < .01$, 95% CI [–.34, –.08], $R^2 = .03$.

### *Testing the indirect effect of the alliance through skillfulness on changes in depression*

The indirect effect of the alliance through skillfulness on session-to-session changes in depression was significant, $ab = –.02$, $SE = .01$, $p = .02$, 95% CI [–.04, –.006] (Fig. 1B). Specifically, a stronger within-person alliance predicted greater within-person skillfulness, $a = .08$, $SE = .03$, $p < .01$, 95% CI [.03,.14], $R^2 = .02$, and greater within-person skillfulness predicted session-to-session decreases in depression, $b = –.27$, $SE = .07$, $p < .01$, 95% CI [–.40, –.14], $R^2 = .05$.[9]

When examining the subscales of the working alliance, the indirect effect of agreement on the tasks of therapy (Task subscale) through skillfulness on session-to-session changes in depression was significant, $ab_{task} = –.05$, $SE = .02$, $p = .03$, 95% CI [–.09, –.01]. Greater within-person task agreement predicted greater within-person skillfulness, $a_{task} = .17$, $SE = .07$, $p < .01$, 95% CI [.04,.30], $R^2 = .02$, and greater within-person skillfulness predicted session-to-session decreases in depression, $b_{task} = –.27$, $SE = .07$, $p < .01$, 95% CI [–.40, –.14], $R^2 = .05$.

Similarly, the indirect effect of the development of an emotional bond (Bond subscale) through skillfulness on session-to-session changes in depression was significant, $ab_{bond} = –.05$, $SE = .03$, $p = .049$, 95% CI [–.11, –.006]. Stronger within-person emotional bonds predicted greater within-person skillfulness, $a_{bond} = .18$, $SE = .08$, $p = .02$, 95% CI [.03,.35], $R^2 = .01$, and greater within-person skillfulness predicted session-to-session decreases in depression, $b_{bond} = –.27$, $SE = .07$, $p < .01$, 95% CI [–.40, –.14], $R^2 = .05$.

By contrast, the indirect effect of the agreement on goals of therapy (Goals subscale) through skillfulness on session-to-session changes in depression was not significant, $ab_{goals} = –.04$, $SE = .02$, $p = .08$, 95% CI [–.09,.0001]. Greater within-person goal agreement did not significantly predict within-person skillfulness, $a_{goals} = .14$, $SE = .07$, $p = .05$, 95% CI [–.0003,.27], $R^2 = .01$, although greater within-person skillfulness predicted session-to-session decreases in depression, $b_{goals} = –.27$, $SE = .07$, $p < .01$, 95% CI [–.41, –.15], $R^2 = .05$.

[9] In response to reviewer suggestions, we also tested the indirect effect of skillfulness before session $t$ through the working alliance after session $t$ on session-to-session changes in depression from session $t$ to $t + 1$. This indirect effect was not significant, $ab = –.004$, $SE = .01$, $p = .73$, 95% CI [–.03,.02] (Fig. 1B, Supplemental Online Materials).

## Discussion

In this secondary data analysis, skillfulness mediated the effects of the alliance on session-to-session changes in anxiety and depression. Specifically, a stronger within-person alliance predicted greater within-person skillfulness (i.e., skillfulness greater than one's personal average) which predicted session-to-session improvements in anxiety and depression, explaining 3% and 5% of the variance in each dependent variable, respectively. When exploring the three aspects of the working alliance, the indirect effect of agreement on tasks was significant in predicting reductions in both anxiety and depression and the indirect effect of the emotional bond was significant in predicting reductions in depression. These findings provide some of the first empirical support for a facilitative effect of the working alliance through skillfulness on session-to-session symptom change in adult patients with emotional disorders [28,29].

We expanded previous findings on the importance of a strong therapeutic alliance and skillfulness on symptom improvements by assessing the temporal relations between these factors. A stronger within-person working alliance at the end of one session significantly predicted greater within-person skillfulness at the next session, which significantly predicted session-to-session reductions in both anxiety and depression. This pattern of results suggests a strong working alliance may increase patients' motivation for change, treatment buy-in, or engagement in session, which in turn improves how much knowledge patients retain about the skills, how often they use them, how well they use them, or how effective they are, leading to reductions in anxiety and depression. These findings suggest that alliance and skillfulness may be active elements of transdiagnostic CBT. Providers may be encouraged to focus on in-session behaviors that promote agreement with patients on which skills to use and how to use them, perhaps by explicitly linking skill use to upcoming stressors or practicing skills in session to ensure patients know how to use them. These results suggest providers could emphasize the value of skillful practice with patients as a potential active element of change and track patients' between-session skillfulness as an indicator of treatment progress. At the same time, the small size of these indirect effects suggests there may be other active elements involved in predicting symptom change. Providers may therefore be encouraged to focus on the alliance and skillfulness as two constructs they can more directly influence while also attending to other potential factors that could contribute to these indirect effects (e.g., sudden gains, therapeutic ruptures and repairs, or intermediary mechanisms such as experiential avoidance). Taken together, these results highlight the complementary and facilitative relations between the alliance and skill use.

Our findings on the relations between the alliance and skillfulness suggest several avenues for future research. For instance, previous researchers have shown that therapists can learn specific skills to improve the working alliance (e.g., accurate empathy, reflection, and self-disclosure; [47]; [48]; [49]. However, it would be helpful to test the degree to which these skills improve each aspect of the alliance. These skills may lead to improvements in the emotional bond, but other more motivational skills may be necessary to enhance agreement on the tasks of therapy [50]. To optimize treatments like the UP, it may also be useful to explicitly include descriptions of these skills in therapist guides and treatment trainings [51].

Contrary to previous findings in which the working alliance did not significantly change during treatment with the UP [31], we observed large, significant increases in the alliance. These increases in the alliance were largest in agreement on the tasks of therapy, followed by the emotional bond, and agreement on the goals of therapy. Differences in changes in the alliance between Sauer-Zavala et al. [31] and the current study are unlikely to be a result of differences in mean scores, as these are similar between the two studies. However, Sauer-Zavala et al. [31] delivered UP modules in the same order for all patients, ending with exposure modules, whereas two-thirds of patients in the current study received UP modules in personalized orders, with 30–40% of patients receiving exposure modules at any given session [52]. It is possible that patients perceive a weaker alliance during exposure modules than other modules, given that therapists often intentionally provide less reassurance during these exercises so patients learn they can tolerate discomfort more effectively. Our results suggest the alliance may continue to strengthen over the course of the UP, although we encourage future researchers to test how ratings of the alliance may respond to different modules.

However, in line with previous findings [18,53], we observed small-to-medium-sized, nonsignificant increases in skillfulness and medium-sized, significant reductions in anxiety and depression in the UP. When examining changes in specific aspects of skillfulness from this dataset, Southward and Sauer-Zavala [18] concluded that increases in skill quality and effectiveness but not skill knowledge or frequency occurred in the UP. These results suggest that patients tend to improve in their abilities to apply skills over the course of treatment while maintaining a high degree of understanding of the skills as taught. The lack of significant change in skill frequency may reflect individual differences: whereas some patients may use skills more frequently as they incorporate them into their regular repertoire over time, others may use skills more frequently earlier in treatment to reduce stressors, and, by extension, need them less frequently later in treatment. We encourage future researchers to replicate these results in independent samples and treatments to test their stability and generalizability.

Although the between-person correlations between the alliance and anxiety and depression in the current study were somewhat smaller than meta-analytic estimates [1], the within-person correlations between the alliance and these symptoms were the same or larger than meta-analytic estimates [6]. These results suggest that similar-sized improvements in the working alliance, anxiety, and depression occur in the UP as in most other CBT-based and non-CBT-based treatments for these conditions.

Exploratory findings revealed that greater agreement on the tasks of therapy predicted greater subsequent skillfulness and reductions in anxiety and depression, whereas stronger emotional bonds between patients and therapists predicted greater subsequent skillfulness and reductions in depression, with similar magnitudes, *abs*: –.02 - –.05. Although the effects of task agreement and bond (on depression) were statistically significant and those of goal agreement and bond (on anxiety) were not, this does not necessarily indicate that the difference between these effects is statistically significant [54]. Given the exploratory nature of these results, they should be interpreted cautiously, and we encourage future researchers to explore these possibilities in pre-registered designs and analyses.

### *Limitations*

Our findings should be considered in the context of the study's limitations. Because half of our participants were randomized to discontinue treatment after the sixth session, our results primarily apply to relatively early treatment sessions. Participants primarily identified as straight, White, and female with at least an undergraduate degree, limiting the generalizability of results beyond these characteristics. Participants also reported anxiety scores slightly higher than the clinical threshold at baseline and depression scores slightly lower than the clinical threshold, indicating a sample with mild-to-moderately severe symptoms. Although these findings may not generalize to more severe populations, they may provide a better understanding of how the alliance, skill use, and symptom change interact in broader clinical settings where patients do not necessarily need a *DSM-5* diagnosis to receive care. Further, participants reported their skillfulness and symptoms once per week, which may have been impacted by recency biases or positivity biases to please their therapist or study personnel. Future researchers are encouraged to track these constructs more frequently between sessions throughout treatment (e.g., using ecological momentary assessment [EMA]; [55]. EMA might also be helpful to better delineate the temporal order of variables, as our study design did not offer temporal separation

between skillfulness and outcomes, given that they were measured at the same timepoint. Because we did not experimentally manipulate the alliance or skillfulness, we also cannot claim causal effects, nor can we rule out reciprocal effects of symptom change preceding and predicting subsequent changes in the alliance or skillfulness (but see [18]. Lastly, participants in this study only received core UP modules and some participants received more modules than others. Thus, these results may not generalize to the typical delivery of the UP with its other supplementary modules.

Despite these limitations, this study offers important insights into the temporal relations among the working alliance, skillfulness, and symptom changes. We demonstrated that a stronger within-person alliance predicted greater within-person skillfulness which predicted session-to-session improvements in anxiety and depression. These effects were primarily driven by agreement on the tasks of therapy and, in the case of depression, the emotional bond with the therapist. Together, these results provide the first empirical evidence to our knowledge of a process of change linking the working alliance, therapy skillfulness, and symptom change in adults to provide a more comprehensive understanding of the process of change in CBT.

### *Public health significance*

When CBT patients have a stronger agreement with their therapist about what techniques will lead to symptom change, they apply these techniques more skillfully the following week. The skillfulness with which they apply these techniques predicts changes in anxiety and depression. These results suggest that cultivating buy-in around treatment techniques may be an indirect way to promote patients' use of therapy skills and treatment outcomes.

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Matthew W. Southward reports financial support was provided by National Institute of Mental Health. Jesse P. McCann reports financial support was provided by National Institute on Drug Abuse. Shannon Sauer-Zavala has patent Unified Protocol with royalties paid to Oxford University Press.

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## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.xjmad.2023.100043.

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