

Running Head: Alliance Factors

The Factor Structure of the Shortened Version of the Working Alliance Inventory

Senior Honors Research Thesis

Presented in partial fulfillment of the requirements for graduation *with honors research distinction* in Psychology in the undergraduate colleges of The Ohio State University

By

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Abstract

In research on the process of change in psychotherapy, perhaps no variable has received more attention than the therapeutic alliance. Measures of the alliance characterize the level of agreement between therapist and client on treatment goals, the level of agreement on how to accomplish those goals, and the affective bond between therapist and client. One of the most widely used measures of the alliance is the 12-item Working Alliance Inventory (WAI-S, shortened version). However, the factor structure underlying the WAI-S remains unclear. Most often researchers have used a total score from the WAI-S, implying a single latent factor. The authors of the WAI-S originally suggested the WAI-S was composed of three distinct factors (i.e., Task, Goal, and Bond). An exploratory factor analysis of the WAI-S in a relatively small sample suggested two factors: Agreement and Relationship (Andrusyna, Tang, DeRubeis, & Luborsky, 2001). To examine the different factor structures proposed, we drew data from three independent samples of depressed patients participating in cognitive therapy for depression. In this combined sample of 207 patients, we used confirmatory factor analyses to compare the fit of the previously proposed one, two, and three factor models of the WAI-S. Using item scores from the third therapy session, our results support a two-factor solution consisting of Agreement and Relationship factors. All fit indices examined favored the two-factor model over competing models. Additional analyses suggest this factor structure applied to ratings of the alliance made by therapists, clients and observers. Our results clarify the factor structure of the WAI-S and should inform future research on the therapeutic alliance.

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Introduction

In research on the process of change in psychotherapy, perhaps no variable has received more attention than the therapeutic alliance. The concept of the therapeutic alliance dates back to Freud's development of psychoanalysis. He noted that the alliance involves the level of understanding, positive regard, and encouragement between therapist and client (Freud, 1910/1957). Researchers have continued to theorize on the nature of the alliance throughout the 20th century as it relates to different forms of psychotherapy, and the exact definition of this concept has varied widely (Gelso & Carter, 1985). Bordin (1979) suggested that the alliance is composed of three distinct components. The *Goal* component refers to the level of agreement between therapist and client on treatment goals. The *Task* component describes the level of agreement on how to accomplish those goals, and *Bond* refers to the affective relationship between therapist and client. Other definitions of the alliance have focused on the client's perceived helpfulness of the client-therapist relationship (Luborsky, Crits-Christoph, Alexander, Margolis, & Cohen, 1983) or the breakdown of the positive and negative contributions of both client and therapist to their relationship (Marziali, Marmar, & Krupnick, 1981). Many researchers consider the alliance as necessary for, or actively contributing to, the process of psychotherapy (Safran & Muran, 2000). Bordin's (1979) definition of the alliance has been the most widely adopted in psychotherapy research due in part to its ease of operationalization and pan-theoretical applicability.

A popular measure of the alliance is the Working Alliance Inventory (WAI) (Horvath & Greenberg, 1989). One of the most widely used variations of the WAI is the 12-item Shortened Version of the Working Alliance Inventory (WAI-S) developed by Tracey and Kokotovic (1989). The original 36-item WAI includes 12 questions designed to assess each of the Task,

Goal, and Bond subscales. The WAI-S retains these three theoretical factors but reduces the number of questions characterizing each subscale to four items. The items were selected using the highest-loading responses in a confirmatory factor analysis (CFA) of the WAI and include two reverse scored items (items 4 and 10). The WAI-S has been adapted for use as an observer, therapist, and patient rated measure allowing for flexibility of deployment and investigation of varying perspectives on the alliance (Horvath & Greenberg, 1989; Tichenor & Hill, 1989).

Other alliance measures include the California Psychotherapy Alliance Scales (CALPAS; Gaston & Marmar, 1994) and the Penn Helping Alliance Questionnaire (HAQ; Alexander & Luborsky, 1986). The HAQ was derived from the Luborsky et al. (1983) definition of the alliance and is based on two theoretical subscales: Helping Alliance and Collaboration. The CALPAS is based on Marziali et al.'s (1981) interpretation of the alliance and has a variety of subscales which include Patient Working Capacity, Working Strategy Consensus, Patient Commitment, and Therapist Understanding and Involvement. Results from the CALPAS may be hard to interpret based on the complexity of the subscale structure, and the simplicity of the HAQ may obscure differences in the formation of the alliance. An advantage of the WAI in comparison to the HAQ and CALPAS is that it is based directly on Bordin's conceptualized Task, Goal, and Bond subscales and has clear and distinct operationalization, which has facilitated its adoption. Another advantage of the WAI is that it does not include items assessing symptom severity, which could lead to erroneous correlations with symptom measures in treatment process studies. This was an issue with studies using results from the HAQ before its revision in 1996 (Luborsky et al., 1996).

The authors of the WAI and WAI-S based their items on the Task, Goal, and Bond subscales (Table 1); however, researchers using the WAI-S invariably look at total scores from

the inventory. Exploratory factor analyses have suggested multiple two factor interpretations of the WAI and the WAI-S. Reynolds, Hatcher, and Hansell (1995) report a two factor Task/Goal and Bond structure (Table 2) in their principal-component analysis of the WAI in a client rated sample. Andrusyna, Tang, DeRubeis, & Luborsky's (2001) principal-component analysis of the observer rated WAI-S suggests an Agreement and Relationship factor structure (Table 3), with Task, Goal, and one Bond item loading onto an Agreement factor and the remaining three Bond items forming a Relationship factor. These differing interpretations of the WAI-S reveal the inconsistencies in our empirical understanding of the inventory in spite of its wide use and relevance to the therapeutic process.

In the current study, WAI-S data was collected from a depressed outpatient population receiving cognitive therapy (CT). Depression (Major Depressive Disorder) is a mood disorder characterized by a major depressive episode and includes symptoms such as depressed mood during a large portion of the day, insomnia or oversleeping, fatigue, feelings of guilt and worthlessness, reduced interest in activities, indecisiveness, and excessive weight loss or gain (First, Spitzer, Gibbon, & Williams, 2001). In the United States, depression is one of the leading causes of disability and affects about seven percent of the population each year (Kessler, Chiu, Demler, & Walters, 2005). CT has received extensive empirical support for its efficacy in the treatment of depression (Department of Health, Mental Health Program, 2008; Chambless & Ollendick, 2001; DeRubeis & Crits-Christoph, 1998). The strategies of CT for depression are based on the concept that negative thinking may be contributing to depressive symptoms, and that the behavioral symptoms of depression, such as lessened interest in daily activities and social withdrawal, lead to further increases in symptom levels. CT attempts to break this cycle by guiding clients in identifying dysfunctional thoughts and teaching them skills to challenge these

negative cognitions. In addition, CT includes behavioral components that are aimed at helping clients reengage in their lives and foster a greater sense of enjoyment and accomplishment (Beck, Rush, Shaw, & Emery, 1979).

Though therapist adherence to treatment methodology was emphasized by treatment developers as a determinant of symptom change in CT, the model underlying CT for depression suggests the alliance may be important (Beck, Rush, Shaw, & Emery, 1979). Meta-analyses of the relationship between the alliance and therapeutic outcome depict reliable correlations between alliance scores and symptom reduction (Horvath & Symonds, 1991; Martin, Garske, & Davis, 2000). Examinations of the alliance in CT specifically have shown modest correlations between the alliance and subsequent symptom change (*rs* of .15 and .16; Strunk, Brotman, & DeRubeis, 2010; Strunk, Cooper, Ryan, DeRubeis, & Hollon, 2012). The relationship between prior symptom change and the formation of the alliance has also been explored. Strunk et al. (2010) showed prior symptom change predicting the alliance ($r = .34$). However, these correlations are between outcome and total scores from the WAI-S. While some researchers have looked at subscale scores from the WAI-S (e.g. Strunk et al., 2010; 2012), the most appropriate partitioning of scores from the WAI-S remains unclear.

The present study aims to clarify the relevant latent factors of the WAI-S by comparing factor structures using CFA. We will assess the applicability of a general total score factor; Bordin's original Task, Goal, and Bond subscales; and the proposed two factor structure models against each other. The primary set of CFAs will be conducted using the largest observer rated data set ever examined from the WAI-S and confirmed across limited therapist and client rated samples.

Methods

Participants

This study is based on data from three independently collected samples:

Cognitive Pharmacotherapy-II sample (DeRubeis et al., 2005, n=60): A two-site, randomized trial of CT which included 60 patients, 58% female, with an average age of 40 years (ranging from 19 to 68). Patient ethnicity included 78% Caucasian, 12% African American, and 10% of other ethnicities. All patients met DSM-IV diagnostic criteria for Major Depressive Disorder (MDD) and scored at least 20 points on the modified 17-item Hamilton Depression Rating Scale (First et al., 2001; Hamilton, 1960). Patients were randomly assigned to 16 weeks of CT treatment as one of three treatment conditions, including pharmacotherapy and placebo groups. Patients were excluded on the basis of (1) history of bipolar disorder; (2) substance dependence necessitating treatment; (3) current or history of psychosis; (4) other current Axis I disorder if it required treatment in preference of MDD; (5) current Axis II disorder judged inadequately suited to treatment with CT; (6) current risk of suicide as reason to treat on an inpatient basis; (7) medical condition that contraindicated pharmacotherapy treatment condition; (8) failure to respond to previous trial of pharmacotherapy treatment condition medication; (9) subnormal intellectual potential ($IQ < 80$) (DeRubeis et al., 2005).

Cognitive Pharmacotherapy-III sample (D.R. Strunk, personal communication, April 5, 2013, n=176): A three-site, randomized trial which included 176 patients from a CT and pharmacotherapy combined condition, 58% female, with an average age of 43 (ranging from 18 to 80). The ethnicities of the patients were as follows: 85% Caucasian, 9% African American, 2% Asian, and 1% American Indian or Native Alaskan. 2% of patients identified themselves as “other.” Patients were currently diagnosed with MDD as determined by the Structured Clinical

Interview for DSM-IV and underwent 16 weeks of CT for depression (First et al., 2001). In addition, all patients met criteria for chronic depression or had at least one previous episode of depression. Patients diagnosed with double depression or dysthymia were not excluded from the study as long as they also met the other inclusion criteria. Cognitive Pharmacotherapy-III exclusion criteria matched that of the Cognitive Pharmacotherapy-II sample (D.R. Strunk, personal communication, April 5, 2013).

The Center for Clinical and Translational Science sample (Adler, Strunk, & Fazio, 2013, n=66): A randomized, single-site CT trial of 66 patients who participated in 16 weeks of CT treatment for depression. Patients were 56.8% female with an average age of 38 (ranging from 18 to 63). Patient ethnicity was primarily White (90.9%). The Center for Clinical and Translational Science sample had similar exclusion criteria to that of the Cognitive Pharmacotherapy samples in addition to exclusion on the basis of clear secondary gain (e.g. court ordered treatment) and evidence of any medical condition that could cause depression (Adler, Strunk, & Fazio, 2013).

Therapists and Treatment

All Treatment was conducted following the treatment manual for cognitive therapy for depression (Beck et al., 1979).

Cognitive Pharmacotherapy-II: CT for depression was provided by six therapists at Vanderbilt University and the University of Pennsylvania. Five therapists were licensed psychologists with PhD degrees, and one therapist was a psychiatric nurse practitioner. Experience in administering psychotherapy ranged from 5 to 21 years at onset of study.

Cognitive Pharmacotherapy-III: 14 therapists with varying experience provided CT for depression at the University of Pennsylvania, Vanderbilt University, and Rush University

Medical Center. On-site supervision of CT was given by Dr. Robert DeRubeis, Dr. Steven Hollon, and Dr. Paula Young.

The Center for Clinical and Translational Science: CT for depression was provided by five advanced clinical psychology graduate students at The Ohio State University under the supervision of Dr. Daniel Strunk.

Measures

Beck Depression Inventory – 2nd Edition (BDI-II) – The BDI-II is a 21-item Likert-type, self-report inventory used to assess severity of depressive symptoms. Question scales range from 0 to 3, with total scores ranging from 0 to 63. Questions concern feelings during the past week (Beck, Steer, & Brown, 1996).

Working Alliance Inventory – Short; Observer, Client, and Therapist rated (WAI-S) – The WAI-S is a set of 12 Likert-type items used to assess the therapeutic alliance by evaluating areas such as confidence, trust, and agreement. Question scores range from 1 to 7. Total scores range from 12 to 84 (Horvath & Greenberg, 1989; Tracey & Kokotovic, 1989; Tichenor & Hill, 1989). The WAI-S items are presented by Agreement and Relationship factors in Table 8.

Analysis

One, two (two versions), and three factor models of the WAI-S were examined using CFA with the IBM SPSS Amos 20 modeling program (IBM Corp., Released 2011). The primary analysis was conducted using observer rated WAI-S ratings (n=207) taken during the third therapy session (Cognitive Pharmacotherapy-II, n=60; Cognitive Pharmacotherapy-III, n=147). Secondary CFAs of therapist (The Center for Clinical and Translational Science, n=54) and client (The Center for Clinical and Translational Science, n=51) rated data sets were conducted in spite of sample size limitations to compare with our primary findings of observer rated data.

Recommended subject-to-item ratios for factor analysis are suggested to be no less than five (Hatcher, 1994; Gorsuch, 1983) or ten subjects per item analyzed (Nunnally, 1978; Everitt, 1975). We were able to achieve a subject-to-item ratio of 17.25 (207:12) in our primary analysis. In regards to absolute sample size, Gorsuch (1983) recommends a minimum of 100 while Hutcheson and Sofroniou (199) recommend 150 to 300 subjects. With a sample of 207 subjects, our primary analysis fits these additional guidelines. This suggests that the present study's findings provide an adequately stable solution.

Fit Indices

For determining goodness of fit in CFA models, a variety of fit indices were included across categories following the recommendations of Thompson (2004). We chose to include the chi-square statistic, the relative chi-square (χ^2/df), the Root Mean Square Error of Approximation (RMSEA, Steiger, 1990), and the Standardized Root Mean Square Residual (SRMR) as absolute fit indices. We also selected two incremental fit measures: the Tucker Lewis Index (TLI, Tucker & Lewis, 1973) and the Comparative Fit Index (CFI, Bentler, 1990). Information theory goodness of fit measures are also listed in the analyses and include the Akaike Information Criterion (AIC, Akaike, 1973; Akaike, 1987), the Consistent Akaike Information Criterion (CAIC, Bozdogan, 1987), the Bayes Information Criterion (BIC, Raftery, 1993), and the Browne-Cudeck Criterion (BCC, Browne & Cudeck, 1989). Recommendations for levels of adequate model fit for these indices are: χ^2/df : *adequate* <3.00 to *good* <2.00; RMSEA: <.06; SRMR: <.08; TLI: *adequate* >.90 to *good* >.95; and CFI: *adequate* >.90 to *good* >.95 (Hu & Bentler 1999; 1995).

Since this study involves the comparison of nonnested models, using the TLI, CFI, chi-square, relative chi-square, and SRMR would not be appropriate for comparison between models

since the discrepancy χ^2 function cannot be used as a test statistic in these cases as they rely on null model comparisons (Kline, 2010). These indices were included to demonstrate respective model fit. The AIC, CAIC, BCC, and BIC are indices that rely on predictive model comparisons and are based on relative (interval) scale values. They do not indicate model fit alone but allow for the comparison of fit between nonnested models, with the lowest scoring model fitting best. AIC difference scores calculated between the proposed best fitting (benchmark) model and the competing models are listed, and a model with a difference score of >10 is considered very unlikely to replicate in other samples with better fit than the benchmark model (Burnham & Anderson, 2002). The CAIC, BCC, and BIC are similar to the AIC but include additional penalties for model complexity and smallness of sample size.

Results

The fit indices for the models tested using observer ratings of the WAI-S are presented in Table 4. The χ^2/df ratios and RMSEA values do not indicate good fit, but both are sample size dependent. The RMSEA tends to over reject true-population models at smaller sample size (Hu & Bentler 1999), and the likelihood of detecting a false model with χ^2 increases with sample size (Marsh, Balla, and McDonald, 1988). The SRMR index suggests acceptable fit for all models tested, and the TLI and CFI indices show at least adequate fit. For comparison between models, the comparative measures of fit all indicate that the Agreement/Relationship two factor solution fits the sample best, with all multifactor interpretations having better fit than the single factor model. Tables 5 and 6 show the results of the CFA analyses with the client and therapist rated samples. Goodness of fit tends to be somewhat improved with these samples though limited sample sizes suggest less stable solutions. Model fit trends are consistent across therapist and client rated samples, with the Agreement/Relationship structure fitting both client and therapist

rated samples best. We concluded that the Agreement/Relationship factor structure represented the WAI-S data most closely. Though the Agreement and Relationship factors are highly correlated in our observer rated sample ($r = .86$), they remain distinct. The path diagram and standardized factor weights for this two factor model are listed in Tables 3 and 7.

Discussion

Our findings indicate that the alliance is composed of two distinct, though highly correlated latent factors. The Agreement factor relates to the level of agreement between client and therapist on goals and tasks for therapy, and the Relationship factor represents their affective bond. These results are consistent across all measures of goodness of fit. While Horvath and Greenberg (1989) included confidence (i.e. how confident the client is in the therapists' ability to help) in the Bond subscale, the results of the present study suggest that confidence relates to collaborative agreement rather than affective bond. This supports Andrusyna et al.'s (2001) conclusions with an exploratory principal components analysis in a relatively small CT sample and fits with the theoretical model of CT.

The CT model for depression treatment is based on teaching clients cognitive and behavioral skills to challenge negative automatic cognitions and reengaging in their original healthy lifestyles. The development of the affective relationship between client and therapist is distinct from agreement on treatment objectives and methodology. Clients can develop confidence in their therapists' ability to treat them in relation to how much they agree on the goals and strategies for therapy irrespective, regardless of whether they like their therapists on a personal level or not.

Previous confirmatory investigations of the WAI-S did not include the Agreement/Relationship factor structure in their analyses, so the present study is the most

thorough comparison between models to date (Hatcher & Gillaspay, 2006; Tracey & Kokotovic, 1989). We were able to confirm the model fit trends of our primary observer rated analysis (n=207) in client (n=51) and therapist (n=54) rated samples. However, the limited sizes of these diverse sources of WAI-S responses are prohibitively small for stable CFA solutions. Analysis of larger data client and therapist rated data sets of the WAI-S is necessary before we can conclude that the factor structure does not vary across perspectives of the alliance. Nevertheless, there has been no evidence to indicate that this would not be the case in the current study. The development of the alliance may vary across treatment methods as well. A more insight focused psychotherapy treatment such as supportive-expressive psychodynamic therapy may result in a different structure for the alliance. Future studies on different treatment samples will be necessary to confirm the stability of the WAI-S factor structure across therapies.

Researchers of the alliance consistently employ total scores from the WAI-S in their analyses. However, our results suggest the WAI-S is comprised of Agreement and Relationship subscales. Previous research with the WAI-S may be inaccurately portraying the relevance of the therapeutic alliance in psychotherapy by only including total scores in their analyses. It will be necessary for future studies to take into account the respective contributions of the Agreement and Relationship constructs in order to clarify their roles in the formation of the therapeutic alliance and its contributions to the therapeutic process.

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Table 1
WAI-S Three Factor Model Path Diagram

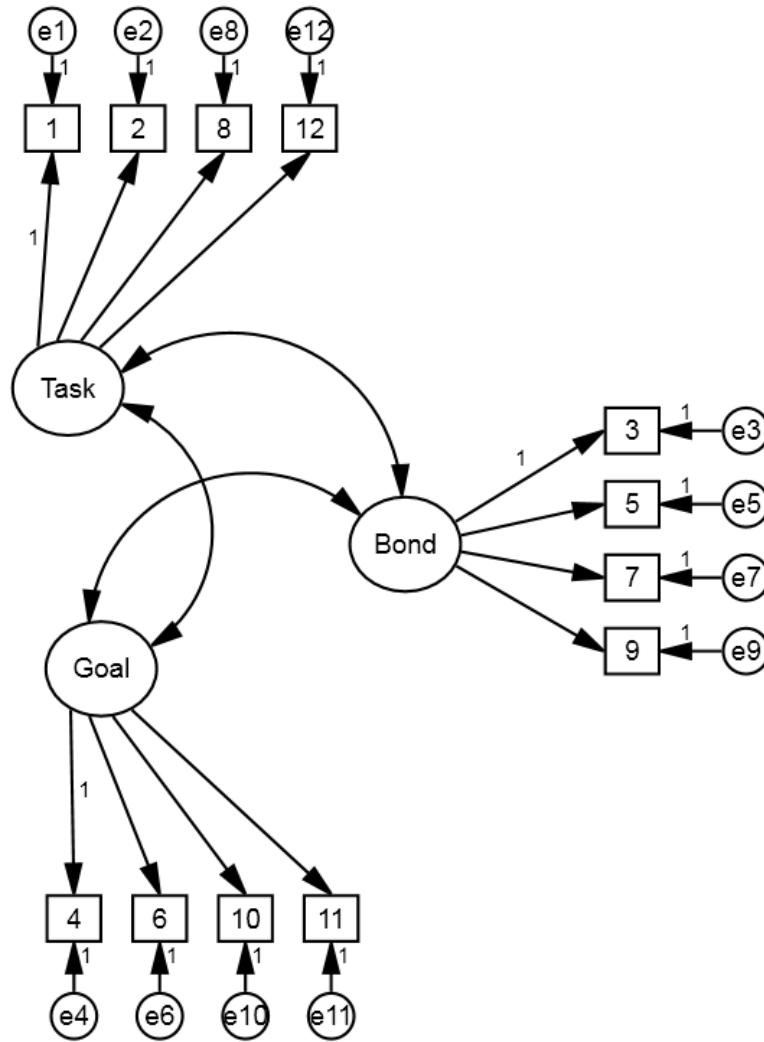


Table 2

WAI-S Two Factor Task/Goal and Bond Model Path Diagram

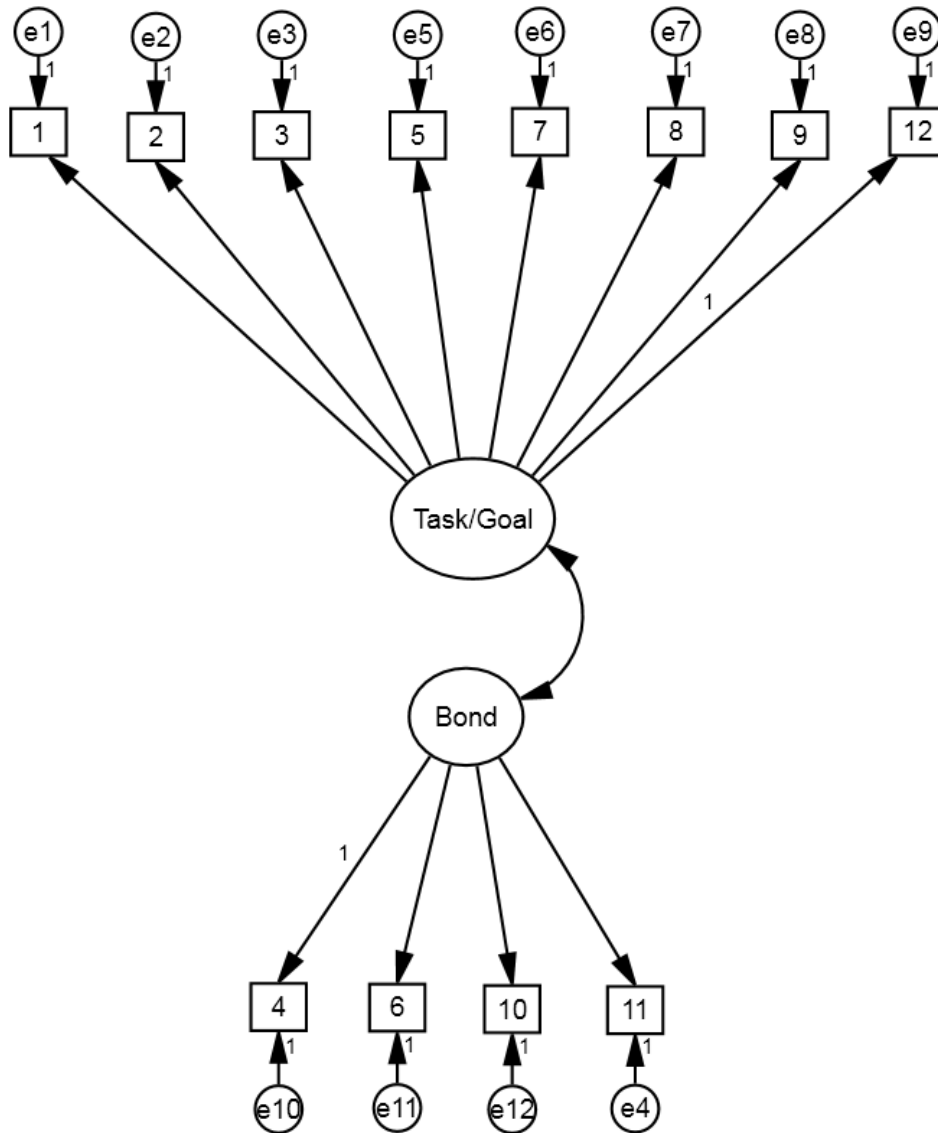


Table 3

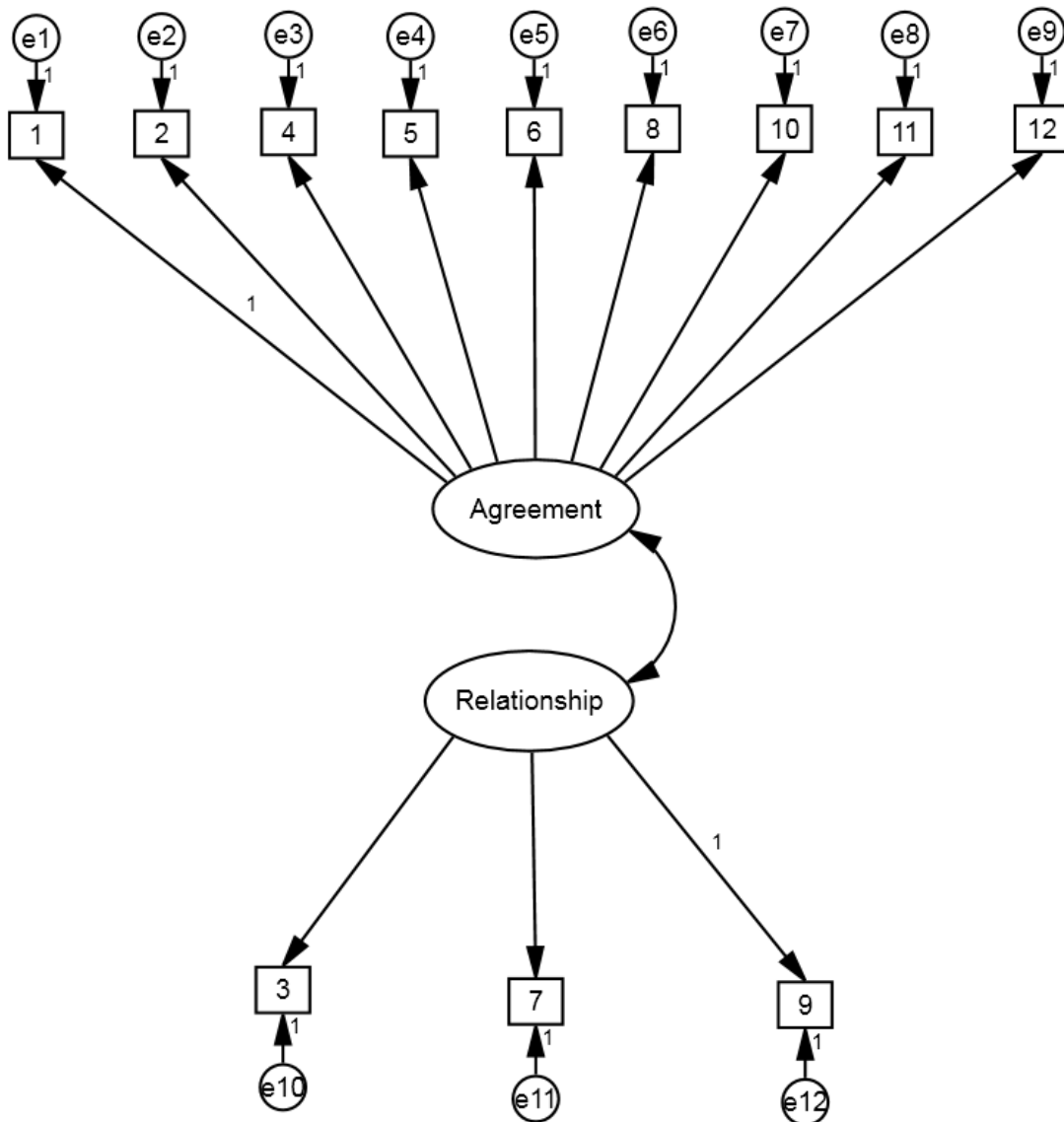
WAI-S Agreement/Relationship Two Factor Path Diagram

Table 4: *Observer Rated Confirmatory Factor Analysis Results*

Likelihood Ratio Tests							
Model	χ^2	<i>df</i>	χ^2/df^\dagger	SRMR [†]	TLI	CFI	RMSEA [†]
One Factor	276.85	54	5.13	0.0445	0.900	0.918	0.142
Two Factors (Agree/Relate)	188.68	53	3.56	0.0371	0.938	0.950	0.111
Two Factors (Goal/Task and Bond)	223.65	53	4.22	0.0384	0.922	0.937	0.125
Three Factors	221.73	51	4.35	0.0385	0.919	0.937	0.127

Comparative Measures of Fit					
Model	AIC [†]	Δ_{AIC}	CAIC [†]	BIC [†]	BCC [†]
One Factor	324.9	86.2	428.8	404.8	328.1
Two Factors (Agree/Relate)	238.7	0.0	347.0	322.0	242.1
Two Factors, 4 Bond	273.6	35.0	382.0	357.0	277.0
Three Factors	275.7	37.0	392.7	365.7	279.4

†lower value indicates better fit

Table 5: *Client Rated Confirmatory Factor Analysis Results*

Likelihood Ratio Tests

Model	χ^2	df	χ^2/df^\dagger	SRMR [†]	TLI	CFI	RMSEA [†]
One Factor	117.26	54	2.17	0.0365	0.913	0.929	0.153
Two Factors (Agree/Relate)	80.24	53	1.51	0.0259	0.962	0.969	0.101
Two Factors (Goal/Task and Bond)	94.07	53	1.77	0.0328	0.943	0.954	0.124
Three Factors	93.28	51	1.83	0.0326	0.939	0.953	0.129

Comparative Measures of Fit

Model	AIC [†]	Δ_{AIC}	CAIC [†]	BIC [†]	BCC [†]
One Factor	165.3	35.0	235.6	211.6	182.1
Two Factors (Agree/Relate)	130.2	0.0	203.5	178.5	147.8
Two Factors (Goal/Task and Bond)	144.1	13.8	217.4	192.4	161.6
Three Factors	147.3	17.0	226.4	199.4	166.3

†lower value indicates better fit

Table 6: *Therapist Rated Confirmatory Factor Analysis Results*

Likelihood Ratio Tests

Model	χ^2	df	χ^2/df^\dagger	SRMR [†]	TLI	CFI	RMSEA [†]
One Factor	119.09	54	2.21	0.0592	0.869	0.892	0.151
Two Factors (Agree/Relate)	66.99	53	1.26	0.0470	0.971	0.977	0.071
Two Factors (Goal/Task and Bond)	82.52	53	1.56	0.0728	0.939	0.951	0.103
Three Factors	82.02	51	1.61	0.0725	0.934	0.949	0.107

Comparative Measures of Fit

Model	AIC [†]	Δ_{AIC}	CAIC [†]	BIC [†]	BCC [†]
One Factor	167.1	50.1	238.8	214.8	182.7
Two Factors (Agree/Relate)	117.0	0.0	191.7	166.7	133.2
Two Factors (Goal/Task and Bond)	132.5	15.5	207.2	182.2	148.8
Three Factors	136.0	19.0	216.7	189.7	153.6

†lower value indicates better fit

Table 7: *Standardized Factor Weights for the Agreement/Relationship Model of the Shortened Working Alliance Inventory*

Item no.	Agreement Factor	Relationship Factor
1	0.92	
2	0.94	
4*	0.84	
5	0.88	
6	0.85	
8	0.88	
10*	0.71	
11	0.87	
12	0.92	
3		0.92
7		0.88
9		0.72

*Indicates reverse scored items

Table 8

The Two Factors of the Observer Rated Shortened Working Alliance Inventory

Factor 1: Agreement*Task Items*

1. There is an agreement about the steps taken to help improve the client's situation.
2. There is an agreement about the usefulness of the current activity in therapy.
8. There is an agreement on what is important for the client to work on.
12. The client believes that the way they are working with his/her problem is correct.

Goal Items

4. There are doubts or lack of understanding about what participants are trying to accomplish in therapy.
6. The client and therapist are working on mutually agreed upon goals.
10. The client and therapist have different ideas about what the patient's real problems are.
11. The client and therapist have established a good understanding of the changes that would be good for the patient.

Bond Item

5. The client feels confident in the therapist's ability to help the patient.

Factor 2: Relationship*Bond Items*

3. There is a mutual liking between the client and the therapist.
7. The client feels that the therapist appreciates him/her as a person.
9. There is mutual trust between the client and therapist.