University of Groningen

Development and validation of the Working Alliance Inventory Dutch version for use in rehabilitation setting
Paap, Davy; Schrier, Ernst; Dijkstra, Pieter U.

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

[Link to publication in University of Groningen/UMCG research database](#)
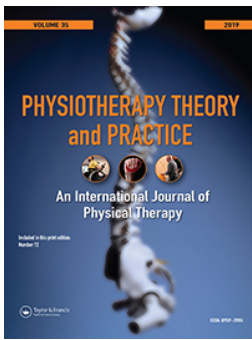
Development and validation of the Working Alliance Inventory Dutch version for use in rehabilitation setting

Davy Paap PT, MSc, Ernst Schrier PT, MS & Pieter U. Dijkstra PT, PhD

Taylor & Francis
Taylor & Francis Group

Check for updates

Development and validation of the Working Alliance Inventory Dutch version for use in rehabilitation setting

Davy Paap PT, MSc [a,b,c], Ernst Schrier PT, MS[c], and Pieter U. Dijkstra PT, PhD[c,d]

[a]Physical Therapy Sciences, program in Clinical Health Sciences, University Medical Center Utrecht, Utrecht, Netherlands; [b]Department Physical Therapy, Expertise Center of Primary Care Groningen, Groningen, Netherlands; [c]Department of Rehabilitation Medicine, University of Groningen, University Medical Center Groningen, Groningen, Netherlands; [d]Department of Oral and Maxillofacial Surgery, University of Groningen, University Medical Center Groningen, Groningen, Netherlands

ABSTRACT

Background: In rehabilitation, therapeutic alliance is associated with improvements in clinical outcomes. The Working Alliance Inventory (WAI) measures therapeutic alliance and is frequently used in rehabilitation research; however, it has not been validated for rehabilitation. **Objectives**: To determine content validity, internal consistency and construct validity of the Working Alliance Inventory Rehabilitation Dutch Version (WAI-ReD). **Methods**: In phase 1, content and face validity of the WAI-ReD was judged by professionals ($n = 15$) and in phase 2 by patients ($n = 22$). In phase 3, 14 hypotheses were tested in patients ($n = 138$) regarding: content validity (i.e., missing items, floor, and ceiling effects); internal consistency; and construct validity (i.e., factor structural testing correlations of WAI-ReD scores with Session Rating Scale (SRS), the Helping Alliance Questionnaire II (HAQ-II), and Visual Analog Scale of Pain (VAS$_{pain}$)). **Results**: After phase 1 and phase 2, the WAI-ReD was formulated and tested. Content validity; missing items were negligible. Ceiling effects were present in all domains. Internal consistency; Cronbach's α ranged between 0.804 and 0.927. Construct validity; correlations between WAI-ReD, SRS, HAQ-II, and VAS$_{pain}$ fell within the hypothesized ranges. **Conclusion**: Eleven of the 14 hypotheses were not rejected confirming good clinimetric properties of the WAI-ReD. The WAI-ReD can be used in rehabilitation to measure therapeutic alliance.

Introduction
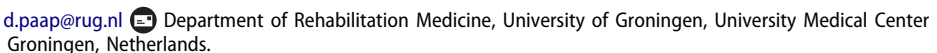
Any treatment has specific and nonspecific effects (Crow et al., 1999). Nonspecific effects are related to treatment relationship, environment, characteristics of the therapist, and patient satisfaction (Crow et al., 1999). Although clinically specific and nonspecific effects act together, quantification of nonspecific effects has not been a primary focus of research in rehabilitation (Fuentes et al., 2014).

The therapeutic alliance is a part of the treatment relationship and contributes to these nonspecific effects (Bordin, 1979; Greenberg and Webster, 1982). The construct therapeutic alliance is derived from the theory of transference, first outlined by Freud (1958). This theory was further elaborated upon by Bordin (1979). The core of his theory is that the therapeutic alliance is a negotiated, collaborative feature of the treatment relationship and it enables the patient to accept and follow treatment faithfully (Bordin, 1994). Therapeutic alliance includes three domains: (1) agreement between patient and therapist on the goals of the treatment; (2) agreement between

patient and therapist about the tasks (to achieve the proposed goals); and (3) quality of the bond between patient and therapist (Bordin, 1979).

Within psychotherapy, a stronger therapeutic alliance between patient and therapist is associated with better treatment outcome (Del Re et al., 2012; Horvath, Del Re, Flückiger, and Symonds, 2011). Growing evidence suggests that within rehabilitation this association also exists (Hall et al., 2010; Lakke and Meerman, 2016). From systematic reviews, it is clear that the therapeutic alliance has not been systematically investigated in rehabilitation, as evidenced by the lack of consensus regarding measurement instruments used (Babatunde, MacDermid, and MacIntyre, 2017; Besley, Kayes, and McPherson, 2010; Hall et al., 2010). To date, more than five instruments measuring therapeutic alliance measures have been validated for psychotherapy (Elvins and Green, 2008; Hall et al., 2010).

The Working Alliance Inventory (WAI) is the most frequently used instrument both within psychotherapy and rehabilitation (Babatunde, MacDermid, and

CONTACT : Davy Paap PT, MSc ✉ d.paap@rug.nl 🖂 Department of Rehabilitation Medicine, University of Groningen, University Medical Center Groningen, P.O. Box 30.001. 9700 RB, Groningen, Netherlands.
Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/iptp.

MacIntyre, 2017; Hall et al., 2010; Horvath, Del Re, Flückiger, and Symonds, 2011). Based on validity studies, the WAI seems to be appropriate for clinical practice and research (Elvins and Green, 2008). However, these studies were performed in patients undergoing psychotherapy; therefore, outcome may not be generalizable to rehabilitation (Hall et al., 2010; Kayes and McPherson, 2012; Paap and Dijkstra, 2017). The WAI and also the other instruments that measure therapeutic alliance include items specific for treatment in psychotherapy, for instance, "As a result of the sessions I am clearer as to how I might be able to change" (Horvath and Greenberg, 1989). It remains unclear whether Bordin's construct of therapeutic alliance is truly transferable to rehabilitation (Babatunde, MacDermid, and MacIntyre, 2017), although it has been suggested that the construct therapeutic alliance is applicable to many therapeutic approaches (Bordin, 1979).

In psychotherapy, psychologists provide a supportive environment strongly based on dialogue between patient and therapist. They both work together to identify and change emotions, thought or behavior patterns with the aim to improve the patient's well-being and mental health (Araujo et al, 2017). In rehabilitation, healthcare professionals aim to help patient to maintain and restore maximum movement and functional ability. Hence, we argue that the nature of the alliance between healthcare professionals in rehabilitation is somewhat different from the therapeutic alliance in psychotherapy. This difference will probably be reflected in the domains goals and tasks of the WAI (Kayes and McPherson, 2012).

The English version of the WAI has been translated into a Flemish version and validated in patients receiving psychotherapy in Belgium (Vertommen and Vervaeke, 1990). Flemish is a Dutch language variety. Between Flemish and Dutch are difference in vocabulary, style, meaning of words and grammar (Bennis et al., 2003; Vandekerckhove, 2005). But the difference in vocabulary is limited to a few thousand words (Vandekerckhove, 2005). In a recent study the Flemish version was used in a prognostic cohort study for development of a prognostic model in patients with shoulder complaints (Karel et al., 2016). In that study the therapeutic alliance was an important prognostic factor, but a major limitation was the large amount of missing data (78%). Missing values may occur when a measurement instrument is used in another population than for which it was originally developed (De Vet, Terwee, Mokkink, and Knol, 2011).

Before the WAI can be applied in the Dutch population undergoing rehabilitation it needs to be re-worded to fulfill content and face validity. Thereafter internal consistency, construct validity and the structural validity of the WAI should be tested in rehabilitation setting. Therefore, the aim of the study was to determine the content validity (including face validity), internal consistency and construct validity (including structural validity) of the Working Alliance Inventory Rehabilitation Dutch Version (WAI-ReD).

Methods

Study Design

Development of the WAI-ReD was performed in three phases according to COSMIN guidelines (Mokkink et al., 2010a) using three samples. In phase 1, content and face validity were judged by professionals. In phase 2, content and face validity was judged by patients via pilot testing. In phase 3, hypotheses were tested in patients for assessing content validity, internal consistency, construct validity and structural validity.

To develop the WAI-ReD we used the Flemish version of the WAI-short form revised version (WAI-SR) as a starting point. Generally, therapists overestimate the strength of the therapeutic alliance with their patient (Horvath and Symonds, 1991). The patient judgment about the therapeutic alliance has the greatest predictive value for treatment outcome (Bachelor, 1995; Horvath and Symonds, 1991). Therefore, we focused on the patient version of the WAI-SR. This Flemish version of the WAI-SR has been translated forward and backward (Vertommen and Vervaeke, 1990). The WAI-SR items are rated on a 5-point Likert scale (Range: 1––Never to 5––Always). The WAI-SR consists of three scales: (1) a task scale, (items 1, 2, 10, and 12); (2) a goal scale (items 4, 6, 8, and 11); and (3) a bond scale (items 3, 5, 7, and 9). The scores on these three scales together form the strength of therapeutic alliance. For the English and the Flemish version internal consistency expressed in Cronbach's α of the subscales ranged from 0.81 to 0.90, and Cronbach's α of the total score was 0.91 (Hatcher and Gillaspy, 2006; Vertommen and Vervaeke, 1990). The Flemish WAI-SR was studied by the authors and a first draft of the WAI-ReD was made.

Phase 1: Rating by Professionals

Content and face validity were judged by professionals. The rehabilitation professionals ($n = 15$) were recruited by means of purposeful sampling, from the Department of Rehabilitation Medicine of the University Medical Center Groningen (UMCG), the Netherlands. We included a speech therapist, rehabilitation physicians, occupational therapists, physical therapists, hand therapists, a psychologist, and psychomotor therapists. The selected rehabilitations professionals were informed in

writing about the construct therapeutic alliance defined by Bordin (1994). Thereafter they were given the Flemish version of the WAI and the suggested WAI-ReD. The rehabilitation professionals were asked to assess the WAI-ReD for relevance, suitability, construct, language, and comprehensive of the items for use within rehabilitation (Mokkink et al., 2010b). They were asked to keep in mind that the WAI-ReD should be applicable for different patient groups and different professionals within rehabilitation. The rehabilitation professionals assessed the WAI-ReD in October 2014 and recorded their comments and suggestion. The comments and suggestion were discussed between the authors and a new version of the WAI-ReD was formulated. The professionals were asked to assess this version again. After the second round consensus was reached between the authors and rehabilitation professionals, resulting in second draft.

Phase 2: Pilot Testing

The second draft of WAI-ReD was pilot tested in a convenience sample of 25 rehabilitation patients of the Department of Rehabilitation Medicine in UMCG. They were asked to read and fill out the WAI-ReD and record unclear or strange wording. In a face to face interview they were asked if they had difficulty in understanding items. Patients assessed the WAI-ReD in December 2014. The comments were collected and discussed between the authors. The WAI-ReD was adjusted until consensus was reached among the authors and the final version was formulated.

Phase 3: Hypotheses Testing

In phase 3, a convenience sample of patients were recruited by speech therapists, physical therapists, hand therapists, a psychologist and psychomotor therapists of the Center for Rehabilitation of the UMCG and a physical therapy clinic in Groningen. Patients were included

when they had at least three treatment sessions within rehabilitation, were 18 years or older, and had sufficient knowledge of the Dutch language to complete questionnaires. Patients were excluded if they suffered from aphasia or were unable to write or read. Recruitment period was between January 2015 and April 2015.

Prior to the validation process, hypotheses were formulated, based on previous research and clinical experience (Table 1). For content validity, floor and ceiling effects and nonresponse of items may be an indication that items of the WAI-ReD are not relevant or a lack comprehensiveness (Mokkink et al., 2010b). Before executing this study no floor and ceiling effects in item responses had been examined in validation studies of WAI. Only recently floor and ceiling effects were studied but results had not been published during the design phase of our study (Araujo et al, 2017). We expected floor and ceiling effects to occur in <15% of the domains scores and we expected <5% of missing items (Hypotheses 1 and 2) (Hatcher and Gillaspy, 2006; Tracey and Kokotovic, 1989).

Internal consistency is the interrelatedness among items (Mokkink et al., 2010b). Based on previous research we expected a good Cronbach's α for the three different domains $(0.70 \leq r < 0.95)$ (Hypothesis 3), and we also expected a good Cronbach's α for the total score $(0.70 \leq r < 0.95)$ (Hypothesis 4) (Hatcher and Gillaspy, 2006; Munder et al., 2010).

Construct validity has been defined as "the degree to which scores of a measurement instrument are consistent with hypotheses (e.g., with regard to internal relationships) relationships with scores of other instruments or differences between groups" (Mokkink et al., 2010b). According to Bordin's theory therapeutic alliance is a universal concept. In previous research (Stinckens, Ulburghs, and Claes, 2009) no differences were found in total scores between males and females, and between two age groups (below and above mean age of the study population), hence we expected no differences between these patient groups (Hypotheses 5 and 6). In previous clinimetric research,

Table 1. Hypotheses for examining validity of the WAI–ReD.

The validity is not rejected when: *Content validity (including face validity)*
(1) Items have a nonresponse < 5%
(2) Floor and ceiling effects: < 15% of respondents score the lowest or highest score for domains scores
Internal consistency
(3) The Cronbach's α of the three different domains is strong $(0.70 \leq r < 0.95)$
(4) The Cronbach's α of the total score is strong $(0.70 \leq r < 0.95)$
Construct validity (including structural validity)
(5) Differences in total scores between males and females are not significant
(6) Differences in total scores between two age groups (below and above mean age of the study sample) are not significant
(7) Differences in the total scores of patients treated by different types of therapists are not significant
(8) The strength of the correlation of the total WAI-ReD score with the total scores HAQ-ll is strong (r ≥ 0.70)
(9) The strength of the correlation of the total WAI-ReD score with the total scores SRS is moderate $(0.50 \leq r \leq 0.70)$
(10) The strength of the correlation with question 1 (*relationship*) of SRS between domain *Bond* of the WAI–ReD is moderate $(0.50 \leq r \leq 0.70)$
(11) The strength of the correlation with question 2 (*goals and topics*) of SRS between domain *Goals* of the WAI–ReD is moderate $(0.50 \leq r \leq 0.70)$
(12) The strength of the correlation with question 3 (*approach or method*) of SRS between domain *Task* of the WAI–ReD is moderate $(0.50 \leq r \leq 0.70)$
(13) The strength of the correlation of the total WAI-ReD score with the VAS_{pain} is non existing or weak $(0.00 \leq r \leq 0.30)$
(14) Three-correlated factor model will best fit the responses

differences in scores related to different type of therapists have not been investigated (Hatcher and Gillaspy, 2006; Stinckens, Ulburghs, and Claes, 2009). Within psychotherapy systematic differences exist between cognitive behavioral treatments and psychodynamic treatments (Raue, Goldfried, and Barkham, 1997; Stinckens, Ulburghs, and Claes, 2009). However, Gelso and Carter suggest that all psychotherapeutic relationships regardless of theoretical orientation consist of three components: (1) a working alliance; (2) a transference configuration; and (3) a real relationship. These three components inevitably develop between two human beings, regardless of the therapeutic context they find themselves in Gelso and Carter (1994). Therefore we assumed no significant differences in the total scores of patients treated by different types of therapists (Hypothesis 7). For testing convergent validity we used the Helping Alliance Questionnaire II (HAQ-II) and the Session Rating Scale (SRS). The SRS measures the therapeutic alliance for each session, the WAI-ReD and HAQ-II measure the therapeutic alliance for a series of treatment. Although the HAQ-II and the SRS have been validated for use in psychology and some questions may be less relevant and comprehensive within rehabilitation, we expected these questionnaires to give an adequate reflection of the convergent validity of the WAI-ReD. The HAQ-II and the WAI-ReD intend to measure the same construct (Trijsburg, Van't Spijker, Van Dam, and Duivenvoorden, 1999), therefore we expected a strong correlation ($r \geq 0.70$) between HAQ-II and WAI-ReD (Hypothesis 8) (Hatcher and Gillaspy, 2006; Munder et al., 2010). The SRS and the WAI-ReD do not measure the same construct but a similar construct and evaluate one session (Duncan et al., 2003); therefore, we expected a moderate correlation ($0.50 \leq r \leq 0.70$) between the total score of the WAI-ReD and the SRS total score (Hypothesis 9). Between the three same domains of the SRS and the WAI-ReD, we expected a moderate correlation ($0.50 \leq r \leq 0.70$) (Hypotheses 10–12). For testing divergent validity of the WAI-ReD, we used the Visual Analog Scale of Pain (VAS_{pain}). The VAS_{pain} measures average pain of the last week. Although a strong therapeutic alliance may be associated with greater improvements in pain, the WAI-ReD and VAS_{pain} do not measure the same construct. For this reason, we expected a non-existing or weak correlation ($0.00 \leq r \leq 0.30$) between the VAS_{pain} and the total score of the WAI-ReD (Hypothesis 13). Structural validity was defined as "the degree to which the scores of a measurement instrument are an adequate reflection of the dimensionality (factors) of the construct to be measured" (Mokkink et al, 2010b). We assumed, based on previous studies, that the three-correlated factor model will fit best (Hypothesis 14) (Hatcher and Gillaspy, 2006; Munder et al., 2010).

Several measurement instruments were used for hypothesis testing. The SRS is a self-report 4-item visual analogue scale designed for measuring therapeutic alliance for each session (Duncan et al., 2003). The SRS is based on Bordin's, 1979 definition of the therapeutic alliance, and the patient theory of change (Duncan et al., 2003). Each item requires the patient to make a mark on a 10-cm horizontal line to score the relationship ("I felt heard, understood, and respected"); goals and topics ("We worked on or talked about what I wanted to work on or talk about"); approach/method ("The therapist's approach is a good fit for me"); and overall experience of the treatment session ("Overall today's treatment session was right for me"). The SRS is scored by summing the scores of the items made by the patient, measured to the nearest centimeter on each of the four horizontal lines (scoring range 0 to 40) (Duncan et al., 2003). The Dutch version of the SRS was translated by using forward and backward translation (Hafkenscheid, 2008). Internal consistency (Cronbach's α) of the total score of the Dutch version is 0.92 (Hafkenscheid, 2010). The correlation between SRS and HAQ-II is 0.48 (Duncan et al., 2003).

The Helping Alliance Questionnaire II is a widely used 19-item questionnaire that measures the strength of the therapeutic alliance in psychotherapy in one dimension (Luborsky et al., 1996). Each item is rated on a 6-point Likert scale (1: "I strongly feel it is not true to" 6: "I strongly feel it is true"). After reversing scores for negatively keyed items, the sum of the 19 items is used to generate an HAQ-II summery score (Luborsky et al., 1996). The Dutch version of the HAQ-II was translated by using forward and backward translation (Trijsburg, Van't Spijker, Van Dam, and Duivenvoorden, 1999). The English version of HAQ-II showed good internal consistency. Cronbach's α was 0.92 and test–retest reliability was 0.78 (Luborsky et al., 1996). The HAQ-II demonstrated high convergence with the California Psychotherapy Alliance Scale (CALPAS) ($r = 0.59–0.69$) (Luborsky et al., 1996).

Visual Analog Scale of Pain is a horizontal line, 100 mm in length, anchored by word descriptors at each end (0: no pain, 100: worst pain possible) (Hayes and Patterson, 1921). Patients were asked to draw a vertical mark across the horizontal line that best represented the average pain of the last week. The VAS_{pain} is a commonly used instrument to assess pain with moderate to good reliability and validity (Crossley, Bennell, Cowan, and Green, 2004; Kersten, White, and Tennant, 2014).

Study Procedures

Permission to carry out this study was granted by the local medical ethics committee of the UMCG (M15.167997). All participants gave an informed consent prior to

inclusion. In phase 3, the three questionnaires and the VAS$_{pain}$ were filled out by the patients, first the WAI-ReD, second the VAS$_{pain}$, third the SRS, and last the HAQ-II. If a patient was treated by more than one therapist, the patient was asked to complete the questionnaires for the therapist who made the request to participate in this study. Professionals were blinded for patients' scores and patients were informed about the blinding to prevent desirability of answering.

Statistical Analysis and Criteria

Statistical analyses were performed with SPSS (version 20.0), and Mplus (version 7.31) (Muthén and Muthén, 1998-2014; Nie et al., 1975). The critical value for significance was set at $p \leq 0.05$. Normality of total scores was analyzed using QQ–plots, histograms, and PP-plots. To analyze associations between the WAI-ReD and the other measurements, Pearson r was calculated (Hinkle, Wiersma, and Jurs, 2003). Independent t-tests were used to analyze differences between younger and older, and between male and female patients. ANOVA was used to analyze differences between patients treated by different types of therapists.

To analyze the structural validity, we applied a confirmatory factor analysis since there is a clear theoretical structure for the WAI-SR (Hatcher and Gillaspy, 2006; Munder et al., 2010) and it enabled to compare our results to the factor structure of the previous WAI versions and this new version in a new population (De Vet, Terwee, Mokkink, and Knol, 2011). Three models were tested: (1) One dimensional factor model, there is no difference in factors between the different domains; (2) Two factors model with one factor being *bond*, and the other being *task* and *goal* together; and (3) and three factors model, where the three domains; *task, goals* and *bond* are distinguishable. A good fit of a model was present when the ratio χ^2/Df is 2 (good fit) or 3 (acceptable fit); and Root Mean Square Error of Approximation (RMSEA) was smaller than 0.05 (good fit) or between 0.05 and 0.10 (acceptable fit); and the two comparative fit indices (i.e., Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI)) is bigger than 0.95 (good fit) or values between 0.90 and 0.95 (acceptable fit) (Hoyle, 2012). The model with the lowest Bayesian information criterion (BIC) is preferred (Raftery, 1995).

Results

Phase 1

The first draft of the WAI-ReD was assessed by rehabilitation physicians ($n = 2$), a speech therapist ($n = 1$), an occupational therapist ($n = 1$), physical therapists ($n = 4$), hand therapists ($n = 4$), a psychologist ($n = 1$), and psychomotor therapists ($n = 2$). After analyzing their input the WAI-ReD was adjusted. For most items, an acceptable Dutch–Flemish translation was obtained, two adjustments were made for a better use in the Dutch population. Firstly, item 7 "apprecieert" was altered in "waardeert", for Dutch people "apprecieert" is a difficult word. Secondly, item 4 "doelstellingen" was altered in "doelen", because "doelen" is a more usual word in Dutch in this context.

Regarding the goal and task domain the WAI-ReD focusses on "to improve" instead of "to change." However, in rehabilitation improving in functioning of the locomotor system and related to that improvement in participation is a common treatment goal. This resulted in adjustments, for example item 1: "As a result of these sessions I am clearer as to how I might be able to change" was rephrased in "As a result of my treatment is I am clearer as to how I might be able to achieve my goals". Another example item 10 "I feel that the things I do in therapy will help me to accomplish the changes that I want" was rephrased in "I notice that the things I do in therapy will help me to accomplish the goals that I want to achieve". Terminology was changed in terms more suitable for the rehabilitation setting. "Practitioner" was used instead of "therapist," "treatment" instead of "therapy."

Phase 2

The WAI-ReD was pilot tested in 22 patients. Mean scores for domains for the WAI-ReD were: task 4.3 (SD = 1.0), goal 4.4 (SD = 0.8), bond 4.1 (SD = 1.0), and total scores 4.3 (SD = 1.0). In total, 6 of 264 items (2.3%) were missing. Two minor adjustments were made. Firstly, in wording of item 11, "goed begrip" was altered in "goed inzicht" because this wording was easily to understand; and secondly in the lay-out of the response scales. None of the patients experienced any difficulties. The final version of the WAI-ReD is presented in the Appendix.

Phase 3

Between January 2015 and April 2015, 138 participants met the inclusion criteria and filled out the questionnaires. Patients were treated in the UMCG ($n = 111$) and a physical therapy clinic ($n = 27$) in Groningen (Table 2).

For content validity, in total 12 of 1656 WAI-ReD items (0.7%) were missing. The percentage of missing data ranged from 0.0 to 3.6 (Table 3); therefore, Hypothesis 1 was not rejected. The most frequently missing items were 9 (5 missing) and 3 (3 missing). Ceiling effects were present in all domains (Table 3); therefore, Hypothesis 2 was rejected. Ceiling effects in

Table 2. Characteristics of patients and professionals and outcomes of questionnaires.

Characteristics of patients (n = 138)	Median (percentiles 25; 75)
- Age (Years)	48 (32; 61)
- Male/Female (missing)	55/75 (8)
- Treatment sessions	5 (3; 10)
Primary disease/symptoms of patients	n (%)
- Arthralgia	6 (4.3)
- Bell's palsy	2 (1.4)
- Brain disease	3 (2.2)
- Cerebrovascular Accident	8 (5.8)
- Chronic pain	10 (7.2)
- COPD	2 (1.4)
- Dupuytren	4 (2.9)
- CPRS- I	2 (1.4)
- Fracture (finger, wrist, hand, and shoulder)	13 (9.4)
- Hand complaints	9 (6.5)
- Hand surgery	5 (3.6)
- Temporomandibular disorder	12 (8.7)
- Knee problems	7 (5.1)
- Low back pain	5 (3.6)
- Luxation (finger, wrist, and hand)	2 (1.4)
- Neck pain	6 (4.4)
- Osteoarthritis	8 (5.8)
- Pelvic complaints	12 (8.7)
- Shoulder pain	10 (7.2)
- Tendon problem	7 (5.1)
- Amputation	2 (1.4)
- Missing	3 (2.2)
Participating professional	Number (%) of patients treated by professionals
-Physical therapists (n = 11)	70 (50.7)
-Hand therapists (n = 6)	29 (21.0)
-Psychologists (n = 1)	15 (10.9)
-Speech therapists (n = 8)	13 (9.4)
-Psychomotor therapists (n = 2)	11 (8.0)
Outcome Questionnaires	Mean (SD)
-WAI-ReD Task	4.0 (0.7)
-WAI-ReD Goal	4.4 (0.8)
-WAI-ReD Bond	4.3 (0.9)
-WAI-ReD Total	4.2 (0.7)
-SRS Approach or Method	9.2 (1.4)
-SRS Goals and Topics	9.2 (1.5)
-SRS Relationship	9.4 (1.2)
-SRS Total	9.2 (1.2)
-HAQ-II Total	5.4 (0.5)
-VAS-P Total	3.4 (2.9)

Note. WAI-ReD, Working Alliance Inventory Rehabilitation Dutch Version; WAI subscales are Task (item 1,2,10 and 12), Goal (item 4,6,8 and 11) and Bond (item 3,5,7 and 9); SRS, Session Rating Scale; HAQ-II, Helping Alliance Questionnaire II; VAS-P, Visual Analog Scale pain.

domain score ranged between 15.9% (tasks) and 28.3% (bond). No ceiling effect was present for the total score (9%). No floor effects of the item scores were measured.

Regarding to internal consistency the Cronbach's α of the three different domains and the Cronbach's α of the total score was strong (Table 4). Because all Cronbach's α fell within the hypothesized ranges, Hypotheses 3 and 4 were not rejected.

Table 3. Descriptive data and distribution of response for each item of the WAI-ReD, for the domain scores and the total score.

Item	Mean (SD)	Lowest scores n (%)	Highest scores n (%)	Missing n (%)
Item 1	3.9 (1.0)	1 (0.7)	45 (32.6)	1 (0.7)
Item 2	4.0 (0.9)	2 (1.4)	42 (30.4)	0 (0.0)
Item 3	4.0 (1.0)	1 (0.7)	56 (41.5)	3 (2.2)
Item 4	4.3 (0.9)	0 (0.0)	71 (51.4)	0 (0.0)
Item 5	4.7 (0.7)	0 (0.0)	106 (76.8)	0 (0.0)
Item 6	4.4 (0.9)	1 (0.7)	84 (60.9)	0 (0.0)
Item 7	4.2 (0.9)	1 (0.7)	66 (48.8)	2 (1.4)
Item 8	4.4 (0.8)	0 (0.0)	80 (58.0)	0 (0.0)
Item 9	3.8 (1.2)	9 (6.5)	50 (37.2)	5 (3.6)
Item 10	4.2 (0.8)	0 (0.0)	58 (42.0)	0 (0.0)
Item 11	4.2 (0.9)	0 (0.0)	58 (42.0)	1 (0.7)
Item 12	4.1 (0.9)	2 (1.4)	56 (40.6)	0 (0.0)
Domain and total scores				
Goal	4.4 (0.8)	2 (1.4)	39 (28.3)	1 (0.7)
Task	4.0 (0.7)	1 (0.7)	22 (15.9)	1 (0.7)
Bond	4.3 (0.9)	1 (0.7)	33 (23.9)	7 (5.1)
Total	4.2 (0.7)	1 (0.7)	12 (8.7)	8 (5.8)

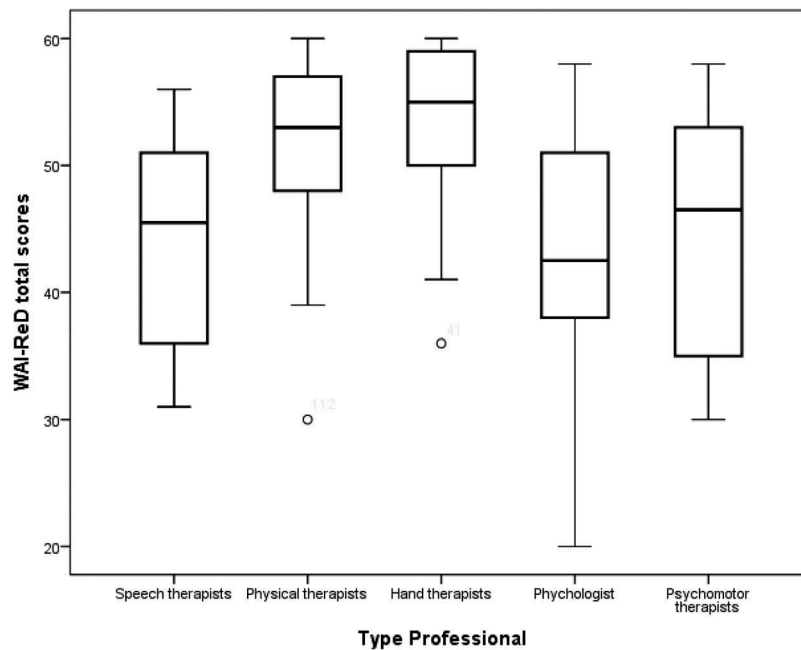Note. N = 138; WAI-ReD, Working Alliance Inventory Rehabilitation Dutch Version.

For construct validity mean total score for male was 49.0 (SD = 8.3) and for female was 51.0 (SD = 8.1). Difference in means between males and females was not significant (95% CI: −1.2 to 4.7, P = 0.243); therefore, Hypothesis 5 was not rejected. Mean total score for the group with an age below sample mean was 49.0 (SD = 8.8), and for the group above sample mean was 51.3 (SD = 7.0). Difference in means between the two age groups was not significant (95% CI: −0.6 to 5.0, P = 0.118); therefore, Hypothesis 6 was not rejected. The mean total scores for patients treated by speech therapists was 44.5 (SD = 8.3), for physical therapists 52.0 (SD = 6.3), for hand therapists 53.7 (SD = 6.4), for psychologist 43.1 (SD = 9.4), and for psychomotor therapists 44.4 (SD = 9.8) (Figure 1). The means differed significantly ($F = 9.48$, d$f = 4,125$, $P < 0.001$); therefore, Hypothesis 7 was rejected.

Correlations between domain and total scores of the WAI-ReD, SRS, HAQ-II, and VAS_{pain} fell within the hypothesized ranges; hence, Hypotheses 8–13 were not rejected (Table 4). Two dimensional factor models with bond and combined task-goal factor best fitted the data (Table 5); therefore, Hypothesis 14 was rejected.

Discussion

In this study, we developed and validated the WAI-ReD using 14 predefined hypotheses of which 11 were

Table 4. Correlations of WAI-ReD (total score and domain scores) with other questionnaires, VAS-Pain and internal consistency.

WAI-ReD	SRS- approach or method	SRS-goals and topics	SRS- relationship	SRS- total	HAQ- II total	VAS- P total	Internal consistency analysis
Task	0.578**	**0.587****	**0.516****				0.845*
Goal	**0.572****	0.582**	**0.508****				0.862*
Bond	**0.515****	**0.550****	0.523**				0.804*
total				0.698**	0.736**	−0.228*	0.927*

Note. N = 138; WAI-ReD, Working Alliance Inventory Rehabilitation Dutch Version; WAI domains are Task (item 1,2,10 and 12), Goal (item 4,6,8 and 11) and Bond (item 3,5,7 and 9); SRS, Session Rating Scale; HAQ- II, Helping Alliance Questionnaire II; VAS-P, Visual Analog Scale pain; * Correlation is significant at the level 0.05 level (two-tailed); ** Correlation is significant at the 0.01 level (two-tailed).

Figure 1. Boxplot of total scores of the working alliance inventory rehabilitation Dutch version (WAI-ReD) for comparison between different type of therapist.

Table 5. Results of the confirmatory factor analyses of the WAI-ReD.

Model	X^2	Df	P	RMSEA	CFI	TLI	BIC
1 Factor	148.9	54	<0.001	0.11	0.90	0.88	3529,27
2 Factors	132.8	53	<0.001	0.10	0.92	0.90	3518,10
3 Factors	128.9	51	< 0.001	0.10	0.92	0.90	3523,98

Note. WAI-ReD, Working Alliance Inventory Rehabilitation Dutch Version; One factor, model with general alliance factor; Two factors, Bond factor and combined Task-Goal factor; Three factors, Bond, Task, and Goal factor; RMSEA, Root Mean Square Error of Approximation; CFI, Comparative Fit Index; TLI, Tucker–Lewis index; BIC, Bayesian information Criterion.

not rejected. One hypothesis regarding content validity was confirmed (Hypothesis 1). A major limitation of the WAI-ReD content validity was the ceiling effects in all domains. In a recent study, the clinimetric properties of the Brazilian version of the WAI for rehabilitation were analyzed. Participants filed in the questionnaire after the first treatment session. Ceiling effects were present in 26% of the total scores (Araujo et al, 2017). Measuring therapeutic alliance after the first session is quite early in the treatment process since establishing goals, agreeing on tasks, and forming a mutual bond may not have completed yet (Watson and Greenberg, 2000). In our study, therapeutic alliance was assessed after the third session and no floor or ceiling effects were present (<9%) in the total scores of the WAI-ReD. This timing may have had a positive influence on reducing ceiling effects. In other studies ceiling effects have not been investigated, although high mean scores and large standard deviations, suggest ceiling effects to be present (Babatunde,

MacDermid, and MacIntyre, 2017; Paap and Dijkstra, 2017). There are several explanations for the high therapeutic alliance scores. Despite professionals being blind for the patients' scores and patients being informed that therapists were blinded, patients may have given socially desirable answers. Additionally, therapeutic alliance differs from outcome measures such as physical disability, where answers to items may be more clear to the patient (Van De Mortel, 2008). Despite of the re-worded and re-contextualized of the WAI-ReD, a ceiling effect could be an indication that items of the WAI-ReD are less relevant (e.g., I feel my therapists cares about me even when I do things that he/she does not approve of; I believe my therapist likes me) or comprehensive (De Vet, Terwee, Mokkink, and Knol, 2011). The high therapeutic alliance scores might also suggest that the majority of patients had a strong therapeutic alliance with their therapist. To gain a better understanding if scores are overrated or not, how patients interpret the WAI-ReD items and therapeutic alliance in rehabilitation, indepth or semi-structural interviews with patients are recommended for future research. A better understanding about the patients' perspective will provide evidence for the face and content validity of the WAI-ReD. Finally floor and ceiling effects may indicate that a scale is not comprehensive (Mokkink et al., 2010b). Based on the Item Response Analysis, Hatcher and Gillaspy (2006) concluded that patients have difficulty effectively discriminating the steps of a 7-point scale,

particularly the lower 5 points of the 7-points scale. They recommended to reduce the number of points of the scale. Although in our study patients did not report comprehensiveness problems in phase 2, these problems might be present. To prevent ceiling effects high-end scale labels can be expanded. A 5-point Likert scale packed with more positive labels generally presents ceilings effects better than a balanced Likert scale (Moret et al., 2007). Another strategy is to replace the Likert scale with a Visual Analogue Scale (Voutilainen, Pitkäaho, Kvist, Vehviläinen-Julkunen, 2016). More research is needed examining methods to reduce ceiling effects of the WAI-ReD.

Both hypotheses regarding internal consistency were confirmed (Hypotheses 3 and 4), which makes the internal consistency of the WAI-ReD strong. In psychotherapy similar internal consistencies for the WAI-SR domain scores and total score were reported (Hatcher and Gillaspy, 2006; Munder et al., 2010). A possible explanation for the high internal consistency is that the different components influence each other, and reinforce each other in the treatment situation. This explanation is consistent with Bordin's view, that development of therapeutic alliance demands negotiation of three aspects of alliance simultaneously (Stinckens, Ulburghs, and Claes, 2009).

Eight of 10 hypotheses regarding construct validity were confirmed (Hypotheses 5, 6, and 8–13), which means construct validity (including structural validity) was good. The two factors and three factors models both had an acceptable fit, whereas the BIC for the two factors model was 6 points lower. Lower BIC implies fewer explanatory variables, better fit, or both (Raftery, 1995). Within psychology several studies have examined the factor structure of the WAI (-SR), some confirming a three-factor structure (Busseri and Tyler, 2003; Hatcher and Gillaspy, 2006; Horvath and Greenberg, 1989; Munder et al., 2010), but noting that the correlation between task and goal is very high and some prefer a two-factor structure with task and goal combined (Andrusyna, Tang, DeRubeis, and Luborsky, 2001; Falkenström, Hatcher, and Holmqvist, 2014; Webb et al., 2011). Another likely factor model is a second order factor structure, with a three-factor structure (i.e., goal, task and bond) and a secondary order factor as agreement (Rindskopf and Rose, 1988). Future research is needed to confirm this model, with a larger sample and focus on model with the least unexplained residue. In our study we tested the factor structure according to the classical test theory. Another method would be to apply the item response theory. But an assumption for item response theory models (Rasch models) is that the items can, to some, extent, be ordered according to difficulty. The items of WAI-ReD cannot be ordered according to difficulty.

Correlations between other therapeutic alliance questionnaires (i.e., SRS and HAQ-II) and the WAI-ReD were strong. In other validation studies in psychotherapy similar correlations were found (Hatcher and Gillaspy, 2006; Munder et al., 2010). The correlations between subscales of the SRS and the WAI-ReD were moderated, which provide support for the construct validity of the WAI-ReD.

Hypothesis 7 was rejected, because the results were in contrast with our assumption of no differences in total scores of patients treated by different types of therapists. Bordin's (1979) theory suggests that different therapies could require and produce different type of therapeutic alliance. Furthermore, the difference in therapists' skills and competences between the different types of therapists may be reflected in difference in scores of patients (Babatunde, MacDermid, and MacIntyre, 2017). The type of treatment applied by psychologists and psychomotor therapists, frequently aimed at psychological problems, could lead to a more complex process of defining the goal of treatment for patients compared to a treatment applied by therapist treating a patient with a more biomedical disorder. A less well-defined goal could have its influence on task and bond between the therapist and patient, resulting in differences in WAI-ReD scores between different types of therapists. A post-hoc analysis with task and goal domains together, showed a significantly lower mean score of psychologist and psychomotor therapists compared to other types of therapists. Post-hoc analysis with the bond domain showed significantly lower mean scores of the psychologist compared to physical therapists and hand therapists. Taking the above into account the question arises if the assumptions of Hypothesis 7 were correct. The nature of the "real relationship" and interpersonal connections as suggest by Gelso and Carter (1994) could also support the likelihood that one would expect a difference between therapist and types of therapist. More research is needed to investigate of there systematically differences is between different type of therapists in therapeutic alliance.

Strengths and Weaknesses of the Study

A limitation of this study is the relative small patients group sizes between the different types of therapists, therefore there is risk for sampling error. As a second limitation, there were 11 patients measured by two psychomotor therapists and 15 patients measured by one psychologist. The influence of the individual therapists could be reflected more strongly in the mean scores. Moreover, not all patients who received the third

treatment session were included by all involved therapists; also it is not known how many patients were asked by the involved therapists, which might have led to selection bias in the study sample. A third limitation was the use of the Flemish version as a starting point. An English to Dutch forward backward translation procedure would have been more accurate. However, Flemish is closer to Dutch than English and therefore translation is rather more straightforward. A final limitation is the dichotomy age of the participants to test construct validity. Correlation might have been better to analyze a potential relationship between age and WAI-ReD scores.

A strength of this study is the small number of missing values. A missing value may occur when a measurement instrument is used in another population than for which it was originally developed (De Vet, Terwee, Mokkink, and Knol, 2011). The revision of the WAI-SR may have contributed to the relevance of the items for the rehabilitation population. Another strength is that this study was performed according to the guidelines for validating measurement instruments of the COSMIN statement (Mokkink et al., 2010a). We reconsidered the content of the WAI-SR before we tested the internal consistency and the construct validity, because rehabilitation is a different setting then psychotherapy.

Implications

The WAI-ReD showed similar clinimetric properties as the WAI. These results suggest that the WAI-ReD is valid for research in rehabilitation to measure therapeutic alliance. However, ceiling effects of the WAI-SR also appeared in the WAI-ReD, which is a limitation for use in rehabilitation. Ceiling effects and therefore content validity need focus in future development. Further research of the WAI-ReD is necessary to assess reliability and responsiveness. However, ceiling effects may affect the responsiveness of the WAI-ReD. A high score cannot show much improvement. Additionally, because of ceiling effects discrimination between patients is difficult. For this study, more patients might be selected who did well in therapy. In that perspective it would be interesting to test therapeutic alliance and treatment outcome in patients with chronic conditions, without treatment progress (Wilson, Chaloner, Osborn, and Gauntlett-Gilbert, 2016).

Clinically, the WAI-ReD can be applied if therapists have doubt about the strength of the therapeutic alliance in their treatment relationship. Patient scores on the WAI-ReD could be helpful to discuss the therapeutic alliance in order to improve it. Domain scores provide insight in which aspects of the therapeutic alliance could be improved. In these cases ceiling effects are less relevant (Paap and Dijkstra, 2017).

Conclusions

This is the first study in which the WAI SR was reworded and re-contextualized for use in rehabilitation. Eleven of the 14 hypotheses were not rejected confirming good clinimetric properties of the WAI-ReD. The ceiling effects of the WAI-ReD should be focus in future developments. The WAI-ReD can be used clinically, but results should be interpreted with care and the WAI-ReD needs future development before it used broadly in rehabilitation.

Acknowledgments

Declaration of Interest

ORCID

Davy Paap 🔟 http://orcid.org/0000-0001-9076-3965

References

Andrusyna TP, Tang TZ, DeRubeis RJ, Luborsky L. 2001. The factor structure of the Working Alliance Inventory in Cognitive-Behavioral Therapy. Journal of Psychotherapy Practice and Research. 10: 173–178.

Araujo AC, Filho RN, Oliveira CB, Ferreira PH, Pinto RZ. 2017. Measurement properties of the Brazilian version of the Working Alliance Inventory (patient and therapist short-forms) and Session Rating Scale for low back pain. Journal of Back and Musculoskeletal Rehabilitation. 30: 879–887.

Babatunde F, MacDermid J, MacIntyre N. 2017. Characteristics of therapeutic alliance in musculoskeletal physiotherapy and occupational therapy practice: A scoping review of the literature. BMC Health Services Research. 17: 375.

Bachelor A. 1995. Clients' perception of the therapeutic alliance: A qualitative analysis. Journal of Counseling Psychology. 42: 323–337.

Bennis H, Haeseryn W, Devos M, Gerritsen M, Hagen A, Kroon S 2003 Variatie in het Nederlands: Eenheid in verscheidenheid. Taalvariatiebeleid in Taalunieverband. Variation in Dutch: Unity in Diversity. Language Variation Policy Language Union Association].

Besley J, Kayes NM, McPherson KM. 2010. Assessing therapeutic relationships in Physiotherapy: Literature review. New Zealand Journal of Physiotherapy. 39: 81–91.

Bordin ES. 1979. The generalizability of the psychoanalytic concept of the working alliance. Psychotherapy: Theory, Research and Practice. 16: 252–260.

Bordin ES. 1994. Theory and Research on the Therapeutic Working Alliance: new Directions. In: Irving B. Weiner (Series ed). The Working Alliance: theory, Research, and Practice. New York: Wiley. 13–37.

Busseri MA, Tyler JD. 2003. Interchangeability of the Working Alliance Inventory and Working Alliance Inventory, Short Form. Psychological Assessment. 15: 193–197.

Crossley KM, Bennell KL, Cowan SM, Green S. 2004. Analysis of outcome measures for persons with patellofemoral pain: which are reliable and valid?. Archives of Physical Medicine and Rehabilitation. 85: 815–822.

Crow R, Gage H, Hampson S, Hart J, Kimber A, Thomas H. 1999. The role of expectancies in the placebo effect and their use in the delivery of health care: a systematic review. Health Technology Assessment. 3: 1–96.

De Vet HC, Terwee CB, Mokkink LB, Knol DL. 2011. Measurement in Medicine: A Practical Guide. New York, NY, Cambridge University Press.

Del Re A, Flückiger C, Horvath AO, Symonds D, Wampold BE. 2012. Therapist effects in the therapeutic alliance–outcome relationship: A restricted-maximum likelihood meta-analysis. Clinical Psychology Review. 32: 642–649.

Duncan BL, Miller S, Sparks JA, Claud DA, Reynolds LR, Brown J, Johnson LD. 2003. The Session Rating Scale: Preliminary psychometric properties of a "working" alliance measure. Journal of Brief Therapy. 3: 3–12.

Elvins R, Green J. 2008. The conceptualization and measurement of therapeutic alliance: An empirical review. Clinical Psychology Review. 28: 1167–1187.

Falkenström F, Hatcher RL, Holmqvist R. 2014. confirmatory factor analysis of the Patient Version of the Working Alliance Inventory–short Form Revised. Assessment. 22: 581–593.

Freud S 1958 On beginning the treatment. The Standard Edition of the Complete Psychological Works of Sigmund Freud Volume XII (1911-1913): pp 121–144. The Case of Schreber, Papers on Technique and Other Works.

Fuentes J, Armijo-Olivo S, Funabashi M, Miciak M, Dick B, Warren S, Gross DP. 2014. Enhanced therapeutic alliance modulates pain intensity and muscle pain sensitivity in patients with chronic low back pain: An experimental controlled study. Physical Therapy. 94: 477–489.

Gelso CJ, Carter JA. 1994. Components of the psychotherapy relationship: Their interaction and unfolding during treatment. Journal of Counseling Psychology. 41: 296–306.

Greenberg LS, Webster MC. 1982. Resolving decisional conflict by Gestalt two-chair dialogue: Relating process to outcome. Journal of Counseling Psychology. 29: 468–477.

Hafkenscheid A. 2008. Routine Process Monitoring: Ervaringen uit de praktijk. Tijdschrift Cliëntgerichte Psychotherapie. 46: 327–345.

Hafkenscheid A. 2010. De Outcome rating scale (ORS) en de Session rating scale (SRS). Tijdschrift Voor Psychotherapie. 36: 394–403.

Hall AM, Ferreira PH, Maher CG, Latimer J, Ferreira ML. 2010. The influence of the therapist-patient relationship on treatment outcome in physical rehabilitation: A systematic review. Physical Therapy. 90: 1099–1110.

Hatcher RL, Gillaspy JA. 2006. Development and validation of a revised short version of the Working Alliance Inventory. Psychotherapy Research. 16: 12–25.

Hayes MH, Patterson DG. 1921. Experimental development of the graphic rating method. Psychological Bulletin. 18: 98–99.

Hinkle DE, Wiersma W, Jurs SG. 2003. Applied statistics for the behavioral sciences. Journal of Educational Statistics. 15: 84–87.

Horvath AO, Del Re A, Flückiger C, Symonds D. 2011. Alliance in individual psychotherapy. Psychotherapy. 48: 9–16.

Horvath AO, Greenberg LS. 1989. Development and validation of the Working Alliance Inventory. Journal of Counseling Psychology. 36: 223–233.

Horvath AO, Symonds BD. 1991. Relation between working alliance and outcome in psychotherapy: A meta-analysis. Journal of Counseling Psychology. 38: 139–149.

Hoyle RH. 2012. Handbook of Structural Equation Modeling. New York, NY, Guilford Press.

Karel YH, Verhagen AP, Thoomes-De Graaf M, Duijn E, Van Den Borne MP, Beumer A, Scholten-Peeters GG. 2016. Development of a prognostic model for patients with shoulder complaints in physical therapist practice. Physical Therapy. 97: 72–80.

Kayes NM, McPherson KM. 2012. Human technologies in rehabilitation: 'Who'and 'How'we are with our clients. Disability Rehabilitation. 34: 1907–1911.

Kersten P, White PJ, Tennant A. 2014. Is the pain visual analogue scale linear and responsive to change? An exploration using Rasch analysis. PLoS One. 9: e99485.

Lakke SE, Meerman S. 2016. Does working alliance have an influence on pain and physical functioning in patients with chronic musculoskeletal pain; A systematic review. Journal of Compassionate Health Care. 3: 1–10.

Luborsky L, Barber JP, Siqueland L, Johnson S, Najavits LM, Frank A, Daley D. 1996. The revised Helping Alliance questionnaire (HAq-II): Psychometric properties. The Journal of Psychotherapy Practice and Research. 5: 260–271.

Mokkink LB, Terwee CB, Knol DL, Stratford PW, Alonso J, Patrick DL, De Vet HC. 2010a. The COSMIN checklist for evaluating the methodological quality of studies on measurement properties: A clarification of its content. BMC Medical Research Methodology. 10: 22.

Mokkink LB, Terwee CB, Patrick DL, Alonso J, Stratford PW, Knol DL, De Vet HC. 2010b. The COSMIN study reached international consensus on taxonomy, terminology, and definitions of measurement properties for health-related patient-reported outcomes. Journal of Clinical Epidemiology. 63: 737–745.

Moret L, Nguyen JM, Pillet N, Falissard B, Lombrail P, Gasquet I. 2007. Improvement of psychometric properties of a scale measuring inpatient satisfaction with care: A better response rate and a reduction of the ceiling effect. BMC Health Services Research. 7: 197.

Munder T, Wilmers F, Leonhart R, Linster HW, Barth J. 2010. Working Alliance Inventory-Short Revised (WAI-SR): Psychometric properties in outpatients and inpatients. Clinical Psychology and Psychotherapy. 17: 231–239.

Muthén LK, Muthén BO. 1998-2014. Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

Nie NH, Hull CH, Jenkins JG, Steinbrenner K, Dale H. 1975. Statistical Package for the Social Sciences. New York: McGraw-Hill.

Paap D, Dijkstra PU. 2017. Working Alliance Inventory-Short Form Revised to measure therapeutic alliance. Journal of Physiotherapy. 63: 118.

Raftery AE. 1995. Bayesian model selection in social research. Sociological Methodology. 25: 111–164.

Raue PJ, Goldfried MR, Barkham M. 1997. The therapeutic alliance in psychodynamic-interpersonal and cognitive-behavioral therapy. Journal of Consulting and Clinical Psychology. 65: 582–587.

Rindskopf D, Rose T. 1988. Some theory and applications of confirmatory second-order factor analysis. Multivariate Behavioral Research. 23: 51–67.

Stinckens N, Ulburghs A, Claes L. 2009. De werkalliantie als sleutelelement in het therapiegebeuren: meting met behulp van de WAV-12, de Nederlandstalige verkorte versie van de Working Alliance Inventory. [The working alliance as a key element in the therapy: measurement using the WAV-12, the Dutch language shortened version of the Working Alliance Inventory]. Tijdschrift Voor Klinische Psychologie. 39: 44–60.

Tracey TJ, Kokotovic AM. 1989. Factor structure of the Working Alliance Inventory. Psychological Assessment. 1: 207–210.

Trijsburg R, Van't Spijker A, Van Dam Q, Duivenvoorden H. 1999. De Helping Alliance Questionnaire (HAQ–II). Tijdschrift Voor Psychotherapie. 25: 56–65.

Van De Mortel TF. 2008. Faking it: social desirability response bias in self-report research. Australian Journal of Advanced Nursing. 25: 40–48.

Vandekerckhove R. 2005. Belgian Dutch versus Netherlandic Dutch: new patterns of divergence? On pronouns of address and diminutives. Multilingua. 24: 379–397.

Vertommen H, Vervaeke G 1990 Werkalliantievragenlijst (WAV). Vertaling voor experimenteel gebruik van de WAI [Dutch translation of the Working Alliance Inventory for experimental use] Leuven: Departement Psychologie KU (ongepubliceerde vragenlijst).

Voutilainen A, Pitkäaho T, Kvist T, Vehviläinen-Julkunen K. 2016. How to ask about patient satisfaction? The visual analogue scale is less vulnerable to confounding factors and ceiling effect than a symmetric Likert scale. Journal of Advanced Nursing. 72: 946–957.

Watson JC, Greenberg LS. 2000. Alliance ruptures and repairs in experiential therapy. Journal of Clinical Psychology. 56: 175–186.

Webb CA, DeRubeis RJ, Amsterdam JD, Shelton RC, Hollon SD, Dimidjian SO. 2011. Two aspects of the therapeutic alliance: Differential relations with depressive symptom change. Journal of Consulting and Clinical Psychology. 79: 279–283.

Wilson S, Chaloner N, Osborn M, Gauntlett-Gilbert J. 2016. Psychologically informed physiotherapy for chronic pain: Patient experiences of treatment and therapeutic process. Physiotherapy. 103: 98–105.

Appendix: Working Alliance Inventory Rehabilitation English Version

(1) As a result of my treatment is I am clearer as to how I might be able to achieve my goals

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(2) What I am doing in treatment gives me new ways of looking at my problem

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(3) I believe my therapist likes me

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(4) My therapist and I collaborate on setting goals for my treatment

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(5) My therapist and I respect each other

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(6) My therapist and I are working towards mutually agreed upon goals

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(7) I feel that my therapist appreciates me

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(8) My therapists and I agree on what is important for me to work on

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(9) I feel my therapists cares about me even when I do things that he/she does not approve of.

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(10) I notice that the things I do in therapy will help me to accomplish the goals that I want to achieve.

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(11) My therapists and I have established a good understanding of the kind of changes that would be good for me

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

(12) I believe the way we are working with my problem is correct

NEVER SOMETIMES FAIRLY OFTEN VERY OFTEN ALWAYS

Working Inventory Rehabilitation Dutch Version

(1) Een resultaat van de behandeling is dat het voor mij duidelijk is hoe ik mijn doelen zou kunnen bereiken

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(2) Wat ik doe in de behandeling, geeft mij inzicht in mijn klachten/problemen

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(3) Ik geloof dat mijn behandelaar mij aardig vindt

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(4) Mijn behandelaar en ik werken samen bij het bepalen van de doelen van mijn behandeling

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(5) Mijn behandelaar en ik respecteren elkaar

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(6) Mijn behandelaar en ik werken aan de doelen die we samen hebben bepaald

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(7) Ik voel dat mijn behandelaar mij waardeert

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(8) Mijn behandelaar en ik zijn het eens over wat voor mij belangrijk is om aan te werken

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(9) Ik voel dat mijn behandelaar om mij geeft, zelfs wanneer ik dingen doe die hij/zij niet goedkeurt

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(10) Ik merk dat de dingen die ik in de behandeling doe, mij zullen helpen om mijn doelen te bereiken

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(11) Mijn behandelaar en ik hebben goed inzicht in de veranderingen die goed voor mij zijn

NOOIT SOMS VAAK ZEER VAAK ALTIJD

(12) Ik geloof dat de manier waarop wij aan mijn klachten/ problemen werken de juiste is

NOOIT SOMS VAAK ZEER VAAK ALTIJD