

# Measuring working alliance and technical alliance from the perspective of healthcare professionals working with people with mild intellectual disabilities: adaptation, factor structure and reliability

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## Abstract

**Background** The establishment of a valuable and meaningful working alliance between people with mild intellectual disabilities (IDs) and healthcare professionals is critically important for improving both the quality of life and impact of therapy for people with mild IDs. Measuring the working alliance as a treatment or support component is therefore of utmost relevance. In light of the increased use of eHealth tools, it is also essential to measure the alliance using these tools, which is referred to as technical alliance. There was a lack of validation of these two measurements for healthcare professionals working with people with mild IDs, which this study sought to address.

**Method** Both the validated Working Alliance Inventory – Short Form – MID (WAI-SF-MID) and Technical Alliance Inventory – Short Form – MID (TAI-SF-MID) for general patient populations were adapted for healthcare professionals working with

people with mild IDs. A two-step approach was conducted to systematically adapt both measurements with an expert group of healthcare professionals. Confirmatory factor analysis was conducted to test a three-factor structure for both the WAI-SF-MID ( $N = 199$ ) and the TAI-SF-MID ( $N = 139$ ), and internal consistency was determined for both scales.

**Results** An acceptable-to-good model fit was found for both the WAI-SF-MID and the TAI-SF-MID; confirmatory factor analysis confirmed a three-factor model for both measurements. Cronbach's alpha and McDonald's omega were excellent for both total scales ( $\geq 0.90$ ) and acceptable to good for sub-scales of both versions.

**Conclusion** Both the WAI-SF-MID and the TAI-SF-MID are promising measurements for determining healthcare professionals' perspective on the (digital) working alliance with people with mild IDs.

**Keywords** (digital) working alliance, confirmatory factor analysis, eHealth, mild intellectual disabilities, professionals

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The importance of positive interpersonal relationships between people with mild intellectual

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disabilities (IDs) – who are characterised by significant limitations in intellectual functioning (IQ score between 50 and 70) as well as in adaptive functioning with evident effects on practical, social and conceptual functioning in daily life (Schalock *et al.* 2010) – and healthcare professionals providing them with support and therapy has been widely acknowledged (e.g. Van Asselt-Goverts *et al.* 2013; Robinson *et al.* 2021). This results in the need for practical, informational and emotional support (Vaucher *et al.* 2021). Healthcare professionals refer to people who provide care services in a professional context (Granja *et al.* 2018). Alongside the informal support of relatives and family members, healthcare professionals such as support staff and therapists have a key role to play in the lives of people with mild IDs (Giesbers *et al.* 2019). Further, professional help is often needed for people with mild IDs who are known to be vulnerable to develop mental health problems associated with general health problems (Hughes-McCormack *et al.* 2017). People with mild IDs receive support and treatment from various types of services, such as ID services, community social care, mainstream mental health services, non-acute and acute psychiatric services and emergency departments (Standen *et al.* 2016; Whittle *et al.* 2018). Forming a valuable and meaningful relationship with a professional contributes greatly to both the quality of life and support for people with mild IDs and therapeutic outcomes (Embregts 2020; Evans & Randle-Phillips 2020; Smith *et al.* 2020). In general client populations, this sense of alignment between healthcare professionals and clients is commonly referred to as the working alliance. Besides the emotional bond as experienced by a healthcare professional and a client, a working alliance also refers to the collaboration in performing activities to achieve goals that they set together (Hatcher & Barends 2006). Gelso (2014) distinguishes three elements of a relationship in his tripartite model: (1) the real relationship (genuine personal relationship between client and professional as valued by both); (2) the transference (the projection of feelings, wishes and expectations to a professional or a client based on former relationships) (Hafkenscheid 2021); and (3) the working alliance. The latter is about the active part of working together within the collaborative relationship between client and professional.

In research and health practice, the construct 'alliance' has been used with various exchangeable adjectives such as 'working', 'helping' and 'therapeutic', depending on the setting where the health care is delivered (Flückiger *et al.* 2018). Alliance can be defined as 'a proactive collaboration of clients and therapists across sessions and in moment-to-moment interactions' (Flückiger *et al.* 2018, p. 330). The concept is often studied in-depth and is traditionally used within the context of psychotherapy (Barber *et al.* 2013). Alliance is considered as a common factor contributing to the effectiveness of psychotherapy regardless of theoretical background such as psychoanalytical or cognitive behavioural therapy (Wampold 2015). Nowadays, the construct of working alliance is used in a broader context and is the focus of this study. Horvath (2018) concluded that working alliance is related to all kinds of relationships between a client and a professional and could be studied as part of the effectiveness of an intervention. A positive working alliance is associated with positive treatment outcomes, client satisfaction with professional contact and lower early withdrawal or drop-out (Barber *et al.* 2013; Flückiger *et al.* 2018; O'Keeffe *et al.* 2020). The working alliance in support and therapy for people with mild IDs, also when eHealth tools are included, seems to be an unexplored area yet and, hence, is the central focus of this study.

Studies exploring the experiences of clients with mild IDs in collaborating with their direct support staff or therapists have produced consistent results (e.g. Pert *et al.* 2013; Evans & Randle-Phillips 2020; Fish & Morgan 2021). Specifically, these studies indicate that being listened to, the need for trust and confidence, feeling respect for one's personal choices, and experiencing personal attention and time are vital factors for a good collaboration. In contemporary professional support, person-centred care based on the personal needs, preferences and self-determination are the central elements in the collaboration between clients with mild IDs and healthcare professionals (Bigby *et al.* 2017). Although some studies amongst healthcare professionals working with people with mild IDs have highlighted the importance of the working alliance, little is known about how these professionals view the emotional bond and collaborative relationship with clients and

which factors are relevant to them in this collaboration (e.g. Jones 2013; Fish & Morgan 2021).

Besides face-to-face contact, eHealth is increasingly being used in the context of supportive or therapeutic relationships (Riper *et al.* 2010; Oudshoorn *et al.* 2021). Examples are the aid of avatars in digital stories within a computerised cognitive behavioural therapy session (Cooney *et al.* 2018), receiving practical and emotional professional support by telecare (Zaagsma *et al.* 2021) and working with a tablet that visualises a task to support task completion independently (Shepley *et al.* 2018). This trend was accelerated by the COVID-19 pandemic (Chadwick *et al.* 2022; Embregts *et al.* 2022). In line with the limited knowledge on working alliance in face-to-face contact, even less is known about these factors when the supportive or therapeutic contact is facilitated by an eHealth tool. eHealth complemented supportive relationships to reinforce newly acquired daily living skills, provide practical information to people with mild IDs and facilitate remote professional support (Oudshoorn *et al.* 2020). In order to better understand how healthcare professionals working with people with mild IDs perceive the working alliance, including when using eHealth tools, a psychometrically sound measurement is required to investigate the working alliance within this target group.

To assess the quality of the working alliance within the general client population, Horvath & Greenberg (1989) developed the widely used and extensively validated Working Alliance Inventory (WAI), which distinguishes between three factors: bond, tasks and goals. This instrument was based on Bordin's theory, which considered working alliance with three interconnected components: (1) bond, the personal bond between a healthcare professional and the client; (2) the mutual agreement on goals; and (3) the tasks contributing to reaching the agreed goals (Bordin 1979). The WAI measurement is used for various purposes: to assess satisfaction, adherence, quality of collaboration from the perspective of clients and therapists and client centredness (Sturgiss *et al.* 2019). Alongside the original scale that consists of 36 items, Hatcher & Gillaspay (2006) also developed a short form comprising 12 items (WAI-SF). The WAI-SF has been applied in various contexts (e.g. for general practice, general mental health care, addiction treatment centres and youth care) to assess the emotional relationship and mutual collaboration (e.g.

Lakke & Meerman 2016; Sturgiss *et al.* 2019). Besides a self-reported version for clients, a version for professionals is available. In general, higher scores on working alliance measures reflect a better working alliance between client and professional as perceived by the person who fills in the measurement. The WAI-SF has good psychometric properties with reliability scores reflecting a satisfying internal consistency (Cronbach's alpha range between 0.81 and 0.91) (Flückiger *et al.* 2018; Paap *et al.* 2018). In addition, the goodness of fit for a three-factor model has been demonstrated by various studies (e.g. Hatcher & Gillaspay 2006; Munder *et al.* 2010; Lamers *et al.* 2015). Within the field of mental health care for people with IDs, Meppelder-de Jong *et al.* (2014) focused on the working alliance between parents with mild IDs and their experiences with family support staff (WAI-SF  $\alpha = 0.86$ ). However, to the best of our knowledge, no specific, psychometrically sound instrument has hitherto been used to examine healthcare professionals' perceptions of how the clients they are working with experience the working alliance, both within face-to-face contact and via the use of an eHealth tool.

The choice to focus on the perspective of professionals was driven by the fact that working alliance instruments are rarely included in ID research or clinical practice. Although the importance of the quality of the professional relationship is generally acknowledged, measuring alliance via well-studied/developed instruments adapted to the context of ID care organisations is understudied. Hartmann *et al.* (2015) concluded that the professionals' experiences on working alliance are less investigated than clients' views, despite these experiences being highly relevant because of their significant contribution to the development of the alliance (e.g. Berger 2015; Nissen-Lie *et al.* 2015; Flückiger *et al.* 2018). The perspective of professionals is important, as their attitudes and choices impact the quality of care (Pelleboer-Gunnink *et al.* 2021). Hackett *et al.* (2020) used the therapist version of the WAI-SF within a small exploratory study that sought to determine the feasibility of interpersonal art therapy for adults with mild IDs and anger problems, without further exploring the psychometric properties of this measurement.

Consequently, in the present study, both the factor structure and the reliability of the two versions of the

WAI for healthcare professionals were described and could be considered as a first step to pave the way for measuring working alliance in the context of care organisations for people with IDs. First, the original WAI-SF (Hatcher & Gillaspay 2006) was adapted for administration by healthcare professionals working with people with mild IDs. Second, the recently developed WAI for online interventions – short form, also briefly referred to as the Technical Alliance Inventory (TAI) – Short Form (TAI-SF; Herrero *et al.* 2020; Kleiboer *et al.* 2016), which focuses on the working alliance within eHealth interventions, was also adapted for the previous referred healthcare professionals. Because of the lack of a uniform definition, we describe technical alliance as the perception of technology (e.g. app, computer program, video conferencing program and social robot) in terms of how it affects someone's experience with the applied technology's contribution to person-centred care, how it helps attain the client's personal goals and how the client develops confidence when using this applied technology in a professional relationship. Hence, the aim of this study was to investigate the factor structure and reliability of the adapted Working Alliance Inventory – Short Form – MID (WAI-SF-MID) and Technical Alliance Inventory – Short Form – MID (TAI-SF-MID) from the healthcare professional's perspective.

## Participants and methods

### Design

After being granted ethical approval by the Ethics Review Board of Tilburg University (EC-2016.71), this study used a convenient sample and a cross-sectional design to validate both the WAI-SF-MID and the TAI-SF-MID by investigating the factor structure and reliability. For this study, eligible participants were recruited from five care organisations for people with IDs in the Netherlands. These organisations are affiliated with the Academic Collaborative Centre Living with an ID, Tranzo, Tilburg University. This study was part of a larger study aimed at exploring the attitude of support staff and therapists towards eHealth usage in providing support and therapy for people with IDs, including the impact on working alliance. To explore the opportunity of the WAI-SF and TAI-SF instruments for

the context of care organisations for people with IDs, both instruments were adapted for administration by healthcare professionals.

### Participants

The inclusion criteria for this study were working with people with mild IDs as a support staff member, psychologist or experience-based therapist (e.g. a drama or psychomotor therapist). Direct support staff members are professionals 'who had regular contact with a person with mild intellectual disabilities and were responsible for supporting and/or facilitating their access to health care' (Whitehead *et al.* 2016, p. 391). These professionals provide support to clients in community-care settings several hours a week as well as 24/7 in residential care. The inclusion of these professional groups ensured that both support and therapy were covered in the study. The WAI-SF-MID professionals' version was presented to support staff members, psychologists and experience-based therapists who reported working with people with mild IDs. Conversely, the TAI-SF-MID was only presented to those working with people with mild IDs who indicated they were using at least one eHealth tool in either a support or therapeutic setting at the time of completing the online survey. The WAI-SF-MID professionals' version was filled out by 199 participants, while the TAI-SF-MID was completed by 139 participants. Table 1 contains more detailed information on the work domain, education level, years of working experience and demographic characteristics of the participants.

### Procedures

Professionals who met the inclusion criteria received an invitation via e-mail to participate in the study, by, depending on the preference of the care organisation, either the first author or a contact person within the care organisation for people with IDs they were affiliated to. In the event that the researcher sent the e-mail within the care organisation, the e-mail addresses were provided by a human resources employee with the approval of the board of directors of the care organisation. The e-mail was accompanied by an information sheet about the study. A reminder e-mail to participate was sent after a 3-week period. One care organisation invited participants indirectly via both a link to the survey and an information sheet

**Table 1** Demographic characteristics of the participants in the present study, differentiated between both scales

Demographic attribute	WAI-SF-MID professionals N = 199		TAI-SF-MID professionals N = 139	
	n	%	n	%
Gender				
Male	37	18.6	15	10.8
Female	161	80.9	123	88.5
Other	1	0.5	1	0.7
Age <sup>†</sup>				
<20 years	1	0.5	1	0.7
20–29 years	28	14.1	20	14.4
30–39 years	64	32.2	50	36.0
40–49 years	62	31.2	42	30.2
50–59 years	34	17.1	18	12.9
>60 years	9	4.5	7	5.0
Education <sup>‡</sup>				
Low	2	1.0	—	—
Mid	61	30.8	30	21.6
High	134	67.6	108	77.7
Other	1	0.5	1	0.7
Profession <sup>‡</sup>				
Support staff	144	72.4	88	63.3
Psychologist	44	22.1	42	30.2
Experience-based therapist	10	5.0	8	5.8
Work domain <sup>‡</sup>				
Community care	60	30.3	51	36.7
Residential care <sup>§</sup>	94	47.2	53	38.1
Daycare centre	9	4.5	3	2.2
Expert centre	34	17.0	31	22.3
Other	1	0.5	—	—
Working experience <sup>†</sup>				
<5 years	52	26.3	34	24.5
6–10 years	20	10.1	15	10.8
11–15 years	35	17.7	25	18.0
16–20 years	31	15.7	21	15.1
>20 years	60	30.3	44	31.7

<sup>†</sup>One case missing, so totalled amounts and percentages are less than total n and %.

<sup>‡</sup>High = higher and scientific education.

<sup>§</sup>Sum of two types of residential care.

on the organisation's website. The link led to the online survey in QUALTRICS<sup>SM</sup>, and the participants were asked to provide informed consent prior to the questions being presented. The link remained open from June 2021 until September 2021. Participants were asked to think of one specific client with IDs they provided support or therapy while rating the 12 items

of the WAI-SF-MID. Participants who specified working with at least one eHealth tool with people with mild IDs were asked to think of the eHealth application they primarily used while rating the TAI-SF-MID. These instructions were provided to ensure a consistent way of rating for all the participants.

## Measurements

### *Working Alliance Inventory – Short Form*

The original WAI-SF contains 12 items with a 5-point Likert scale, ranging from 1 (totally disagree) to 5 (totally agree) with higher mean scores reflecting a stronger working alliance. The WAI-SF contains three factors: (1) bond, which focuses on the emotional relationship between healthcare professional and clients; (2) goals, which focus on the mutual agreements between healthcare professionals and clients regarding the perspective and objectives; and (3) tasks, which focus on the mutual agreement over the activities healthcare professionals and client users will engage in when working together to achieve the agreed goals. The WAI-SF is a self-reported measurement that is scored by healthcare professionals themselves. The model fit indices for the WAI-SF 3-factor model are  $\chi^2 = 128.9$ , root mean square error of approximation (RMSEA) = 0.10, comparative fit index (CFI) = 0.92 and Tucker–Lewis index (TLI) = 0.90. Reported internal consistency for the WAI-SF total scale is  $\alpha = 0.927$ ; for the sub-scales Tasks, Goals and Bond, it is  $\alpha = 0.845$ ,  $\alpha = 0.862$  and  $\alpha = 0.804$ , respectively (Paap *et al.* 2018).

*Adaptation procedure.* The Dutch version of the WAI-SF (Paap *et al.* 2018) formed the basis for the adaptation procedure carried out in the present study. A systematic translation procedure in Dutch was conducted by Paap *et al.* using the COSMIN guidelines (Mokkink *et al.* 2010). In the present study, this Dutch version was adapted for administration by healthcare professionals working with people with mild IDs. First, the first author adapted the 12-item version for clients by changing the formulation into the perspective of healthcare professionals (i.e. the new items focused on healthcare professionals' perceptions of how the people with mild IDs they were working with would evaluate the working alliance between them). Further, in accordance with the suggestion of both Beaton *et al.* (2000) and Hoben

*et al.* (2013) to consult an expert group when adapting instruments for use in another context, experts in the field of IDs were also invited to participate in the adaptation. Specifically, two groups of experts comprising experienced healthcare professionals with diverse positions (e.g. support staff members, psychologists and team managers) were contacted by the first author to ensure heterogeneous perspectives from an experienced group of professionals. The first expert group ( $N = 5$ ) individually read the formulation of the 12 adapted items, before subsequently evaluating the readability, recognisability and suitability for use within the context of care organisations for people with mild IDs. Generally speaking, the healthcare professionals deemed that most of the formulations were understandable and recognisable, but they did advise to avoid the usage of abstract concepts (e.g. 'appreciates him/her', which were adapted into '... feels that I recognise his/her potential and strengths') and noted some overlap and similarities between several items (e.g. '... how I might be able to change/achieve my goals' and '... working towards mutually agreed upon goals'). Recommendations for improving the formulations led to some items being adjusted, while, simultaneously, ensuring that the items retained the meanings of the original instrument. Based on the advice of the first expert group, the first author prepared an overview of the 12 adapted items, which was then discussed with the present authors. Next, the 12 items were also discussed with the second group of experts ( $N = 6$ ) by means of video conferencing because of COVID-19 restrictions. The discussion with the second expert group led to adaptations in the formulation of certain items. More specifically, those items that emphasised the individual and personal responsibility of clients were adapted to stress the shared responsibility of clients and healthcare professionals (e.g. the item 'As a result of these sessions [name of client] it is clearer as to how he/she might be able to change' was changed to 'My client and I agree about what we need to do to improve his/her situation'). This formulation was perceived to be more appropriate within the context of care organisations for people with mild IDs. Another critical piece of feedback from the expert group pertained to the usage of the term 'problems'. They recommended changing a problem-oriented item description into a more

helpful and supportive tone, in addition to making some other minor linguistic adjustments. Finally, an overview of all adaptations was discussed with the present authors, and as recommended by Beaton *et al.* (2000), the adapted items in Dutch were then translated into English by a professional native editor in order to ensure a proper translation of the adapted items into English in preparation for publication.

#### *Technical Alliance Inventory – Short Form*

The Dutch version of the TAI-SF formed the basis for the adaptation for healthcare professionals working with people with mild IDs. This instrument has previously been used in a large European study (for more details, see Kleiboer *et al.* 2016). Originally, this 12-item measurement was designed to assess the working alliance within a self-guided online intervention for depression amongst mental health populations (Herrero *et al.* 2020). This measure, which encompasses the same three factors as the WAI-SF (i.e. bond, goals and tasks), originally used a 7-point Likert scale. For the purposes of the present study, a 5-point Likert scale was used to rate the statements in a similar manner as to all the other statements within the online questionnaire. The scores ranged from 1 (totally disagree) to 5 (totally agree), with a higher mean score indicating a better working alliance using an eHealth application. Cronbach's alpha coefficient for the total TAI-SF scale was high ( $\alpha = 0.97$ ) (Herrero *et al.* 2020). Kiluk *et al.* (2014) reported good internal consistency for the sub-scales of the WAI-SF (Bond  $\alpha = 0.78$ ; Tasks  $\alpha = 0.84$ ; and Goals  $\alpha = 0.75$ ) applied in an online intervention. Gómez Penedo *et al.* (2020) examined a three-factor model within online interventions and found the following model fit indices:  $\chi^2(51) = 155.008$ ,  $P < 0.001$ , CFI = 0.996, TLI = 0.995, RMSEA = 0.099 and standardised root mean square residual (SRMR) = 0.062.

*Adaptation procedure.* Similar to the adaptation procedure of the WAI-SF, the formulation of the TAI-SF items was adapted based on the comments of the first expert group, who stressed the importance of a concrete and understandable formulation of the items. The second expert group also received a written overview with the original formulation and an adapted formulation of the TAI-SF-MID items. As a

result of a short discussion with the expert group, the concept of trustworthiness referred to in one of the items was changed to reflect trust in the eHealth tool itself. Similar to the adaptation procedure of the WAI-SF, an overview of the adapted 12 items and the final adaptation of the TAI-SF were discussed with all present authors after consultation with the expert groups. A small number of linguistic adjustments were made to improve the understandability of some of the items.

### Data analysis

The data analysis was performed using IBM SPSS for Windows (version 24), JASP software package (JASP Team 2019) and MPLUS version 8.1 (Muthén & Muthén 1998–2017) and comprised three steps. First, the latent factor structure of both the WAI-SF-MID and the TAI-SF-MID was tested by means of confirmatory factor analyses (CFAs). Although the WAI-SF-MID is an adapted scale that was developed for the purposes of this study, testing a three-factor model that distinguished between the factors tasks, goals and bond was preferred over an exploratory factor analysis because of the robust evidence in extant literature for the three-factor structure of the WAI-SF (e.g. Hatcher & Gillaspay 2006; Munder *et al.* 2010; Lamers *et al.* 2015). With respect to the TAI-SF-MID, three models were tested: a three-factor model, which distinguished between the factors tasks, goals and bond (Munder *et al.* 2010); a two-factor model, which distinguished between the factor bond and a factor consisting of both tasks and goals (Gómez Penedo *et al.* 2020); and a one-factor model (Miragall *et al.* 2015). The robust maximum likelihood MLR estimator for continuous data was used. Although data were collected on a 5-point Likert scale, they were handled as continuous data because continuous MLR is deemed to be a good estimator for ordinal data with  $\geq 5$  categories (Rhemtulla *et al.* 2012). The model fit was examined via four traditional model fit indices: the normed  $\chi^2$ , the RMSEA, the CFI and the SRMR. Whereas cut-off values of normed  $\chi^2 < 3.00$ , RMSEA  $< 0.08$ , CFI  $> 0.90$  and SRMR  $< 0.10$  indicate an acceptable model fit, cut-off values of normed  $\chi^2 < 2.00$ , RMSEA  $< 0.08$ , CFI  $> 0.95$  and SRMR  $< 0.10$  indicate a good model fit (Schweizer 2010; Kline 2011). In addition, as these traditional fit

indices control for neither type I nor type II errors (Marsh *et al.* 2004), the 'detection of misspecification' procedure of Saris *et al.* (2009) was also used. The minimum size of the misspecification detected by the modification index test with a power  $> 0.80$  (i.e. a high likelihood) was set at 0.10, in order to interpret the modification index test for each restricted parameter of the model (Saris *et al.* 2009). Hence, the modification index was used to increase the model fit. That is to say, those parameters that would increase the model fit if they were freed were identified. Further improvement to the model fit was achieved by removing items with factor loadings  $< 0.40$  (Field 2013).

Second, descriptive statistics for both the WAI-SF-MID and TAI-SF-MID scales were calculated. Third, internal reliability estimates of the WAI-SF-MID and TAI-SF-MID were measured. Specifically, Cronbach's alpha ( $\alpha$ ) and McDonald's omega ( $\omega$ ) were computed to examine the internal reliability of both scales; values between 0.70 and 0.80 were considered as acceptable, while values  $\geq 0.80$  were deemed to be good (Field 2013).

## Results

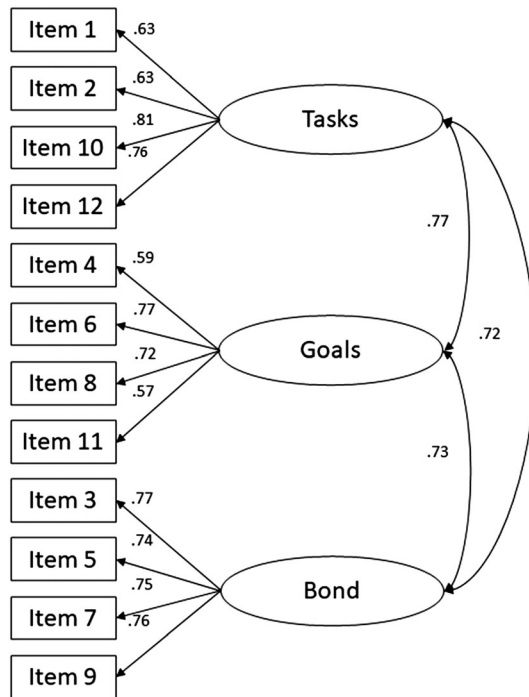
### Psychometric examination of the WAI-SF-MID

To investigate the factor structure of the WAI-SF-MID, a three-factor model, distinguishing between the factors tasks, goals and bond, was tested by means of a CFA. Based on the global fit measures, this three-factor model had an acceptable-to-good model fit: normed  $\chi^2 = 1.87$ , RMSEA = 0.066 [90% confidence interval (CI) 0.045–0.087], CFI = 0.93 and SRMR = 0.048. Based on the 'detection of misspecification' procedure, modification index inspection showed no relevant misspecifications.

The standardised factor loadings ranged from 0.57 and 0.81 and were all found to be significant at the  $P < 0.001$  level (Fig. 1). The means, standard deviations and range of scores on the WAI-SF-MID scales are shown in Table 2. The overall internal consistency of the WAI-SF-MID was found to be 0.92 for both Cronbach's alpha and McDonald's omega. The internal consistency scores for each scale of the WAI-SF-MID are presented in Table 4; Cronbach's alphas and the McDonald's omegas ranged from 0.76 to 0.85.

**Psychometric examination of the TAI-SF-MID**

A series of CFAs were conducted to explore which of the three models (i.e. a one-factor model, a two-factor model or a three-factor model) had the best model fit. Based on the global fit measures (Table 3), the fit of the three-factor model performed better than the other two models. While the  $\chi^2$  test for this model



**Figure 1.** Visual representation of the three-factor model of the WAI-SF-MID ( $N = 199$ ; 12 items). The circles represent the latent variables, while the rectangles represent the items. The numbers between the single-arrow lines that connect the items and latent variables are standardised factor loadings. The numbers between the bidirectional arrows that connect the latent variables indicate the relationship between factors (expressed as correlations).

was significant, three global fit measures demonstrated an acceptable fit: normed  $\chi^2 = 2.12$ , CFI = 0.94 and SRMR = 0.049. Despite the unacceptable value of RMSEA (0.091), the model nevertheless showed potential and thus served as the basis for further examination.

As no items had factor loadings  $< 0.40$  (Field 2013), no items were removed in advance. Based on the ‘detection of misspecification’ procedure, modification index inspection showed three relevant misspecifications. The modification index between items 1 and 9 most affected the model fit; however, adding a parameter between these two items was not appropriate as these items pertained to different latent variables. Therefore, a parameter was added between the two items that affected the model second most and belonged to the same latent variable: items 7 and 9. This resulted in a comparable model fit: normed  $\chi^2 = 2.05$ , RMSEA = 0.087, CFI = 0.94 and SRMR = 0.048; the RMSEA criterion was still not met. Moreover, modification index examination showed two relevant misspecifications. These misspecifications were related to items pertaining to different latent variables, which meant that adding a parameter was not appropriate. However, in order to examine the impact of these misspecifications upon the model, additional parameters were added to these two misspecifications. First, a parameter was added between items 1 and 9, which, in turn, resulted in a comparable model fit, while a parameter was subsequently added between items 9 and 10, which resulted in an improved model fit with acceptable-to-good model fit measures (normed  $\chi^2 = 1.69$ , RMSEA = 0.071, CFI = 0.96, SRMR = 0.041), without misspecifications. Hence, adding two inappropriate parameters to the model increased the model fit. Interestingly, it should be noted that all additional parameters were related to item 9. In light

**Table 2** Means, standard deviations and ranges of scores on the WAI-SF-MID and TAI-SF-MID scales

Factor	WAI-SF-MID			TAI-SF-MID		
	Mean	SD	Min–max	Mean	SD	Min–max
Tasks	3.83	0.47	1.50–5.00	3.38	0.63	1.00–5.00
Goals	3.89	0.48	2.25–5.00	3.36	0.72	1.25–5.00
Bond	4.02	0.51	1.75–5.00	3.35	0.74	1.00–5.00

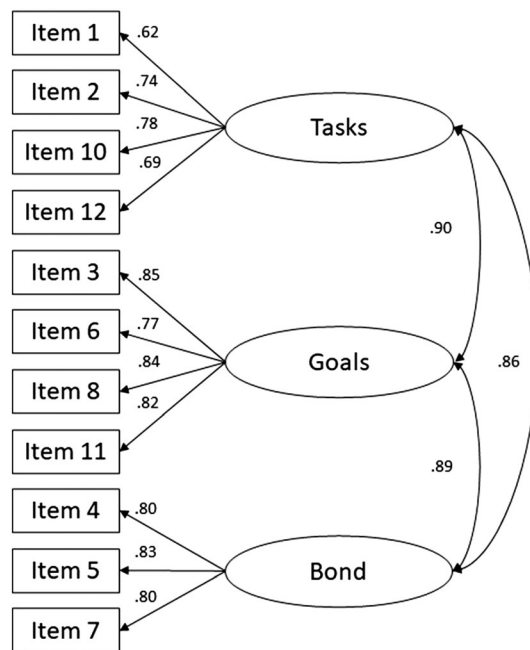


**Table 3** Global fit measures of the three tested models regarding TAI-SF-MID

Model	$\chi^2$	df	$\chi^2/df$	RMSEA (90% CI)	CFI	SRMR	BIC
1. Three-factor model	108.36*	51	2.12	0.091 (0.067–0.114)	0.94	0.049	3014.98
2. Two-factor model	121.96*	53	2.30	0.097 (0.075–0.120)	0.92	0.050	3021.98
3. One-factor model	122.25*	54	2.26	0.096 (0.073–0.119)	0.93	0.050	3017.13

\* $P < 0.05$ .

BIC, Bayes information criterion; CFI, comparative fit index; CI, confidence interval; df, degrees of freedom; RMSEA, root mean square error of approximation; SRMR, standardised root mean square residual.

**Figure 2.** Visual representation of the three-factor model of the TAI-SF-MID ( $N = 139$ ; 11 items). The circles represent the latent variables, while the rectangles represent the items. The numbers between the single-arrow lines that connect the items and latent variables are standardised factor loadings. The numbers between the bidirectional arrows that connect the latent variables indicate the relationship between factors (expressed as correlations).

of this, a model without item 9 was tested, and the model fit substantially increased as a result: normed  $\chi^2 = 1.53$ , RMSEA = 0.062 (90% CI 0.027–0.092), CFI = 0.97 and SRMR = 0.039. This model contained one misspecification between two items (i.e. 10 and 11) pertaining to different latent variables, which, in turn, resulted in a slightly increased model fit. However, as the addition of this parameter was inappropriate and the model fit without this

parameter was also acceptable to good, this parameter was ignored. Hence, to summarise, the three-factor model without item 9 was adopted (Fig. 2).

The standardised factor loadings ranged from 0.62 and 0.85 and were all found to be significant at the  $P < 0.001$  level (Fig. 2). The means, standard deviations and range of scores on the TAI-SF-MID scales are shown in Table 2. The overall internal consistency of the TAI-SF-MID was found to be 0.95 for both Cronbach's alpha and McDonald's omega. The internal consistency scores for each scale of the TAI-SF-MID are presented in Table 4; Cronbach's alphas and McDonald's omegas ranged from 0.81 to 0.89.

## Discussion

The present study evaluated the factor structure and reliability of both the WAI-SF-MID and the TAI-SF-MID for administration by healthcare professionals working with people with mild IDs. Both measurements were adapted in collaboration with experienced healthcare professionals working with people with IDs. In accordance with previous studies, CFA confirmed that the three-factor model was a good model of fit for the WAI-SF-MID. For the TAI-SF-MID, the same three-factor model displayed greater potential in comparison with both the one-factor and two-factor models; further examination showed that one item had to be removed for an acceptable-to-good model fit for this three-factor model. The internal consistency for the sub-scales and the total scores of both the WAI-SF-MID and the TAI-SF-MID were good to excellent. These findings are in line with research investigating the use of WAI-SF and TAI-SF by healthcare

**Table 4** Internal consistencies of the WAI-SF-MID and TAI-SF-MID

Scale	Internal consistencies WAI-SF-MID		Internal consistencies TAI-SF-MID	
	Cronbach's alpha	McDonald's omega	Cronbach's alpha	McDonald's omega
Total scale	0.92	0.92	0.95	0.95
Sub-scale 1: Tasks	0.80	0.81	0.81	0.81
Sub-scale 2: Goals	0.76	0.76	0.89	0.89
Sub-scale 3: Bond	0.85	0.84	0.85	0.85

professionals working with patient groups without IDs (e.g. Hatcher & Gillaspay 2006; Kiluk *et al.* 2014; Flückiger *et al.* 2018; Herrero *et al.* 2020). One potential explanation for removing the TAI-SF-MID item is that the adapted translation for healthcare professionals working with people with IDs (i.e. 'My client feels comfortable using the eHealth tool') was less accurate compared with the original one (i.e. 'My client trusts the online program'). Furthermore, the participants may have perceived that 'feeling comfortable' referred to them, rather than to the eHealth tool, which may have led to a different response. The WAI-SF-MID measures healthcare professionals' perceptions of how clients experience the working alliance. In this respect, it stimulates professionals' awareness and sense of alignment in the provision of support and therapy. Moreover, the WAI-SF-MID could be helpful for identifying and monitoring changes over time via repeated measurements. Several studies amongst (mental) health populations without IDs have underlined the importance of the working alliance in the early stages of therapy, namely, in terms of adherence, symptom change, outcomes and tailoring the intervention to the needs of clients (e.g. Barber *et al.* 2013; Flückiger *et al.* 2018; Baier *et al.* 2020; O'Keeffe *et al.* 2020). Further, Krause *et al.* (2011) underlined the development of alliance over time and the evaluation 'in the context of an asymmetric relationship in which one is the help-seeker and the other one the help-giver' (p. 274). People with mild IDs experience more barriers in communicative, cognitive and executive functioning. These barriers require that healthcare professionals be sensitive and responsive to the specific needs of persons with mild IDs. The quality of the working alliance may therefore conceivably take

on even greater importance for clients with mild IDs (e.g. Ramsden *et al.* 2016). When using digital tools for support and therapy, attention should be paid to matching a suitable eHealth tool to the support needs, appropriate adjustments and digital/other abilities of people with mild IDs (Oudshoorn *et al.* 2020). Hence, further research into the role of the working alliance in the field of IDs warrants attention, insofar as it could help to facilitate process–outcome studies (e.g. Cameron *et al.* 2020).

In recent years, both support and therapy are increasingly being provided via either digital tools like computers and smartphones or a combination of face-to-face contact with digital applications (i.e. blended care) (Riper *et al.* 2010; Wentzel *et al.* 2016). The COVID-19 pandemic has accelerated the use of eHealth (World Health Organization 2020), which, in turn, has impacted upon the working alliance (e.g. Aafjes-Van Doorn *et al.* 2020; Poletti *et al.* 2020). In light of this trend, Van Daele *et al.* (2020) recommend to include valid measurements in future research in order to discern what precisely works for whom in eHealth interventions. Further research on healthcare professionals working with people with mild IDs is urgently needed, as the majority of studies on eHealth interventions merely focus on clients' perspectives. This is problematic given that healthcare professionals' attitudes towards eHealth and the working alliance, as well as their perceptions of what the added value of these are for clients, are crucial for successful implementation (e.g. Parsons *et al.* 2008; Clifford Simplican *et al.* 2017).

For clinical practice, both the WAI-SF-MID and TAI-SF-MID measurements seem valuable for evaluating the working alliance within professional face to face and digital contact with people with mild

IDs, as well as for goal attainment, supportive autonomy or monitoring therapeutic progress. In the research literature on relationships between clients with mild IDs and support staff as well as therapists, the main focus is on the perceived relationship. Less attention is paid to the bidirectional collaboration between client with mild IDs and healthcare professional (Goals and Tasks component of Working Alliance) over time, as is rather the case in client populations without IDs (e.g. Krause *et al.* 2011; Gelso 2014). Based on the feedback of the expert group, some WAI/TAI items were reformulated for the context of care for people with mild IDs. For example, the Goal items underline the shared instead of a personal responsibility to formulate goals. The Bond items emphasised being seen and understood, a main topic in research on collaboration between people with mild IDs and professionals, instead of kindness as formulated in the original instrument. In the Task items, 'insight' is too abstract because of cognitive limitations of people with mild IDs. In the adaptation of the WAI items, a better understanding and focus on needs instead of problems were formulated. In the adaptation of the TAI items, technology as complement to support or therapy was mentioned to increase our knowledge on the possible impact of eHealth in developing a working alliance. The application of both instruments could contribute to developing knowledge on this collaboration process, the role of support staff and therapists and the possible impact of eHealth in developing a working alliance. Notwithstanding the application of both instruments within the context of support and therapy, both instruments could also function as reflective tools for healthcare professionals, by virtue of the fact that filling out the questionnaire requires healthcare professionals to reflect on the alliance between themselves and their clients. These instruments enable professionals to objectify the alliance over time and get a better understanding of their own role in the development. When applied in support or therapy for various clients with mild IDs, it could also be a helpful instrument for supervision, training and insight in personal strengths and vulnerabilities. It should be noted, however, that it is essential to adapt and test the psychometric properties of both instruments to investigate the perspective of clients with mild IDs in intervention studies as well. Getting both partners involved in the alliance to

evaluate the alliance would make it possible to customise the support or the therapy to the needs of clients. By measuring both perspectives, any ruptures could be detected earlier in the process, and healthcare professionals would have more time to try to repair them (Eubanks *et al.* 2018).

Some critical reflections on this study should be delineated. First, the participants were instructed to complete both instruments with a specific client in mind. We are therefore unsure about possible risk of recall bias on scoring the WAI-SF-MID or TAI-SF-MID for former instead of actual clients. Although retrospective assessment is possible in more theoretical studies, it is less common and generally less accurate than actual scoring (Owen *et al.* 2010). For future studies, we recommend applying these instruments in predefined moments such as post-therapy, as is common in intervention studies (Flückiger *et al.* 2018) or when evaluating a support plan. The aim of the current study was to investigate both the factor structure and reliability of the adapted measurements in a cross-sectional design; as such, no further information about clients and their reasons for help was collected. Future research should thus include behavioural, mental health or support needs assessments amongst clients as well as providing relevant characteristics of the healthcare professionals. This could lead to a more nuanced picture of whether specific characteristics of clients, healthcare professionals or a specific eHealth tool impact upon the working alliance (e.g. for clients with complex trauma, it might be harder to establish a working alliance). Although this study is a first step to validate these instruments for application in professional relationships between professionals and people with mild IDs, it would be important for future research to investigate the predictive and convergent validity of both adapted instruments. Further, we recommend replicating the measurement of model fit indices and the internal consistency of the WAI-SF-MID and TAI-SF-MID in future intervention studies. Second, the authors used a convenience sampling method, which potentially resulted in only participants with a positive attitude towards eHealth participating in the study and, in line with this, high technical alliance scores. This could have led to a different response pattern compared with the entire population of healthcare professionals working in care organisations for people with IDs. Therefore, it is

recommended that future studies employ random sampling methods. Third, the collaboration with a broad group of experienced healthcare professionals working in various domains of a care organisation (e.g. community care and residential care) in the adaptation of both measurements is a key strength of the study. The final expert group also represented various domains within the field of care for people with IDs. This increased the face validity of both the WAI-SF-MID and the TAI-SF-MID. Finally, with respect to the TAI-SF-MID, the participants evaluated different kinds of eHealth tools, which resulted in responses related to eHealth tools in a broad context (e.g. video conferencing, use of apps, and remote forms of support or therapy). It is thus recommended that future studies focus on specific eHealth tools to extract the potential influence of a specific tool.

People with mild IDs deserve high standards of support and therapy, including within eHealth delivered forms (Aref-Adin & Hassiotis 2021). The working alliance is essential for establishing meaningful relationships and contributes to enhancing clients' quality of life. Both the WAI-SF-MID and the TAI-SF-MID are expedient and successfully adapted instruments through which to capture the quality of the working alliance within the innovative sphere of eHealth delivery.

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### Conflict of interest

The authors have no known conflicts of interest to disclose.

### Ethics approval statement

Ethical approval was granted by the Ethics Review Board of Tilburg University (EC-2016.71).

### Data availability statement

The data that support the findings of this study can be requested from the corresponding author upon reasonable request on the basis of a Data Transfer Agreement (DTA).

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