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Two Brief Valid Measures of Therapeutic Alliance in Counseling for Tobacco Dependence

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Abstract

Behavioral counseling is effective for smoking cessation and the psychotherapy literature indicates therapeutic alliance is key to counseling effectiveness. However, no tobacco-counseling specific measures of alliance exist that are suitable in most tobacco counseling contexts. This hinders assessment of counseling components in research and clinical practice. Based on the *Working Alliance Inventory*, and external expert review, we developed two alliance instruments: the 12-item and 3-item *Working Alliance Inventory for Tobacco* (WAIT-12 and WAIT-3). Two samples of 226 daily smokers via Amazon Mechanical Turk completed measures including demographics, tobacco characteristics, working alliance scales, and quit attempts. Both WAIT-12 and WAIT-3 had good to excellent internal consistency (0.92 and 0.88 for the WAIT-3 and 0.96 for the WAIT-12). The WAIT-12 1-factor model indicated poor fit (CFI = 0.83, TLI = 0.79, RMSEA = .19, SRMR = 0.09). The WAIT-12 3-factor model (CFI = 0.94, TLI = 0.93, RMSEA = .11, SRMR = 0.04) was indicative of acceptable fit. Both the WAIT-12 and the WAIT-3 were significantly associated with

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participants' self-reported cigarettes per day, quit attempts, and cessation. Initial validation of the WAIT-12 and WAIT-3 indicates they are psychometrically sound measures of tobacco dependence counseling alliance. The WAIT-3 provides brevity; it can be administered in under one minute. The WAIT-12 allows for assessment of specific components of therapeutic alliance. Overall, these instruments should allow for better measurement of alliance in clinical services and research.

Keywords

Working Alliance; smoking cessation treatment; practice assessment

1. Introduction

Counseling is an effective intervention for smoking cessation, increasing the likelihood of quitting by 40-60% compared to minimal support (Mottillo et al., 2009). At present, the kind of support provided across cessation interventions is quite broad, yet meta-analyses have failed to identify specific effective components (Lancaster & Stead, 2017).

Research across multiple health and mental health outcomes has found that therapeutic alliance between counselor and patient is the single most powerful determinant of counseling intervention effectiveness (Ahn & Wampold, 2001). Therapeutic alliance is an inherent feature of counseling that is nonspecific—-independent of any counseling content or approach. It consists of the bond that can form between counselor and the client, as well as the ability of the parties to collaborate on the goals and methods of treatment (Lambert, 2016). Stronger therapeutic alliance predicts greater therapeutic change (Orlinsky, Ronnestad, & Willutzki, 2004), as well as prospectively predicting quit attempts among cigarette smokers (Klemperer, Hughes, Callas, & Solomon, 2017). Michie and colleagues' taxonomy of behavior change techniques for smoking cessation includes two roles. One role focuses on non-specific components and competencies related to general aspects of the interaction that are considered evidence-based for smoking cessation counselors (Michie, Churchill, & West, 2011).

U.S. Tobacco Treatment Guidelines call for research to determine the specific effective components of counseling and the mechanisms through which counseling interventions exert their effects (Fiore, et al., 2008). Such knowledge could facilitate the development of more effective and efficient treatments. In order to determine the efficacy of different specific approaches to counseling, it is important to measure and control the nonspecific effect of alliance.

Although the role of therapeutic alliance has received some attention in the tobacco treatment literature (e.g. Klemperer, et al., 2017) to date, studies of therapeutic alliance in tobacco treatment have generally used the Working Alliance Inventory (WAI; Horvath & Greenberg, 1989) or its short forms (e.g. WAI-Short Revised; Hatcher & Gillaspay, 2006). The WAI is the most widely-used measure of therapeutic alliance (Horvath, Del Re, Fluckiger, & Symonds, 2011). It includes sub-scales measuring three aspects of the alliance between counselor and patient based on Bordin's conceptualization (1979): 1) *agreement on*

goals; 2) agreement on methods for achieving goals; and 3) the overall bond between patient and counselor (Mallinckrodt & Tekie, 2015).

However, the context of psychotherapy is different than the context of tobacco counseling. Tobacco counseling often occurs in health care settings and there is wide variation in how it is operationalized (Lancaster & Stead, 2017). It may also differ from typical psychotherapy in length (some tobacco interventions are limited to brief advice), context (many tobacco interventions are telephone-based), and provider (many tobacco interventions are delivered by health care providers with little to no counseling training). Person-to-person treatment delivered in four or more sessions is the recommended minimum for tobacco cessation counseling, although brief advice also has a cumulative effect on cessation (Fiore et al., 2008). Conversely, psychotherapy routinely ranges from one session to greater than two years of continuous services (Leichsenring & Rabung, 2011) and it can address a wide range of therapeutic targets, from skin-picking (e.g. Selles, McGuire, Small, & Storch, 2016) to suicide prevention (e.g. Ougrin, Tranah, Stahl, Moran, & Asarnow, 2015).

The WAI is broad in the verbiage used related to outcome, it refers to patients' experience with "therapy" or their "therapist," and it was developed and validated in face-to-face psychotherapy sessions (Hatcher & Gillasp, 2006). An ideal measure of tobacco counseling alliance would use language appropriate to the more common contexts of tobacco counseling.

Another limitation of the WAI is length. Brief versions of the WAI, the WAI-Short Revised (WAI-SR; Hatcher & Gillasp, 2006) and the WAI-Short (Tracey & Kokotovic, 1989), contain 12 items, which does not afford the very brief assessment that is often desirable in health care contexts. Therapeutic alliance measures that minimize time and patient burden might be used more (Falkenström, Hatcher, & Holmqvist, 2015) and be more useful, in tobacco treatment settings such as clinics and quitlines.

The purpose of this study was to create and evaluate two instruments: one instrument with tobacco-specific language that closely parallels the WAI including all three subscales, and a second addressing the issues of tobacco-specific language *and* brevity. In addition, we aimed to examine the construct validity of the new instruments with respect to tobacco-specific outcomes including a comparison of the construct validity of the two new instruments.

2. Materials and Methods

2.1 Instrument Adaptation

To address the issue of tobacco-counseling specific language, we made minimal edits to the 12-item WAI-SR, which has been widely used in psychotherapy literature as well as some smoking cessation studies (Klemperer et al., 2017; Bolger et al., 2010). In the original WAI-SR validation study (Hatcher & Gillasp, 2006) internal consistency was high (overall $\alpha = .91-.92$, subscale $\alpha = .85-.90$) and confirmatory factor analysis (CFA) demonstrated acceptable model fit ($\chi^2(51) = 128.9-137.5$; CFI = .95, TLI = .94, RMSEA = .08). The Society for Psychotherapy Research provided permission for use of the WAI-SR. As the goal was merely to address the language discrepancy between alliance instruments and tobacco

counseling, minimal modifications were made to create the new measure, which we refer to as the Working Alliance Inventory for Tobacco Version-12 (WAIT-12).

We further adapted the WAIT-12 to a 3-item inventory—the Working Alliance Inventory for Tobacco Version-3 (WAIT-3). Initially, we selected items from the WAIT-12 to match Bordin's conceptualization (1979) and the WAI-SR factor structure (Falkenström et al., 2015). We engaged outside experts ($n=3$) to consider psychometric evidence (Falkenström et al., 2015), theory (Bordin, 1979), and validity in reviewing items. The response format for both the WAIT-3 and the WAIT-12 instruments are the same as for the original WAI-SR. To simplify comparisons between the two instruments, average item responses were used for scoring purposes. The items from both instruments are presented in Table 1.

2.2 Setting and Participants

Participants were recruited for two different samples from Amazon's Mechanical Turk (M*Turk) population. M*Turk is a large web-based service in which participants complete tasks in exchange for financial compensation. This large, diverse subject pool has been used for research on health behaviors (Mason & Suri, 2012), addictions (Kim & Hodgins, 2017), and tobacco cessation (Cogle, Hawkins, Mactee, Zvolensky, & Sarawgi, 2014). M*Turk has also been used to establish instrument reliability (Buhrmester, Kwang, & Gosling, 2011).

The first sample provided initial psychometrics for the WAIT-3, and the second sample was used to compare psychometrics with the WAIT-12. To be eligible, "Turkers" were required to self-report having 1) smoked cigarettes on a daily basis within the last six months, 2) an interaction in which their health care provider talked to them about quitting smoking in the past 6 months, and 3) being at least 18 years of age. In line with recommended M*Turk research practice (Chandler & Shapiro, 2016), participants in Sample 1 were blocked from participating in Sample 2. Participants from both samples were reimbursed \$1 USD. The University of Kansas Medical Center's Institutional Review Board approved the study.

2.3 Measures

To evaluate the psychometric properties of the instruments, we collected demographics, cigarettes smoked per day (CPD), and smoking within five minutes of waking. To assess construct validity, we included self-reported post-counseling quit attempts ("Did you try to quit when the health professional advised you to stop smoking") and 7-day point prevalence smoking status (Hughes, et al., 2003).

2.4 Analyses Overview

Cronbach's α provided internal reliability information for both instruments. CFA tested the WAIT-12 for 1-factor model fit for general alliance, and a 3-factor model fit, based on Bordin's conceptualization (1979). We also examined construct validity using logistic and Poisson regression models that regressed smoking and quit attempts on the WAIT-3 and the WAIT-12. To assess how cutting additional items affected the construct validity of the WAIT-3, we compared the WAIT-3 to the WAIT-12 in the second sample. We used SPSS Version 22 to conduct the regression analyses and Classical and Bayesian Instrument

Development (CBID) software from R to assess instrument internal consistency, reliability, and factor structure (Garrard, Price, Bott, & Gajewski, 2016).

3. Results

3.1 Participants

Participants in Sample 1 ($n = 119$, $M = 31.4$ years) smoked on average 9.87 cigarettes per day. Most (63%) were male, white (70.6%), and 47.9% smoked within 5 minutes of waking. Participants in Sample 2 ($n = 107$, $M = 33.9$ years) smoked on average 11.8 cigarettes per day. Most (65%) were male, white (74.5%), and 54.7% smoked within 5 minutes of waking. The mean participant CPD in these samples are less than estimated national averages for current daily smokers (16.4 CPD), but are similar to smokers with a quit attempt in the past year (11.5 CPD; Hughes & Callas, 2010).

3.2 Psychometric Properties

Table 2 presents measurement psychometrics. Cronbach's α for the WAIT-3 remained stable between Sample 1 and Sample 2 (0.88-0.92), indicating acceptable-good internal consistency according to Devellis's guidelines (2016). Additionally, Cronbach's α for the WAIT-12 indicated excellent internal consistency.

Lastly, model fit was assessed using Little's standards (2013). The WAIT-12 1-factor model indicated poor fit (CFI = 0.83, TLI = 0.79, RMSEA = .19, SRMR = 0.09). The WAIT-12 3-factor model (CFI = 0.94, TLI = 0.93, RMSEA = .11, SRMR = 0.04) was indicative of acceptable fit.

3.3 Criterion-Related Correlations

Table 3 compares WAIT-3, WAIT-12, and tobacco use outcomes. Logistic regression indicated the WAIT-3 was significantly associated with post-counseling quit attempts in Sample 1 ($B = 1.01$, $\text{Exp}(B) = 2.75$, 95% C.I. = 1.76-4.31, R^2 range = .18-.27, $p < .001$) and again in Sample 2 ($B = 1.31$, $\text{Exp}(B) = 3.71$, 95% C.I. = 2.12-6.49, R^2 range = .24-.34, $p < .001$). This finding indicates that for every one point increase in the WAIT-3 score, the odds of a quit attempt are expected to change by a factor of 2.75 (in Sample 1) and 3.71 (in Sample 2), holding other variables constant. This association was also replicated with the WAIT-12 in Sample 2 ($B = 1.23$, $\text{Exp}(B) = 3.43$, 95% C.I. = 1.93-6.08, R^2 range = .20-.28, $p < .001$) indicating that for every one point increase in the WAIT-12 score, the odds of a quit attempt are expected to change by a factor of 3.43, holding other variables constant. Similar findings across both instruments indicates that greater working alliance in a cessation intervention is associated with a greater chance of a quit attempt.

Logistic regression indicated the WAIT-3 was significantly associated with 7-day point prevalence smoking status across Sample 1 ($B = .95$, $\text{Exp}(B) = 2.59$, 95% C.I. = 1.30-5.17, R^2 range = .08-.14, $p = .007$) and Sample 2 ($B = .92$, $\text{Exp}(B) = 2.50$, 95% C.I. = 1.22-5.15, R^2 range = .07-.13, $p = .01$). These findings across both samples indicate that for every one point increase in the WAIT-3 score, the odds of 7-days of tobacco abstinence are expected to change by a factor of 2.59 (Sample 1) and 2.50 (Sample 2), holding other variables constant.

Again, this finding was replicated with the WAIT-12 in Sample 2 ($B = 1.23$, $\text{Exp}(B) = 3.43$, 95% C.I.= 1.42-8.29, R^2 range = .09-.17, $p = .006$), indicating that for every one point increase in the WAIT-12 score, the odds of 7-days of tobacco abstinence are expected to change by a factor of 3.43, holding other variables constant. Consistent findings across both instruments indicates that greater working alliance in a cessation intervention is also associated with a greater chance of 7-days of tobacco abstinence.

Lastly, Poisson regression was utilized to examine relationships between cigarettes per day (CPD) and therapeutic alliance. The WAIT-3 was significantly associated with a decrease in CPD post-intervention in Sample 1 ($B = -0.91$, $\text{Exp}(B) = 0.91$, 95% C.I.= 0.87-0.96, $p = .001$) and again in Sample 2 ($B = -.18$, $\text{Exp}(B) = 0.83$, 95% C.I.= 0.78-0.88, $p < .001$). These findings across both samples indicate that for every one point increase in the WAIT-3 total score, cigarettes per day are expected to decrease by a factor of 0.9 in Sample 1 and 0.17 in Sample 2. Additionally, the WAIT-12 produced similar results in Sample 2 to the WAIT-3 ($B = -0.17$, $\text{Exp}(B) = 0.85$, 95% C.I.= 0.79-0.89, $p < .001$), indicating that for every one point increase in the WAIT-12 score, cigarettes per day are expected to decrease by a factor of 0.15 in Sample 2. Again, consistent results across two instruments in different samples provides evidence that greater working alliance in cessations interventions is also associated with lower cigarettes per day post-intervention. Of note, the WAIT-3 achieved more desirable fit statistics regarding Akaike Information Criterion (AIC; 1066.48 compared to 1078.8) and Bayesian Information Criterion (BIC; 1071.81 compared to 1084.13) than the WAIT-12 regarding CPD.

Overall, model fit statistics of the 1-factor model WAIT-3 and the 3-factor model of the WAIT-12 support interpretation of data in this study. In two samples, greater working alliance is associated with higher increases in the odds of a quit attempt, higher increases in the odds of 7-day smoking abstinence, and a higher increase in the odds of lower cigarettes per day post-intervention.

4. Discussion

The WAIT-3 and WAIT-12 demonstrate good internal consistency and construct validity and offer tobacco-specific alternatives to the WAI-SR. The WAIT-12 allows assessment of therapeutic alliance subscales, whereas the WAIT-3 offers brevity. The WAIT-3 appears to be superior to the WAIT-12 regarding key fit psychometrics.

For researchers and clinicians interested in therapeutic alliance as a single factor construct, the WAIT-3 also proved to be as related to self-reported abstinence as the longer WAIT-12. While both were significantly related to CPD, WAIT-3 had better model fit. This may be because the shorter WAIT-3 pays less of a penalty regarding the number of parameters used compared to the longer WAIT-12.

The findings were also consistent across two samples, increasing confidence in the results. Additionally, the fit statistics of the WAIT-12 were similar to the initial validation of the WAI-SR (Hatcher & Gillaspay, 2006), which suggests this was a good sample for testing the new instruments. Overall, this study provides evidence that despite differences from

psychotherapy in therapeutic context and therapeutic length, like in psychotherapy, greater working alliance is associated with positive outcomes in tobacco cessation interventions.

4.1 Limitations

Limitations of this study involve the M*Turk sample and the analyses of cessation outcomes. First, we compensated Turkers \$1 to avoid coercing participants to misreport smoking status in order to participate. However, because we used participant self-report, it was not possible to verify the tobacco use or cessation status of participants. Future studies that confirm these associations with confirmed quitters would increase confidence in these findings.

A second limitation relates to the timing of assessments. Cessation outcomes and the working alliance were assessed retrospectively and as much as 6 months after their counseling interactions. The time since counseling occurred may have affected participants' memories of working alliance. Moreover, because cessation and working alliance were assessed simultaneously, it cannot be determined whether alliance influenced outcome, or whether outcomes influenced the recollected quality of the alliance. For example, participants who successfully quit may reflect more favorably on their counseling experience than participants who failed to quit. Nevertheless, our results are consistent with extensive evidence in various counseling contexts that higher therapeutic alliance is prospectively associated with better outcomes (Martin, Garske, & Davis' 2000; Klemperer et al., 2017).

A third limitation is that we did not compare the performance of our adapted instrument to the original WAI scale. Although these instruments may perform similarly the tobacco specific scale has the advantage of using more context-appropriate language.

Last, our sample size was modest and M*Turk samples overrepresent White and Asian persons. This may affect generalizability (Paolacci & Chandler, 2014). On the other hand, M*Turk samples are in general more representative than either collegiate samples (Berinsky, Huber, & Lenz, 2012) or samples obtained through social media (Casler, Bickel, & Hackett, 2013)—both of which have been used to establish the reliability of instruments (Buhrmester, Kwang, & Gosling, 2011).

5. Conclusions

Because tobacco remains a top cause of premature mortality, and motivation to quit is highly variable, we “owe it to smokers” to develop effective and specific counseling approaches to optimize treatment opportunities (Baker, 2017). As such, it is important to be able to assess counseling mechanisms such as therapeutic alliance in the tobacco treatment context. Assessing therapeutic alliance is important because it relates to outcomes and may be influenced by both counselor skills as well as other factors that differ from typical psychotherapy settings (e.g., the professional background of the provider, phone versus in-person therapy, readiness to quit). The results of this study indicate that the WAIT-12 provides a reliable, psychometrically appropriate measure that assesses therapeutic alliance and its subscales in tobacco interventions. The WAIT- 3, which is similarly reliable with only 25% of the items, takes less than 1 minute to administer. This brief measure may be

especially useful in common tobacco treatment services—such as tobacco quitlines, or national tobacco treatment services such as exist in the United Kingdom—by enabling them to monitor counselor performance for quality improvement and research purposes.

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Highlights

1. This study developed two therapeutic alliance measures for tobacco counseling.
2. Both measures are psychometrically sound and related to positive tobacco outcomes.
3. The WAIT-12 allows for assessment of specific components of therapeutic alliance.
4. The WAIT-3 provides brevity—it can be administered in under one minute.
5. Both measures allow for routine monitoring of tobacco cessation counseling.

Table 1**Items**Working Alliance Inventory for Tobacco - 3 item (WAIT-3).

Below is a list of statements and questions about experiences people have had with their health care provider or professional, referred to below as a tobacco counselor, who talked to them about quitting smoking in the last 6 months. Think about your experience in this interaction, and decide which category best describes your own experience:

[1] Seldom; [2] Sometimes; [3] Fairly Often; [4] Very Often; [5] Always

Goal: My tobacco counselor and I agreed on clear tobacco treatment goals for me.

Task: My tobacco counselor and I agreed on the method I would use to achieve my tobacco treatment goals.

Bond: I felt that my tobacco counselor appreciated me.

Working Alliance Inventory for Tobacco - 12 item (WAIT-12)

Below is a list of statements and questions about experiences people have had with their health care provider or professional, referred to below as a tobacco counselor, who talked to them about quitting smoking in the last 6 months. Think about your experience in this interaction, and decide which category best describes your own experience:

[1] Seldom; [2] Sometimes; [3] Fairly Often; [4] Very Often; [5] Always

Goals Subscale:

My tobacco counselor and I collaborate on setting goals for my therapy.

My tobacco counselor and I are working towards mutually agreed upon goals.

My tobacco counselor and I have established a good understanding of the kind of changes that would be good for me.

My tobacco counselor and I agree on what is important for me to work on.

Task Subscale:

As a result of these sessions, I am clearer as to how I might be able to change.

What I am doing in therapy gives me new ways of looking at my problem.

I feel that the things I do in therapy will help me accomplish the changes that I want.

I believe the way we are working with my problem is correct.

Bond Subscale:

I believe that my tobacco counselor likes me.

My tobacco counselor and I respect each other.

I believe that my tobacco counselor appreciates me.

I feel that my tobacco counselor cares about me even when I do things that he/she does not approve of.

Note. Italics indicates this item was adapted for the WAIT-3.

Table 2

Measurement Psychometrics

Working Alliance Inventory for Tobacco – 3 item (WAIT-3).					
<i>M</i> (<i>SD</i>)	Reliability	α	CFI/TLI	RMSEA	SRMR
Phase 1 3.31 (1.08)	0.92	0.81	-	-	-
Phase 2 3.13 (1.01)	0.88	0.79	-	-	-
Working Alliance Inventory for Tobacco - 12 item (WAIT-12).					
<i>M</i> (<i>SD</i>)	Reliability	α	CFI/TLI	RMSEA	SRMR
Phase 2 3.35 (.93)	0.96	0.95	0.83/0.79	0.19	0.09
Phase 2	0.90-0.92 [*]		0.94/0.93 [*]	0.11 [*]	0.04 [*]

Note.

^{*} indicates 3-factor model

Table 3

WAIT-3 versus WAIT-12 Associations with Smoking Outcomes

Phase 1	Outcome	Exp(B)	95% C.I.	R ² range	p-value
WAIT-3	Quit Attempt	2.75	1.76, 4.31	.18,.27	$p < .001$
	Abstinent	2.59	1.30, 5.17	.08,.14	$p = .007$
	CPD	0.91	0.87, 0.96	-	$p = .001$
Phase 2	Outcome	Exp(B)	95% C.I.	R ² range	p-value
WAIT-3	Quit Attempt	3.71	2.12, 6.49	.24,.34	$p < .001$
WAIT-12	Quit Attempt	3.43	1.93, 6.08	.20,.28	$p < .001$
WAIT-3	Abstinent	2.50	1.22, 5.15	.07,.13	$p = .01$
WAIT-12	Abstinent	3.43	1.42, 8.29	.09,.17	$p = .006$
WAIT-3	CPD	0.83	0.78, 0.88	-	$p < .001$
WAIT-12	CPD	0.85	0.79, 0.89	-	$p < .001$