Adapting the TWEETS: Measuring Professional Engagement With Online Mental Health Platforms

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Abstract

Background

For patients to optimally benefit from therapist guided online therapy they need to engage with it. Engagement is defined as a process in which the individual is involved in a combination of cognition, behavior and affect towards an object or program. There has recently been some development regarding the measurement of engagement in patients. However, based on the available literature it is expected that engagement of therapists also plays a role in treatment outcomes. Thus, it is of interest to be able to measure professionals' engagement. Until now, there is no tool available for this purpose.

Objective

This study aims to validate a scale for measuring the engagement of professionals, the PEEHTS. It is a revised version of the TWEETS, a scale for patient engagement.

Methods

91 therapists who use the Dutch E-health platform Therapieland were administered the PEEHTS. To investigate its reliability, Cronbach's alpha and the split-half reliability were calculated. To get an overview of the construct validity, an exploratory and confirmatory factor analysis were performed. Lastly, the predictive validity was assessed by an ordinal logistic regression analysis.

Results

The results showed that the PEEHTS has a high reliability (.89) and split-half reliability (.87). Further, in the factor analysis, eight of the nine items loaded strongly on the factor 'engagement of professionals'. The PEEHTS has predictive validity, being correlated to the number of clients professionals invite to use Therapieland.

Discussion

This exploratory study showed that the PEEHTS is a promising scale with a high reliability that can be used to predict the percentage of clients invited to an online mental health platform. However, one item loaded lower on the factor and therefore has to be adjusted for future usage of the scale. Having such a scale can be useful to investigate whether client outcomes correlate with the engagement of professionals.

Keywords: online-interventions, blended-care, engagement, TWEETS, Chronic Care Model, Therapieland, internet Cognitive Behavior Therapy, PEEHTS

Introduction

The prevalence of mental disorders is high and too few treatment resources are available, making it hard for affected people to find help. Studies have shown that the prevalence of mental disorders increased over the past years, reaching a prevalence of 12 to 19% for different geographical regions (Mental Health America [MHA], 2021a; World Health Organization [WHO] Regional office for Europe, 2019). Further, these studies show that in the US as much as 57% of the affected population do not get treatment (MHA, 2021b). In Europe, a median number of 1 psychiatrist is available per 100,000 people (WHO Regional office for Europe, 2019). One possible solution for this problem might be digital mental health care. Most digital treatments work with the cognitive-behavioral approach and target symptoms of two of the most frequently diagnosed mental disorders: depression and anxiety (Fairburn & Patel, 2017). They have been shown to be effective: Research studying internet Cognitive Behavioral Therapy (iCBT), consisting of self-help modules based on the cognitive-behavioral approach accessed via the internet, shows a significant decrease of depression and anxiety symptoms in patients (Englund, 2020). Additionally, a meta-analysis conducted by Spijkerman et al. (2016) investigated the effects of mindfulness-based online interventions on anxiety, depression, well-being and stress. Across studies the researchers found a moderate, robust positive effect. These online treatments can for example be modules which may be followed via an online platform or an app. They may look different in structure, like e.g., they can be sessions that can be followed step by step by the patient or patients may even choose certain modules on their own and start them. In most cases, there is a possibility for the professional to tailor the components contained in a website to the client's needs. Further, professionals' input is necessary for the patients as they have to provide written feedback to assignments (Fairburn & Patel, 2017). Online interventions are often used in a blended way, referring to a combination of face to face (F2F) therapy and online sessions. This is a rising practice in mental health nowadays and even partially replaces pure F2F therapy. Psychologists may do regular F2F sessions combined with online modules. This way, patients can integrate different therapy practices into their daily lives (Wentzel et al., 2016; Fairburn & Patel, 2017). In sum, due to its effectiveness, high flexibility, potential for tailoring and easy integration into patients' daily lives, online mental health care, if used in the right way, shows high potential for contributing towards alleviating the gap between increasing disease prevalence and resource availability.

However, there are problems with the uptake of these interventions in practice (Feijt et al., 2018). Recent reviews suggest that a regular usage and the adaptation of the online modules to the client's needs are of great importance when it comes to the benefit of E-health interventions (Bruijniks et al., 2020; Englund, 2020). When the intervention is used less than it should be to be efficient, this can be explained by a number of factors, among which are a lack of engagement by either the patients, the therapists or both (Feijt et al., 2018; Kip et al., 2020b). Kelders, Van Zyl, and Ludden (2020) did a review on how engagement is defined in different disciplines in health care to evaluate what aspects are important with regards to measuring engagement. They included 69 articles that aimed to define engagement in any of the disciplines. The results showed that engagement should be seen as a combination of cognitive, affective, and behavioral components. It should further be defined as a process in which the individual is involved on the above-mentioned components with an object, resulting in a positive outcome. In other words: engagement with online interventions should be measured by how much a person is involved with the intervention and whether this involvement ends in a positive outcome for this person. A scale to measure patient's engagement according to this model has already been developed and validated: Kelders, Kip, and Greeff (2020) developed the Twente Engagement with eHealth Technologies Scale (TWEETS) which defines engagement by the three components behavior, affect and cognition. The component of behavior includes routines, effort and adaptation needs when using the technology. The domain of affect entails emotions coupled to the technology. Lastly, cognition entails the extent to which the technology is able to motivate and help people to reach their goals. Its internal consistency is considered good and its test-retest reliability is moderate. However, no similar scale exists for measuring the engagement of therapists, even though it is likely to be an important factor as well.

Other studies have pointed to the importance of the engagement of professionals in eHealth treatments. Bodenheimer et al. (2002) describe in their article about the Chronic Care Model, a model designed to facilitate cooperation of multiple components in the care of chronically ill patients, that a prepared and active engagement of the professional is important to arrive at the best possible outcome for the patient. Therapists have many duties in online therapy: they have to encourage their patients, introduce modules of the online intervention to them, give feedback and respond to messages (Kip et al., 2020a). Moreover, Wentzel et al. (2016) and Kip et al. (2020a) pointed out that in blended care it is just as important for therapists to adapt the contents of online components to fit the client better as it is in F2F therapy. In a study by Nazi (2013) aiming at providing more insights into the use of Personal

Health Records (PHRs), it was found that professionals need to engage with the technology (PHR) too. It is not sufficient if only the patient engages in the health technology. The authors emphasize that engagement in technologies in health care is always a reciprocal process where professional's engagement is also important. This body of research offers theoretical support for the importance of therapists' engagement in ensuring good patient outcomes, which underlines the need for a way to measure their engagement as well.

There is also some evidence that therapists' engagement might not be sufficiently high in all cases: Kip et al. (2020b) used a mixed-method approach to look at the engagement of professionals with an online intervention. Based upon the NASSS framework encoding scheme they found that the cognitions, behaviors and characteristics of therapists have an influence on their use of the online intervention (Greenhalgh et al., 2017). One of the most mentioned problems was that therapists did not put enough effort in the intervention to keep or start using it. As usage is a component of engagement this shows that there are therapists who are not engaged with online interventions (Kelders, Kip, & Greeff, 2020). The low engagement of professionals is a factor in the low uptake and integration of online mental health programs in therapy which reduces the benefits patients may experience from these kinds of therapies. Having a tool that can reliably measure professionals' engagement with online mental health services might thus help to identify professionals who might need some further assistance to improve their engagement. Being able to support these professionals by, for instance, educational activities like implementation training, might increase the effectiveness of the online interventions for the patients (Nazi, 2013). In this study such a tool for measuring engagement, an adapted version of the aforementioned TWEETS, called PEEHTS (Professional Engagement with E-Health Technologies Scale), is evaluated.

In summary, as described above there has recently been some development regarding the measurement of engagement in patients (Kelders, Kip, & Greeff, 2020). However, professional's engagement is thought to also be an important factor here but has not been studied as extensively. Until now, there is no tool available to measure it. Therefore, this study aims to evaluate a scale for measuring the engagement of professionals with the platform Therapieland. This study will investigate the research question whether the adapted version of the TWEETS can reliably and validly measure the engagement of professionals with the platform Therapieland. To be more specific, the following questions will be answered:

1. Does a confirmatory factor analysis of the PEEHTS confirm the one factor solution found in the evaluation of the TWEETS ?
2. To what extent do the items of the PEEHTS fit this factor?
3. Can the PEEHTS reliably measure engagement of professionals, i.e. does the questionnaire show a high Cronbach's alpha and split-half reliability?
4. Is there a correlation of the engagement score and the number of participants invited to Therapieland showing its predictive validity?
    a. This research question is selected because professionals who are engaged in Therapieland may be convinced of its benefits and thus refer it more often to their clients (Kim et al., 2013).
5. Is there a correlation between the engagement score of the participants and the start point of using Therapieland?
    a. This research question was selected because it is assumed that professionals who did work with Therapieland for a longer period have had more information on how to use it, introducing an ease of use which increases their satisfaction with the platform and thus also the engagement (Revels, 2010).
6. Is there a correlation between the engagement score of the participants and the work field they are working in?
    a. This research question was selected because it is assumed that professionals working in specialized mental healthcare might perceive a greater benefit from adding E-health to their work as it accompanies the patients suffering from more severe mental disorders in their daily lives. Additionally, they can target concrete symptoms better (Spijkerman et al., 2016).
7. Is there a correlation between the engagement score of the participants and the perceived added value by using Therapieland?
    a. This research question is selected because it is assumed that the more engaged a professional is, the more he integrates the platform into his routines. This again can maximize the benefits of the E-health program for the patient (Bruijniks et al., 2020; Englund, 2020). Additionally, Dovalienne et al. (2015) found that there is a direct correlation between perceived value and engagement with a platform.

8. Is there a correlation between the engagement score of the participants and the number of practitioners working at the same institution?
    a. This research question is selected because it is assumed because bigger institutions may force the use of online mental health programs on their employees, making them less likely to deal with and engage in the new ways of online therapy on their own accord (Feijt et al, 2018).

Method

Therapieland

Therapieland is an online Mental Health platform. It integrates the possibilities to chat or video-call a patient or give them exercises by assigning modules about different therapeutic topics. Modules can be followed by the patients with or without guidance by the therapists. It is mostly used in a blended way, integrating the possibilities given by Therapieland with regular F2F sessions.

Participants

The target group of this study were psychotherapists who work with Therapieland. Participants were included only if they worked in a generalized basic mental health, specialized mental health or youth care practice. The Dutch generalized basic mental healthcare system (BGGZ) is designed to treat patients with mild to moderate mental disorders while the specialized mental healthcare system (SGGZ) focuses on patients with severe mental disorders who need a longer treatment duration. For the selection procedure, purposive sampling was used. Therapists who already used the platform for some time and had previously replied to earlier surveys received an e-mail by Therapieland in which they were informed that the company wants to study the engagement of professionals with its platform. They were asked to take part in a survey to support this study. In the end, 91 participants took part in the study. There were 84 (92.3%) women and 7 (7.7%) men in the sample. The distribution of the age among the participants is displayed in Table 1.

Table 1. Distribution of age among participants

	< 30 years	31-40 years	41-50 years	51-60 years	> 60 years

Percentage	16.5	17.6	26.4	25.3	14.3

Materials and Procedure

Overview and general Procedure

A link embedded in the email referred participants to SurveyMonkey. The design of the study was cross-sectional. In the following, the questions will be explained in the same order as they appeared in the questionnaire. This order was identical across participants. Participation was voluntary and no punishment or reimbursements were given for not completing the survey. Filling out the survey took about five minutes and the data selection period lasted for about two months.

Part 1: PEEHTS

First, participants filled out the Professionals Engagement with E-Health Technologies Scale (PEEHTS). As an adjusted version of the TWEETS, this questionnaire was designed to measure the engagement of the professionals with Therapieland. The final version had nine questions which were answered on a 5-point Likert-scale ranging from 1 to 5 (1 = strongly disagree; 5 = strongly agree). The questions of the original TWEETS and the PEEHTS are displayed in Table 2. Adjustments made to the TWEETS, by employee(s) of Therapieland and a researcher, were: first, the adaptation to professionals included exchanging sentences saying that Therapieland helps the patient to achieve his goals to that Therapieland helps the professional to help the patient to achieve his goals. An example of this would be: ‘I am able to use Therapieland as often as needed to achieve my goals’ becomes ‘I am able to use Therapieland as often as needed to help my clients achieve their goals’. This decision was made by Therapieland based on the idea that professionals were mostly interested to see whether Therapieland would help their patients to achieve their goals Next, the questions of the TWEETS were adapted to the use of Therapieland by inserting the name into the gaps. Lastly, the new version was sent to a convenience sample of 10 professionals who work with Therapieland to test whether every item is well understandable. No concerns about the understandability of the questions were raised.

Table 2. The adapted version of the PEEHTS in comparison with the TWEETS

Original TWEETS		**PEEHTS**	
Item	Thinking about using [the technology] the last week, I feel that:	Item	When I think about my current use of Therapieland, I feel that:
1	[this technology] is part of my daily routine	1	The use of Therapieland is part of my daily routine.
2	[this technology] takes me little effort to use.	2	Therapieland takes me little effort to use.
3	I'm able to use [this technology] as often as needed (to achieve my goals)	3	I am able to use Therapieland as often as needed (to help my clients reach their goals).
4	[this technology] makes it easier for me to work on [my goal]	4	Therapieland makes it easier for me to help my clients reach their goals.
5	[this technology] motivates me to [reach my goal]	5	Therapieland motivates me to help clients reach their goals.
6	[this technology] helps me to get more insight into [my behavior relating to the goal]	6	Therapieland helps me to get more insight into my clients.
7	I enjoy using [this technology]	7	I enjoy using Therapieland.
8	I enjoy seeing the progress I make in [this technology]	8	I enjoy seeing the progress my clients make in Therapieland.
9	[This technology] fits me as a person	9	Therapieland fits me as a person.

Part 2: Background of participants

Participants were also asked questions on their demographic and professional background. These questions included their age and gender, how many therapists work at their institution, when they started using Therapieland, whether they feel that Therapieland is of added value to their work, how many clients they invite to use Therapieland, and in which work field they work. These questions are displayed, in the order they were presented in the questionnaire, in Appendix A. The question about whether the professionals feel that there is added value to their working method by using Therapieland is measured on a Likert-scale where 1 = strongly disagree to 5 = strongly agree. At the end of the survey, participants had the opportunity to leave their contact data for the possibility of participating in future research.

Data Analysis

All calculations were performed in RStudio. First, the scores on the PEEHTS were calculated by adding up all scores on the items with a high score indicating high engagement with Therapieland. The normality of the PEEHTS scores was checked with a Shapiro-Wilk test (Ghasemi & Zahediasl, 2012). The mean score across participants for the PEEHTS was 32.11 with a standard deviation of 5.98. The scores could theoretically range from 9 to 45. The Shapiro-Wilk normality test showed that the data is not normally distributed ($w = 0.94$, $p < 0.001$). The distribution is bimodal and has one peak at 12 points and a bigger peak at 33 points. Most participants have scores between 20 and 40. A density and Q-Q plot of the PEEHTS scores can be found in Appendix B. Since the PEEHTS scores were non-normally distributed and the sample was smaller than 100 participants, several indices were considered when evaluating the factor analysis (Kline, 2005).

Next, a reliability analysis was conducted on the nine questions constituting the PEEHTS. For this analysis, the *psych* package in R was used. First, the inter-item correlations for the nine items were calculated. Next, the Cronbach's alpha and the item-rest correlations were calculated. Here, a Cronbach's alpha of .70 is seen as the minimum necessary, while an alpha of .80 - .90 is seen as good internal consistency (Hinkin, 1998; Tavakol, & Dennick, 2011). Further, an item-rest correlation of below .40 is considered to be bad (Zijlmans et al., 2017). To get an idea of the test-retest reliability the split-half reliability will be assessed by calculating the Pearson r for the odd versus the even items and this was corrected by the Spearman-Brown Formula. Although no standards on the interpretation of a good or bad

alpha in test-retest reliability exist, it can be used to get an idea of the stability of the questionnaire (Crocker, & Algina, 1986).

Next, in an exploratory factor analysis a Scree test and plot together with a parallel analysis were conducted to get the number of factors that can optimally be extracted from the PEEHTS. The exploratory factor analysis will be combined with a confirmatory factor analysis according to established practice (Morgado et al., 2017). Values bigger than 0.10 and values smaller than 0.06 for the RMSEA are seen as poor and good fit, respectively. Values bigger than 0.95 for the CFI are seen as acceptable fit, and values smaller than 0.08 for the SRMR are seen as acceptable model fit (Boateng et al., 2018). Within this analysis, the fit of the individual items to the factor were obtained. Factor loadings were seen as acceptable when they exceed .50. Loadings beneath .32 are seen as low loadings (Tabachnick et al., 2007). Every loading in between will be subject to individual decision (Tabachnick et al., 2007).

To investigate the predictive validity of the PEEHTS, an ordinal logistic regression with the PEEHTS scores and the percentage of invited clients to Therapieland was performed with the PEEHTS scores as independent and the percentage of invited clients as dependent variable. For the correlations between the PEEHTS score and the perceived added value, start of using Therapieland and the number of practitioners working at an institution the Spearman correlation was calculated. To calculate the difference of the engagement of professionals between work fields an ANOVA was performed.

Results

Descriptive statistics

The descriptive statistics show that the vast majority of participants agree that the use of Therapieland is of added value to their work, most therapists work in small practices and in generalized and specialized mental health care. About 50% of practitioners work in single-practitioner practices, with a small number of the participants working in bigger practices with more than 11 practitioners. Most practitioners started using Therapieland at least half a year ago. Lastly, all practitioners referred at least some of their clients to Therapieland, with about 25% referring less than every fourth patient and another 25% referring almost every patient and the rest lying in between. An overview of the full descriptive statistics can be found in Appendix C.

Reliability

The findings of the inter-item correlations of the PEEHTS items are shown in Table 3. Here, most items correlate strongly among each other. Only items 5 and 6 correlate substantially less, with the correlations being non-significant in some areas.

The Cronbach's alpha of the reliability analysis for the PEEHTS was .89. The Cronbach's alpha if item 6 was deleted was calculated to check whether this would increase the alpha. It did change the overall alpha to .90, showing a slightly higher reliability of the questionnaire without item 6. The alpha if item deleted table can be found in Appendix D. The item-rest correlations are displayed in Table 4. Here, most items have a high correlation while items 5 and 6 have a lower correlation. The split-half reliability of the questionnaire, after correction by the Spearman-Brown formula was .87 which can be considered good.

Table 3. Inter-Item correlations of PEEHTS

item	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Q1	-	0.63***	0.58***	0.58***	0.31**	0.24**	0.55***	0.37***	0.73***
Q2		-	0.51***	0.46***	0.14	0.16	0.54***	0.35***	0.52***
Q3			-	0.55***	0.28**	0.2	0.58***	0.42***	0.56***
Q4				-	0.56***	0.55***	0.63***	0.64***	0.66***
Q5					-	0.44***	0.45***	0.47***	0.47***
Q6						-	0.39***	0.45***	0.29**
Q7							-	0.63***	0.72***
Q8								-	0.59***
Q9									-

** p < 0.05, ** p < 0.01, *** p < 0.001*

Table 4. Item-rest correlations of PEEHTS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
r	.68***	.56***	.62***	.81***	.51***	.44***	.77***	.66***	.79***

** p < 0.05, ** p < 0.01, *** p < 0.001*

Factor Analysis

After the Scree test showed a 1-factor solution to be the best option, the confirmatory factor analysis with a 1-factor solution yielded a Chi-Square of 85.42 (p = .000), a RMSEA of 0.154 (p = .000), a SRMR of 0.083, a CFI of 0.87. The factor explained 53% of the variances, meaning that a portion of the variances is left unexplained. Of the nine items, eight items loaded strongly positive (≥ 0.5) on the one factor. For the concrete loadings of the items on the factor, see Table 5. Item 6 loaded lower on the factor (.42). When excluding item 6 from the factor analysis, the RMSEA becomes 0.149 (p = .000), meaning that excluding item 6 did not increase the fit of the model.

Table 5. PEEHTS Factor Loadings on Engagement of Professionals

	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**
Loadings	.76	.56	.68	.68	.50	.42	.64	.60	.78

Predictive Validity and relationship to professionals' demographics

The ordinal logistic regression model with engagement and the percentage of invited clients to Therapieland was significant and positive ($ß$ = 0.16, OR = 1.17, p = .003), meaning that the more engaged professionals are the more clients they refer to Therapieland. Besides the predictive validity, the Spearman correlation between the engagement of professionals and the perceived value the professionals experience from using Therapieland was significant and positive (r = 0.62, p = .00), implying that individuals scoring higher on engagement perceive more value from the usage of Therapieland. No significant systematic relationships between the engagement of professionals and the number of practitioners working in the clinic (r = 0.14, p = .2), the start of using Therapieland (r = 0.15, p = .16), and the difference of engagement between work fields ($F(2)$ = 0.885, p = .42) were observed.

Discussion

Answer to Research Questions

In this study, it was investigated whether the PEEHTS, as an adapted version of the TWEETS, has the potential to reliably and validly measure the engagement of professionals

with the E-mental health platform Therapieland. A reliability analysis revealed a high internal and test-retest reliability of the PEEHTS. The inter-item correlations of the reliability analysis show that all items intercorrelate significantly, showing a moderately strong common factor, which is also confirmed by the factor analysis. The PEEHTS showed some promise due to its predictive validity: Individuals who scored higher on the PEEHTS referred more of their clients to Therapieland. Additionally, the PEEHTS scores also showed a positive relationship with the perceived added value to the therapist's work. No relationships were found with the number of professionals working at an institution, the work field, or the start of using Therapieland.

Discussion of the Results

Within the psychometric analyses, item 6 ("Therapieland helps me to get more insight into my clients.") performed especially poorly. Therefore, the alpha if item 6 was deleted was calculated, indicating a slightly better reliability without the item. However, according to Tabachnick et al. (2007) it is seen as acceptable to retain the item despite the comparably low loading on the factor. Nevertheless, since the model fit improved slightly when item 6 was deleted, and the item loaded low on the factor it is suggested to adapt it. While the item measures the goal-directed motivation of the therapist, therefore fitting the definition of cognitive engagement by Kelders et al. (2020), it might be possible that getting insights into the client's inner state may be a goal therapists do not generally reach for since it is too ambitious (Fenn & Byrne, 2013). Therefore, it might be advisable to adapt the question to "Therapieland helps me to get more insights into my client's problems.". Rephrasing the statement to understanding the problems of the clients might be a good compromise here. It narrows what exactly the professional gets more insights into: the problem of the client. Incidentally, it keeps the statement broader than only focusing on the goals of the clients.

A positive relationship between PEEHTS scores, the percentage of clients referred, and the perceived added value was found. Although a regression analysis was performed to integrate the directionality into the analysis, this is an observational study, meaning that the correlations found might go both ways. Regarding the percentage of referred clients, the mere exposure effect states that the more frequently a stimulus is encountered, the more it is preferred by the encountering person (Zajonc, 2001). According to this effect, it might be possible that if more clients are invited to use Therapieland because of external factors (e.g., the professional's employer requiring clients to be invited), the professionals are encouraged

to use the platform more frequently, which could lead to a higher level of satisfaction with the platform and thus higher engagement (Hansen & Wänke, 2009). This implies that it might be possible to increase engagement by stimulating usage. Regarding the perceived added value, directionality can again not be concluded from the observational data. However, other studies did find that a higher perceived added value can increase the engagement with platforms or other objects (Kim et al., 2013; Dovaliene et al., 2015). Thus, this finding might pave the way for future research that identifies ways of increasing engagement of therapists with online mental health platforms by addressing the added value to their work.

There might be more ways to increase the engagement of professionals with E-mental health platforms. It can be said that the more engaged a professional is, the more clients he invites to the E-health platform. Increased referral rates mean that more clients can enjoy the benefits of an E-health component additional to their F2F therapy (Englund, 2020; Spijkerman et al., 2016). One possibility of doing so is offering special trainings to professionals in which they can learn how to use the platform efficiently for their work (Nazi, 2013). Another possibility to increase the engagement of professionals with E-health platforms might be to increase the perceived added value of professionals. Both variables could serve as targets for interventions aimed at boosting therapist's engagement. This might pave the way for clients to benefit even more from E-mental health offers.

No relationship was found between the PEEHTS scores and the other variables from the area of professionals' demographics: In contrast to the initial expectations, professionals in smaller institutions are not less engaged than those in larger ones. It is possible that the assumption underlying this hypothesis, namely that larger institutions exert more control and make professionals feel less autonomy in their choices, is false. It might be better to directly measure perceived autonomy in future validation studies, rather than to go by the indirect variable of practice size. Similarly, professionals in specialized mental healthcare were not more engaged than those in basic mental healthcare, which had been hypothesized as it was thought that they might derive more value from it for their more challenging cases. The same concerns apply here, for validation, it is preferable to directly measure the proposed mechanism, in this case perceived added value. Finally, the absence of the predicted correlation between the start of using the platform and engagement can also be attributed to the indirectness of the proposed mechanism: having started earlier does not necessarily imply more usage, as professionals might also be early adopters, but never really grow familiar with the platform due to inherent characteristics. In general, looking at the characteristics of institutions might be a less interesting avenue to follow, also because of the great number of

possible confounding variables, instead a greater focus should be laid on individual's skills and attitudes directly.

Limitations

This study also has some limitations which will be discussed in the following. In this study no formal consent was asked from the participants. This could have negatively impacted the confidence of the participants in whether their data will be processed anonymously and securely. Thus, people might have avoided answering the survey. However, no personal data was asked from the participants and the data was processed anonymously providing the participants overall with the necessary anonymity. Nevertheless, future studies should therefore make sure to integrate a consent letter. Another limitation of this research was the relatively small sample size of 91 participants. As discussed in the data analysis section, there is no consensus in the literature about the sample size that is needed to reliably perform a factor analysis. Kline (2005) suggests that a sample smaller than 100 is always insufficient. He also suggests that a response to item ratio of 20:1 is desirable. Nevertheless, there is literature suggesting that a sample as small as 33 participants can be a reliable basis for a factor analysis under the present circumstances (Mundform et al., 2005). Since it was assumed that these circumstances apply in this case and because this study was exploratory and an initial pilot study, the decision to do a factor analysis with 91 participants is justifiable. Nevertheless, it would be interesting to perform the factor analysis again with a sample of 200 or more participants to satisfy the 20:1 criterion by Kline (2005). Another limitation is the sampling method used in this study. Purposive sampling might cause biases. The professionals in the sample might for example be more positive in general toward Therapieland. This can also be seen in the distribution of the PEEHTS data. The data is skewed to the left as there are only a few participants who do not engage with Therapieland. It seems there is an abrupt drop in the distribution of engagement at some point. The resulting non-normal distribution of the data is another limitation of this study. While this was considered during the selection of the analysis methods it could still have affected the results.

Further, the poor fit of the model constituting the PEEHTS can probably partially be explained by the fact that the scores are not normally distributed in the sample. Boateng et al. (2018) point out that, for example, Chi-Squared is an index that is sensitive to normality. A possible explanation for the non-normality might be the purposive sampling method. As explained above, in the sample there is a small number of people who score low on the

PEEHTS. On the other hand, Benson and Fleishman (1994) showed in an example study with skewed data that, especially the Maximum Likelihood method is not very sensitive to normality. It might nevertheless be wise in future research to sample in a different manner to avoid this issue.

Future Research

For future research it might be advisable to repeat the PEEHTS with a randomly selected sample to see whether this changes the fit of the items to the factor. On another note, the questionnaire is constructed of relatively few items. Osborne et al. (2014) pointed out that a minimum of five items per factor would be desirable to get a good estimate of the model fit. Another option to re-check the model fit would therefore be to increase the number of items. It might also be advisable to repeat the PEEHTS with the adjusted version of item 6, checked by the therapists after adjustment, to see whether the fit becomes better. The reliability should also be checked again after repetition of the study. A controlled experiment should be performed to disentangle the directionality between PEEHTS scores, perceived added value and percentage of invited clients. Lastly, it would be important for future research to assess whether trainings can increase the engagement of professionals with E-health platforms. Professionals with low engagement could be identified early by their scores on an improved version of the PEEHTS and could get training specifically tailored to them.

Conclusion

In this study, we presented the first psychometric evaluation of the PEEHTS, a scale designed to measure the engagement of professionals with E-health technology. The results of the evaluation show that the scale is reliable with eight of nine items loading strongly on the factor of engagement and some predictive validity could already be established. Minor changes to item 6 will be necessary to improve the scale. It is worth noting, that this study was a pilot study. Therefore, although the results are promising, they should be interpreted with caution. This scale can be further improved and then be validated in a study with a larger sample size to make it usable in practice. Having such a scale can be useful in the future to investigate whether client outcomes correlate with the engagement of professionals in the use of online mental health platforms. Moreover, special training programs for the platforms or an explanation of the added value of the platform might be a way to increase professional

engagement in the future. Finally, it can be said that the PEEHTS is a promising way of measuring the engagement of professionals with online mental health programs.

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Appendix

Appendix A.

Questions on demographic and professional background

Demographic Questions

1. Age

☐ < 30 years ☐ 31 - 40 years ☐ 41 - 50 years ☐ 51 - 60 years ☐ > 60 years

2. Gender

☐ female ☐ male ☐ other

Professional Background

3. Do you feel that Therapieland is of added value for your working method?

☐ strongly disagree

☐ disagree

☐ neutral

☐ agree

☐ strongly agree

4. In which work field do you work?

☐ General basic mental health care (BGGZ)

☐ Specialized mental health care (SGGZ)

☐ child- and adolescent mental health care.

How many practitioners/ professionals does your institution count?

☐ 1 ☐ 2-10 ☐ 11-40 ☐ > 40.

When did you start with using Therapieland?

☐ less than half a year ago

☐ half a to one year ago

☐ one to two years ago

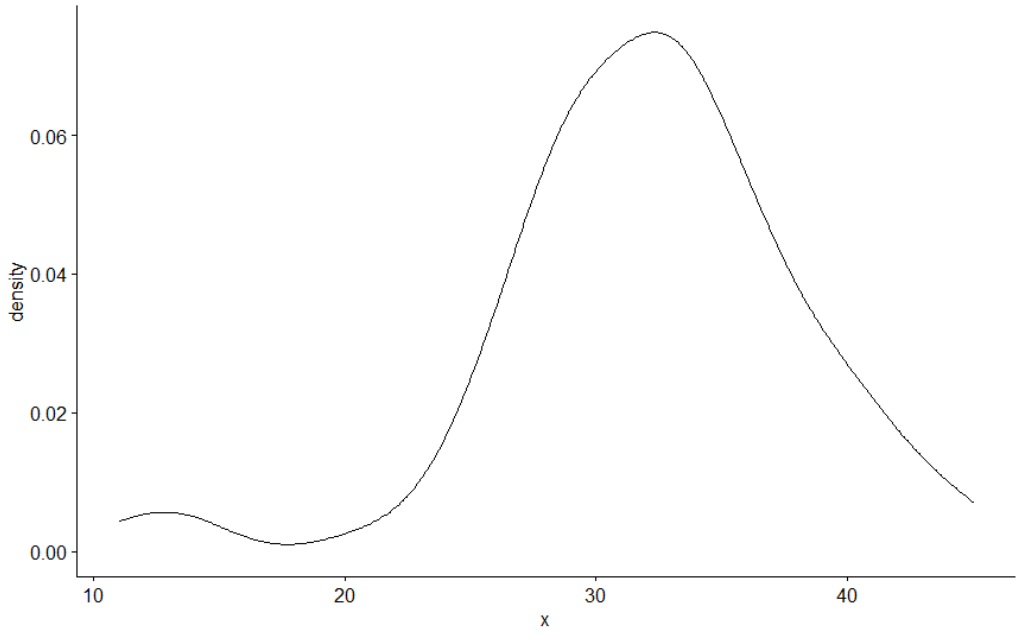
☐ more than two years ago.

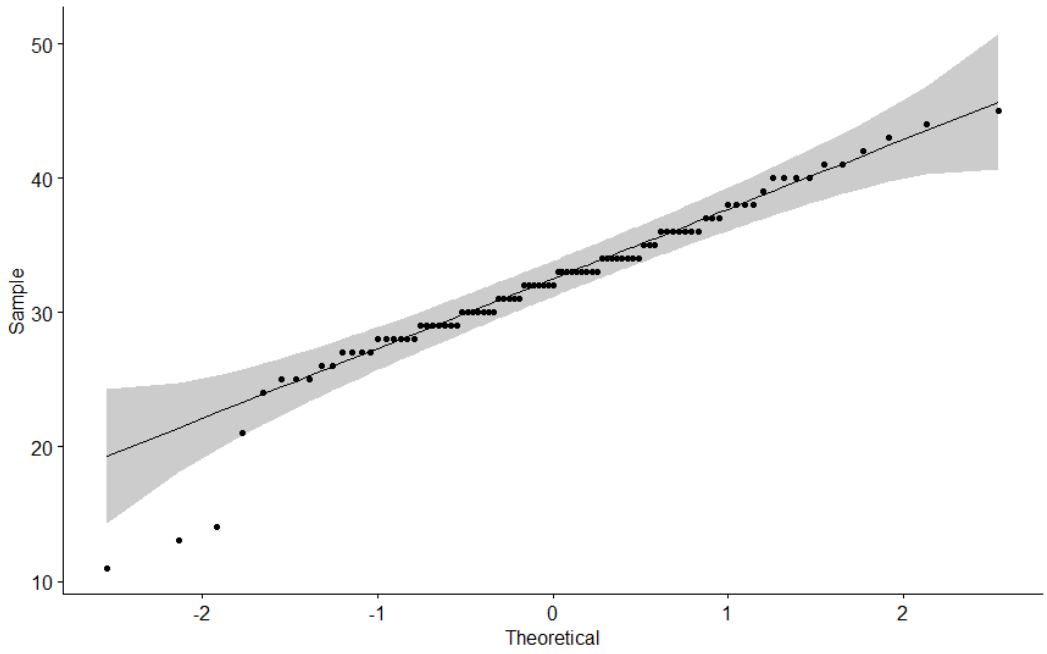
What percentage of your clients do you invite to use Therapieland?

☐ 1-25% ☐ 26-50% ☐ 51-75% ☐ 76-100%.

Appendix B

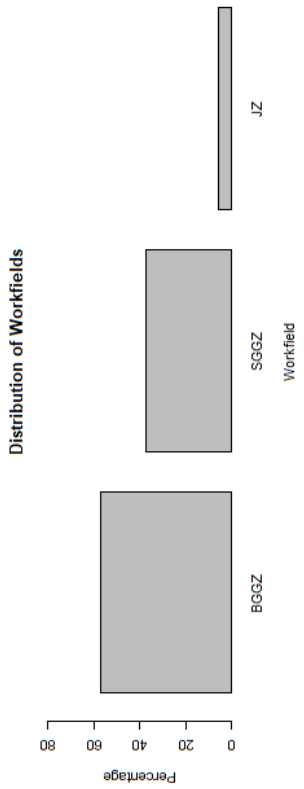
Density Plot of PEEHTS Scores and Q-Q Plot of PEEHTS Scores

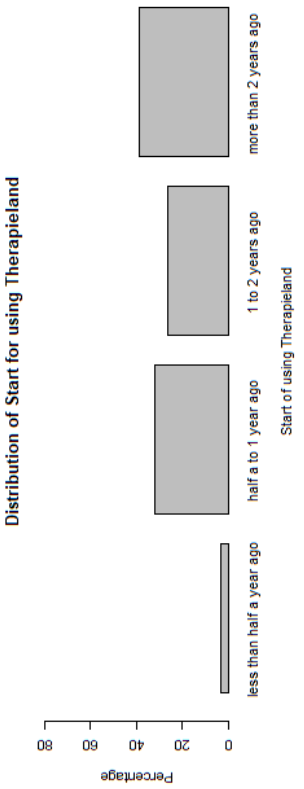


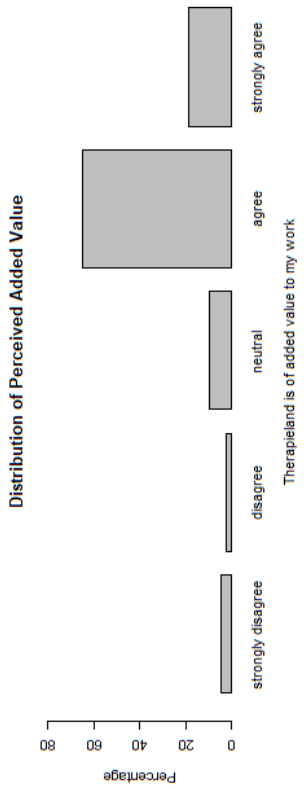


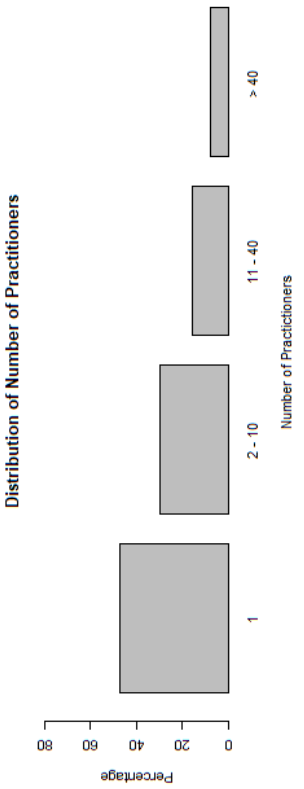
Appendix C

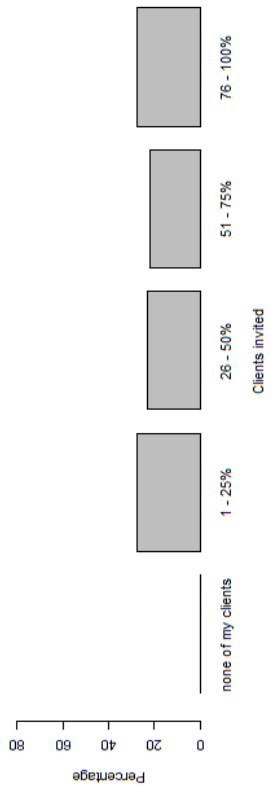
Descriptive Statistics of the Separate Questions











Appendix D

Alpha if item deleted table.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
r	.88	.89	.88	.87	.89	.90	.87	.88	.87