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RESEARCH ARTICLE

Interpersonal factors in internet-based cognitive behavioral therapy for depression: Attachment style and alliance with the program and with the therapist

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Abstract

Objective This open-trial study examined effects of a culturally-adapted Hebrew version of guided internet-based cognitive behavioural therapy (ICBT) for depression. We examined therapeutic alliance with the therapist and with the programme (content) as potential predictors of outcomes. Furthermore, we examined whether anxious and avoidant attachment styles improved, although relationships were not the focus of treatment. **Method:** We examined alliance with therapist and alliance with programme and their time-lagged (1 week), longitudinal relationship with depression outcomes, and change in anxious and avoidant attachment during treatment. **Results:** Depression and insomnia improved significantly (Cohen's *d*: depression = 1.34, insomnia = 0.86), though dropout was relatively high (49%). Alliance with programme and with the therapist predicted adherence and dropout, whereas only alliance with therapist predicted symptom improvement. Avoidant attachment decreased over treatment whereas anxious attachment did not. **Conclusion:** A culturally-adapted version of ICBT for depression showed that alliance with therapist and alliance with programme both can play an important role in its effectiveness: alliance with programme and the therapist drive adherence and dropout and alliance with therapist is related to symptom improvement. Although the focus of treatment is not interpersonal, avoidant attachment style can improve following ICBT.

Keywords: depression; ICBT; adherence; dropout; internet alliance; attachment

Clinical or methodological significance of this article: This study suggests that in internet-based therapy, alliance with the therapist and alliance with the programme both play an important role in supporting motivation and persistence in engaging with the programme treatment. Thus, clinician should consider delivering a weekly internet alliance questionnaire along with the therapy programme to follow the development of the working alliance with the programme and with the therapist, which might enable them to intervene or improve the alliance. Future studies should examine the components that might influence the alliance with the therapist and the alliance with the programme.

Depression is one of the most prevalent psychiatric conditions, with a lifetime prevalence of approximately 10.6% worldwide and 9.8% in Israel

(Bromet et al., 2018). Untreated depression has become an even more pressing issue since the COVID-19 pandemic, which has both exacerbated

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difficulties in providing mental health services and intensified losses, distress, and financial struggles for individuals (Clemente-Suárez et al., 2021). Cognitive behavioural therapy (CBT) for depression has been well-established as an effective treatment. However, many individuals with depression face challenges in accessing CBT due to limited health-care resources, stigma, and economic costs (Karyotaki et al., 2018).

One solution to enhance access to CBT for depression, especially during a pandemic, is through internet interventions. Internet-based therapy offers numerous benefits, including broader accessibility, reduced shame and stigma, consistent treatment delivery, decreased clinician time, and cost-effectiveness (Andersson et al., 20192]; Carroll & Rounsaville, 2010; Ebert et al., 2018; Marks & Cavanagh, 2009; Marsch & Dallery, 2012). Internet-based CBT (ICBT) has demonstrated efficacy across various disorders compared to waitlist or usual care (Andrews et al., 2018; Karyotaki et al., 2017) and is recommended as an initial low-intensity intervention for individuals with mild to moderate symptoms or serving as a bridging therapy while awaiting traditional CBT (National Institute for Health and Care Excellence, 2009). Recent meta-analyses reported positive effects of guided internet-based cognitive behavioural therapy (ICBT) for depression (Karyotaki et al., 2018) and insomnia (Soh et al., 2020). Guided ICBT has demonstrated superiority over unguided ICBT, particularly among patients with higher baseline severity of depression (Karyotaki et al., 2018). Moreover, some studies suggest that outcomes of therapist-guided ICBT do not differ significantly from face-to-face (FTF) CBT (e.g., Olthuis et al., 2016; Chow et al., 2022).

ICBT is typically based on the content and structure of traditional, face-to-face CBT. Patients log in regularly over a specified period to access online materials organized into a series of modules, which are delivered via an internet platform. Each module contains homework assignments that they are expected to complete before the next module becomes available. Patients typically receive written guidance from their therapists. This guidance is usually feedback on the worksheets and general progress, partially to facilitate adherence. The relationship between the therapist and patient during ICBT typically develops through this written correspondence. Similarly, patients write to their therapist throughout the treatment and usually receive a response within 24–48 hours, which they can read repeatedly. The therapeutic alliance during guided ICBT most likely influences superior retention and outcomes compared to unguided interventions

(e.g., Baumeister et al., 2014; Bur et al., 2022; Zalaznik et al., 2021).

Interpersonal aspects in ICBT

The role of the therapist in ICBT has been modified and scaled down in comparison with standard FTF treatment, prompting a crucial question: How do these modifications to the therapist's role impact the interpersonal factors in ICBT? Within this context, two significant aspects of interpersonal factors may be influenced by the adaptations in ICBT. First, it is important to examine the unique experience of the therapeutic alliance and its impact on treatment outcomes. Second, the absence of FTF contact with the therapist during treatment could potentially diminish the interpersonal consequences typically occurring in traditional psychotherapies, such as improvements in anxious and avoidant attachment styles (e.g., Levy et al., 2018). In the current study, we focused on these two aspects in ICBT for depression.

The experience of therapeutic alliance in ICBT

In traditional FTF therapy, the therapeutic alliance is one of the most consistent predictors of positive treatment outcomes (e.g., Flückiger et al., 2018; Horvath et al., 2011; Martin et al., 2000). The causal direction of the association between therapeutic alliance and outcome has been debated, and it has been demonstrated that therapeutic alliance predicts therapy outcomes, but also vice versa (Flückiger et al., 2020). Meta-analytic research on the therapeutic alliance in internet-based therapy attests to the notion that the patient's experience of alliance during internet-based therapy is a significant component of the therapeutic process, functioning as a predictor of treatment outcomes close to the findings in FTF (e.g., Berger, 2017; Flückiger et al., 2018; Kaiser et al., 2021). The limited involvement of the therapist in ICBT raises questions regarding the precise nature of the therapeutic alliance. Furthermore, whereas the alliance and its impact on FTF treatment has been extensively researched (e.g., Flückiger et al., 2018; Zilcha-Mano & Fisher, 2022), relatively little is known about the unique experience of the alliance in internet interventions.

Studies of alliance in ICBT have predominantly employed conventional alliance measures, which often suffer from ceiling effects and fail to distinguish between the alliance with the therapist and the alliance with the treatment programme (cf., Berger,

2017). Gómez Penedo and colleagues (2020) adapted an existing alliance measure for internet interventions. They utilized the items from the Working Alliance Inventory, modifying the goal and task subscales to assess alliance with the programme instead of the alliance with the therapist. Other studies also modified existing measures of alliance to examine the aspect of the alliance with the therapist and the programme (e.g., Bur et al., 2022; Herrero et al., 2020; Meyer et al., 2015; Zalaznik et al., 2021). Overall, the level of programme helpfulness/alliance has been found to be related to the level of symptom reduction. Probst and colleagues (2023) conducted a comprehensive meta-analysis of alliance in ICBT and reported the effect of alliance on outcomes which is consistent with studies of FTF therapy. However, they found that the task component of alliance exhibited slightly higher prediction of outcomes compared to the bond component. These findings suggest that the alliance in internet interventions serves as a robust predictor, yet the individual components of the alliance might manifest some differences compared to FTF therapy.

In a recent study on ICBT for panic, Zalaznik et al. (2021) developed a novel measurement that distinguishes between the experience of alliance with the therapist and alliance with the programme. The Internet Patient Experiences and Attunement Responsiveness (I-PEAR) scale was created by adapting specific items from the Patient Experiences and Attunement Responsiveness scale (PEAR; Snyder & Silberschatz, 2016). The I-PEAR was specifically designed to capture the alliance experience in internet interventions.

In their study, Zalaznik, and her colleague (2021) found that patients' relationship with programme was associated with subsequent symptom reduction, whereas patients' relationship with the therapist was associated with number of modules completed. We argue that the distinction between alliance with the therapist and alliance with the programme may be particularly important in internet-based interventions in order to test their relative contributions to treatment outcomes and adherence and dropout.

Indeed, dropout rates for ICBT, which range from 0% to 75% (Schmidt et al., 2019), are one of the greatest concerns regarding ICBT. FTF treatment studies suggest that poorer alliance plays a role in dropout from therapy (cf., Flückiger et al., 2018; Sharf et al., 2010, 2020]; for meta-analyses of dropout and therapeutic alliance). However, there are few studies that have examined alliance as a predictor of adherence and dropout in internet interventions. Therefore, it is important to examine whether the alliance with the therapist

and the alliance with the programme are related to adherence and dropout.

Attachment style in psychotherapy and ICBT

The construct of adult attachment has been widely studied empirically over the last decades, demonstrating relationships with interpersonal relationships, and psychopathology (Mikulincer & Shaver, 2016). Following Bowlby's famous essay (Attachment and Loss; Bowlby, 1969/1982) depression has been shown to be associated with impairments in attachment in multiple meta-analyses (e.g., Dagan et al., 2018; Spruit et al., 2020) and attachment has been suggested as a potential target for preventing or treating depression. Improvement in anxious and/or avoidant attachment during treatment likely contributes to improvements in relationships and general well-being, regardless the focus of the treatment (Dagan et al., 2018). Attachment styles provide the cognitive schemas, or working models, through which individuals perceive and relate to their worlds. In turn, these schemas predispose the development of psychopathologies and influence outcomes when people undergo psychotherapy (Shorey & Snyder, 2006). Most studies support the conceptualization of two-dimensions of attachment styles, which typically are called anxious and avoidant styles (e.g., Bartholomew & Horowitz, 1991; Brennan et al., 1998).

Research indicates that attachment styles can improve during psychotherapy, including in CBT (Levy et al., 2018; Zalaznik et al., 2019). Traditionally, the explanations of patient improvement in attachment during psychotherapy have mostly focused on the therapist's influence via provision of a healthy working model of relationships. Based on attachment theories (i.e., Mikulincer & Shaver, 2016), we suggest that the therapist influences patient attachment mainly via two components: an emotional one (involving being cared for and understood by the clinician) and a cognitive one (including the belief in the competence of the therapist to administer an effective treatment). These components vary with different weights among different psychotherapies (i.e., interpersonal, attachment-focused, psychodynamic, CBT, schema, etc.). In general, in FTF CBT, the focus of the treatment is not on the relationship, and the experience of being understood by the therapist exists via therapist validating the patient's experience of emotions. The second component (belief in the competence of the therapist to administer an effective treatment), is traditionally very dominant in CBT; the focus of the treatment is on symptom reduction, and the

treatment process is clear. We suggest that the same components exist in ICBT and are related to the unique characteristics of both the therapist and the programme during ICBT. For the emotional component, the therapist gives the patient-tailored feedback, which leads to the feeling of being cared for and understood by the therapist. In addition, during treatment, the patient reads the content, which includes a description of other individuals managing with similar problems, and this helps explain their symptoms. Therefore, they feel validated and understood. For the cognitive component, the ICBT therapist guides the patient on specific issues related to executing the interventions and gives feedback on the patient's worksheets and general progress. Thus, the patient feels confident with the competency of the therapist. Moreover, the ICBT therapist bases the guidance on the clearly written protocol, which might result in the patient feeling more confident in the therapist. Furthermore, the programme is based on evidence-based treatment using CBT, and this likely makes the patient feel confident with its efficacy. As an emerging area of research, there is only one study which examined changes in anxious and avoidant attachment during ICBT (for panic disorder) and found that anxious attachment improved during treatment (Zalaznik et al., 2021b). Clearly, more research is needed to examine the changes in attachment styles in ICBT. To the best of our knowledge, no study has examined improvement in attachment styles in ICBT for depression.

Research aims

First, the current study examined whether culturally-adapted ICBT for depression is effective. Given that insomnia is often included as one of the symptoms of depression, (cf., Andersson et al., 2005) we included an optional module for insomnia. We hypothesized that measures of depression and insomnia would improve over time.

The main aim of the current study was to develop a comprehensive understanding of two interpersonal factors in ICBT for depression: the alliance and attachment. Regarding the alliance, we addressed the following questions: (1) Does alliance with the therapist and alliance with the programme develop over treatment? (2) Are alliance with the therapist and alliance with the programme related to treatment outcome? (3) Are alliance with the programme and alliance with the therapist related to dropout and adherence? We hypothesized the following: (a) The internet alliance measure of the I-PEAR and its subscales (I-PEAR with the programme, I-PEARp; I-

PEAR with the therapist, I-PEARt) would increase over time. (b) The internet alliance measure of the I-PEAR and its subscales would be related to reduction of depression symptoms. Given the significance of temporality (see Flückiger et al., 2020; Zilcha-Mano, 2017), we examined whether the alliance predicted symptom reduction in the subsequent week (time-lagged by 1 week), or vice versa. (c) The I-PEAR and its subscales would predict adherence. (d) The I-PEAR and its subscales will predict dropout.

Regarding attachment styles, we hypothesized that anxious and avoidant attachment would improve during ICBT for depression. Similar to alliance, we examined whether anxious and avoidant attachment styles were related to dropout and adherence. Although previous studies did not support this relation (Levy et al., 2018; Zalaznik et al., 2022), given that this is one of the initial studies to examine this question in the context of ICBT, we decided to examine this question in an exploratory manner.

Method

Participants and recruitment

Individuals were recruited via advertisements for a free, open-trial study of internet treatment for depression and were asked to complete an online survey/screen, including completing a self-report measure of depression (PHQ-9; Kroenke & Spitzer, 2002) as part of their registration. After completing online questionnaires, participants first completed a phone screen and then were invited to an in-person (or by Zoom) interview with an independent evaluator if they were found eligible (by using a structured interview for DSM-5, the Mini International Neuropsychiatric Interview 7.0.0; M.I.N.I. 7.0.0; Sheehan 2014). Study inclusion in the screening phase included: 18 years-old or older, not in concurrent weekly psychotherapy, no history of a full course of CBT for depression, computer access, and PHQ-9 scores ≥ 9 and < 20 . Study inclusion after intake was: a DSM-5 diagnosis of current major depression as the primary disorder and a score of 17 or above on the HAM-D (21 items; Hamilton, 1967). Patients who were on a stable dose of medication for two months were allowed to participate in the study provided they did not increase their medication during the study. Exclusion criteria included a history of psychosis or mania, recent history of substance abuse or dependence, or current suicidal ideation or a history of suicide attempts.

Our aim was to include 40 patients in the open trial. Out of 551 people who registered online, 187 did not complete any information, 118 did not have

a complaint of primary depression, 34 were in current psychotherapy, 31 never answered a follow-up call after first conversation, 20 had too low severity of depression (PHQ-9 <9), 19 were suicidal, 17 were not interested in ICBT, 15 were not interested in research, 14 were diagnosed with bipolar disorder or psychosis, 9 had adjustment disorder with depressive features due Covid-19, 7 had too severe depression (PHQ-9 > 20), 6 improved after intake without intervention, five had already a full course of CBT, two reported substance dependence and one was a student in psychology at The XXXX University Department of Psychology and was excluded due to confidentiality. In sum, the majority who were ineligible were due to either not having depression as a primary complaint, being in another treatment, or their symptoms being too mild. This left us with 39 patients who received ICBT for depression as part of an open trial examining efficacy and acceptability. The sample included 59% females ($n = 23$), aged 21–79 years ($M = 37.9$, $SD = 14.4$). Participants had an average of 15.2 ($SD = 3.3$) years of education, and 33% ($n = 13$) reported that they were employed when they started the treatment. Of the 39 patients, 62% were single, 23% were married, 13% were divorced and 2% were widowed. At baseline, 54% of patients reported current use of antidepressant medications, among them 15% reported use of sleep medication. The average duration of depression was 7.8 years. 74% reported having had psychotherapy previously. In terms of comorbidity, 72% (28 patients) were diagnosed with comorbid disorders, among them 54% (21 patients) had more than one comorbid disorder. Of 39 patients, 33% (13 patients) were diagnosed with general anxiety disorder, 23% (9 patients) with social anxiety disorder, 18% (7 patients) with panic disorder with agoraphobia, 12.5% (5 patients) with obsessive-compulsive disorder, 10% (4 patients) with binge eating disorder, 5% (2 patients) with post-traumatic stress disorder. In addition, 18% (7 patients) reported having received a diagnosis of a personality disorder. All patients were fluent and literate in Hebrew. The study was approved by the university's ethics board and all participants signed informed consent prior to their participation in the study; treatment was offered to participants at no cost. The design for this sample, along with a panic sample was preregistered on ClinicalTrials.gov (NCT04659577). Given that some of the questions that were asked were the same for the panic and the depression samples, they were preregistered in one preregistration. However, the intention from the outset was to examine the depression sample ($n = 39$) separately from the panic sample ($n = 90$). The current manuscript is the only analysis presented to date for the

depression sample, and no further analyses are currently planned. The measures examined in this paper only present a subsample of the measures collected during the study. These measures were selected a priori for the current analyses and were defined from the outset as part of the first author's dissertation proposal, approved prior to initiation of the study.

Treatment

The ICBT programme is based on cognitive-behavioural protocols, adapted for the online environment (Andersson et al., 2005). Each module included specific content with fictional figures with depressive symptoms (one male and one female), interactive exercises, a summary and exercises as homework. Additionally, patients could track the improvement of their symptoms by following a graph that displayed the weekly questionnaires they filled out. The current ICBT for depression programme included six modules (recommended times for each noted in parentheses): Module 1 included an introduction to the programme and initial psychoeducation (up to 1 week), Module 2 included further psychoeducation and cognitive work (e.g., conceptualization of the four components of patient's depression—the depression cycle: feelings, symptoms, thoughts and behaviour; monitoring automatic thoughts and mood; 1–2 weeks). Module 3 focused on behavioural activation (i.e., building weekly active plan and evaluation; 3–4 weeks), Module 4 included further cognitive work of challenging thoughts (i.e., cognitive biases and thought challenging; 2–3 weeks), Module 5 was optional and included CBT techniques for reducing insomnia (i.e., sleeping hygiene, sleeping log; 3–4 weeks), and Module 6 included a summary of the treatment programme and work on relapse prevention material (1–2 weeks). The treatment platform allows both the patient and therapist to login securely and allows the therapist to monitor patient's activity and progress (Vlaescu et al., 2016). All communication between the patient and therapist was via a built-in messaging system.

Therapists

Treatment was provided by six doctoral students in clinical psychology who were during/post their training as clinical psychologists at The Hebrew University under the supervision of an expert in CBT (the last author). Therapists were between 29 and 40 years-old; four were female. Group supervision was provided for an hour weekly and typically covered five to eight patients. Supervision covered treatment

progress via evaluating patient symptom monitoring, worksheets and correspondences with the therapist. As all written exchanges with the patient are recorded in the treatment platform, and the system administers the main content of the treatment, it was possible to monitor therapist fidelity continuously. Therapists helped clarify the CBT conceptualization of their depression when needed and encouraged patients to do the worksheets via written correspondence. In rare cases of crises such as suspicion of suicidal ideation (only one case) and in cases in which the patient did not enter the platform for two weeks, therapists contacted patients directly via phone (mostly dropout cases).

Measures

All patients were interviewed by a trained, independent evaluator using a structured interview for DSM-5, the Mini International Neuropsychiatric Interview 7.0.0 (M.I.N.I. 7.0.0; Sheehan 2014). The Hamilton Rating Scale for Depression (HAM-D, 21 items; Hamilton, 1967), the gold standard for clinical trials of depression, was the primary outcome administered pre and post treatment by an independent evaluator (typically the same interviewer), blind to treatment progress. Internal consistency was good (α 's $\geq .80$, 95% CI [.70;.90]). The Insomnia Severity Index (ISI; Bastien et al., 2001; (α 's $\geq .87$, 95% CI [.80;.94]).) a brief screening measure of insomnia was administered by independent evaluator as well at pre and post treatment. In addition, participants completed four self-report measures at pre and post treatment: Beck Depression Inventory (BDI-II; Beck et al., 1996; (α 's $\geq .90$, 95% CI [.87;.94])) the Patients Health Questionnaire-9 items (PHQ-9; Kroenke & Spitzer, 2002; (α 's $\geq .92$, 95% CI [.89;.95]), the Ruminative Response Scale (RRS 10 items; Treynor et al., 2003; (α 's $\geq .82$, 95% CI [.75;.88]) and the Experiences in Close Relationships scale (ECR-short version of 12 items; Brennan et al., 1998; α 's $\geq .87$, 95% CI [.84;.89]). The PHQ-9 and RRS were also administered weekly throughout the treatment. In addition, patients completed at pre, post, and after each module during treatment a unique measure of working alliance in internet interventions: the Internet Patients' Experience and Attunement with Programme/Therapist (Zalaznik et al., 2021a; α 's $\geq .95$, 95% CI [.94;.96]) and α 's $\geq .96$, 95% CI [.95;.97]), respectively), which is a measure that relates separately to the alliance with the programme (i.e., content in the ICBT platform) and the alliance with the therapist (i.e., via correspondence).

Procedure

As noted above, after completing the online questionnaires, participants completed a phone screen, and if they were found eligible, they were invited to a face-to-face or via Zoom interview (according to their preference and COVID-19 policy in effect) with an independent evaluator. The independent evaluators were four MA-level psychologists. Participants were evaluated using the M.I.N.I.-7.0.0, the HAM-D and the ISI. Patients who met the criteria and consented to participation in the ICBT programme received guidance on the platform and completed the pretreatment online questionnaires. They then received a short, introductory phone call (4–8 minutes) from their therapist and began the ICBT programme. After each module, patients completed a battery of questionnaires including the alliance and attachment measures. Additionally, patients answered weekly online questionnaires about their symptoms (PHQ-9; Kroenke & Spitzer, 2002, and RRS; Treynor et al., 2003). This is the first published analysis of the study.

Data analytic plan

In order to examine outliers in the data, we calculated the skewness and kurtosis as well as visually examined the histograms of scores at each timepoint.

We calculated the effect sizes (Cohen's *d*) for the main study variables, pre and post treatment by calculating the difference between the estimated marginal means at pre and post, and then divided the difference by the estimated standard deviation that was computed by multiplying the standard error of the pre and post slope by the square root of the degrees of freedom. Statistical analyses were performed using the software R Version 3.6.1 (R Core Team, 2013) with $\alpha = 0.05$. The first purpose of this study was to examine changes in depression and insomnia symptoms during ICBT for depression. Reliable and significant change index was calculated for the PHQ-9 (using Clark et al., 2018). Reliable change criteria in PHQ-9 scores were a decrease of at least six points and caseness threshold was defined as PHQ-9 ≤ 10 . Clinically significant and reliable change was defined as both reliable change and caseness. The second purpose was to examine the within-patient changes in anxious and avoidance attachment styles and within-patient changes in alliance with the programme and alliance with the therapist. Additionally, we wanted to examine whether alliance with the programme and alliance with the therapist were related to within-patient variability in depression symptoms in a time-lagged fashion during treatment.

Symptom data were collected weekly during treatment as part of weekly data monitoring, whereas alliance and attachment data were collected at pre and post treatment and after each module. The structure of the data did not allow for traditional cross-lagged panel analyses or DSEM and therefore multilevel-modelling (MLM) was determined to be the most suitable approach. We analysed the data using a MLM that adjusted for the hierarchy of clustering with nested random effects (Bryk & Raudenbush, 1992). This was done in order to accommodate the interdependence of the repeated observations within individuals and the multiple levels of data (i.e., time within patients). This dependency is accounted for by introducing individual-specific random effects and by modelling the covariance structure of the residuals. Models used a first-order autoregressive covariance structure (AR1) at the time level and random intercepts and slopes at the patient level and were modelled using repeated measures with restricted maximum likelihood estimation method (REML; Shin et al., 2017) without imputation, which is relatively robust to missing data. Linear, curvilinear and log-linear curves were examined and compared using maximum likelihood estimation (ML); linear models had the best model fit. Analyses were conducted using the R package “nlme” version 3.1 (Pinheiro et al., 2016).

In order to examine change over time, we ran a simple model, for all main variables. All variables were expected to change over time, where the slopes represent average improvement in relationship per module during therapy.

Next, to determine temporal precedence of alliance with the symptoms and vice versa we used different timepoints of the dataset. The alliance measures (i.e., I-PEARp and I-PEARt) were administered after each module, but the depression measure (i.e., PHQ-9) was administered weekly. Using these timepoints, we conducted separate, directional lagged models in which the depression weekly measure (i.e., PHQ-9) completed approximately one week (average 7 days; range 5–12 days) before the assessment of the alliance scores was selected. For the reverse direction, we conducted models in which the alliance scores predicted later (average of 7 days) depression symptoms.

Following Wang and Maxwell (2015), person-mean centring of the time-varying predictors was used. In addition, the factor of time in the model was not controlled in the lagged models because time is an integral part of the therapy process; therefore, detrending (controlling for the effect of time) could overcorrect the within-person association and mask the effects of interest, particularly in a time-lagged model (see Wang & Maxwell, 2015).

We also examined whether alliance and attachment predicted dropout from therapy and adherence. Dropout was examined via logistic regressions using I-PEAR of the two first measures and of ECR at pre-treatment level entered as predictors. Adherence was examined via linear regression for the same time-points of alliance and attachment as for dropouts.

Results

Data integrity and missingness

For the pre-post interviewer ratings (HAM-D and ISI), there were 67 out of a potential 78 data points (86%) for each measure. In the weekly data for the PHQ, there were expected 624 (16 weeks* 39 participants) datapoints, but in reality, there were 638 datapoints. This was due to the fact that some patients took longer than the expected 16 weeks. Overall, the range of PHQ datapoints ranged from 2 to 36 per person. There were 19 patients who did not complete 16 PHQs. Overall, of the potential weekly PHQs, approximately 76% were completed over the first 16 weeks. In terms of the module-level data, there were 39 patients who should have completed up to 6 modules (234 total datapoints per measure). Of these, 116 (approximately 49%) of the datapoints were completed for the I-PEAR and 110 (47%) for the ECR. Note that this was partially due to the fact that most patients did not complete the questionnaires after the last module. In addition, these proportions are relative to full completion of treatment for all patients, and that all modules were assigned to each patient. Given that the insomnia module was optional and patients dropped out, the expected proportion of completed data is within the range we found.

Treatment effects

Table I presents means and standard deviations at pre- and post-treatment for all variables, and Table II presents the results of the change over time in depression symptom and insomnia. ICBT was effective in reducing depression and insomnia symptoms according to within group effect sizes. Effect sizes for independent evaluator for depression symptoms and insomnia were HAM-D = 1.34 [95% CI = 0.85, 1.92] and ISI = 0.86 [95% CI = 0.36, 1.37] (see Figures 1 and 2), and for self-report measures were: PHQ-9 = 1.32 [95% CI = 0.80, 1.85] and BDI = 1.62 [95% CI = 1.07, 2.19], and RRS = 0.68 [95% CI = 0.2, 1.19].

In terms of weekly change, on average clients displayed a significant reduction of .28 points on the

Table I. Means and standard deviations of pre and post treatment for all variables.

Pre treatment			Post treatment		
Variable	Mean	SD	Mean	SD	Cohen's <i>D</i> [95% CI]
HAM-D-IE	19.6	4.11	11.80	7.15	1.34 [0.85, 1.92]
ISI-IE	12.4	4.95	7.41	6.66	0.86 [0.36, 1.37]
PHQ-9-SR	12.32	4.66	6.06	4.79	1.32 [0.80, 1.85]
BDI-II-SR	30.7	8.62	15.10	10.6	1.62 [1.07, 2.19]
RRS-SR	26.5	6.20	21.00	9.77	0.68 [0.20, 1.19]
ECR-Anx	3.82	1.50	3.64	1.49	0.12 [0.00, 0.60]
ECR-Avoid	4.68	1.11	4.06	1.33	0.51 [0.02, 1.0]

Notes: *SD*: standard deviation; *CI*: confidence intervals, *HAMD-IE*: Hamilton Rating Scale for Depression-Independent Evaluation (Hamilton, 1967), *ISI-IE*: Insomnia Severity Index-Independent Evaluation (Bastien et al., 2001), *PHQ-9-SR*: Patients Health Questionnaire-9 items-Self Report (Kroenke & Spitzer, 2002), *RRS-SR*: Ruminative Response Scale-Self Report (Treynor et al., 2003), *BDI-II-SR*: Beck Depression Inventory-Self Report (Beck et al., 1996), *ECR avoidant/anxious* = Experiences in Close Relationships scale-Self Report (short version of 12 items; Brennan et al., 1998). *N* = 39.

PHQ-9 for every week in the treatment programme ((596) = -5.85, $p < .0001$). Weekly reduction on the RRS was 0.30 points ((596) = -5.19, $p < .0001$).

Reliable and significant change index was calculated for the PHQ-9 (using Clark et al., 2018). Reliable change criteria in PHQ-9 scores were a decrease of at least six points: 46% of patients (18 patients) met this criterion at post treatment, among them: 28% (11 patients) completed treatment, and 18% (7 patients) were dropouts who completed at least two modules. Caseness threshold was defined PHQ-9 ≤ 10 and included 46% (18 patients) among

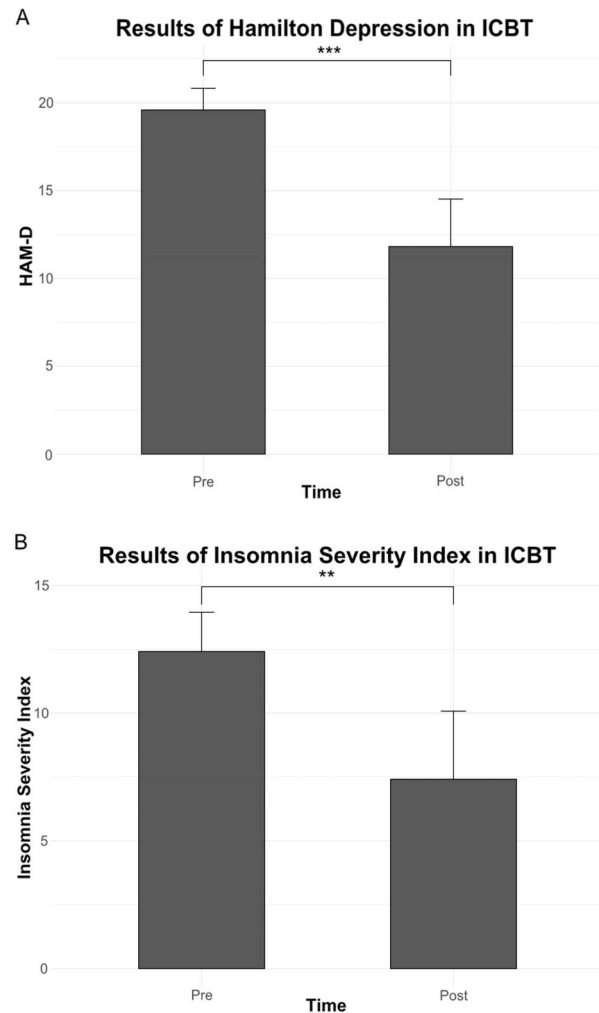


Figure 1. Change in Hamilton Depression and Insomnia from Pre-Post ICBT for Depression. *HAMD*: Hamilton Rating Scale for Depression-21 items, Independent Evaluation (Hamilton, 1967), *ISI*: Insomnia Severity Index, Independent Evaluation (Bastien et al., 2001). ** = significance level of $p < 0.01$, *** = significance level of $p < 0.001$.

Table II. Change in all variables: (a) depression symptoms and insomnia for independent evaluator and self-report (b) self-report of alliance and attachment.

Time	Variable	<i>b</i>	<i>SE</i>	<i>F</i>	<i>df</i>	<i>P</i>
Pre-Post	HAMD-IE	-7.87	1.33	-5.89	26	<.00001
Pre-Post	ISI-IE	-5.02	1.47	-3.42	26	=.0021
Pre-Post	BDI-II-SR	-17.08	2.94	-5.80	15	<.00001
Weekly	PHQ-9-SR	-0.28	0.05	-5.85	596	<.00001
Weekly	RRS-SR	0.30	0.06	-5.19	596	<.00001
Pre-post+ Post Module	ECR-avoidant	-0.12	0.04	-2.93	109	=.004
Pre-post+ Post Module	ECR-anxious	-0.02	0.04	-0.49	109	=.622
Post Module	Alliance with therapist	0.13	0.04	3.09	112	=.002
Post Module	Alliance with programme	0.13	0.04	3.70	60	<.00001

Notes: *b*: unstandardized coefficient; *SE*: standard error. *HAMD-IE*: Hamilton Rating Scale for Depression-Independent Evaluation (Hamilton, 1967), *ISI-IE*: Insomnia Severity Index Independent Evaluation (Bastien et al., 2001), *BDI-II-SR*: Beck Depression Inventory-Self Report (Beck et al., 1996), *PHQ-9-SR*: Patients Health Questionnaire-9 items (Kroenke & Spitzer, 2002), *RRS-SR*: Ruminative Response Scale (Treynor et al., 2003), *ECR avoidant/anxious* = Experiences in Close Relationships scale (short version of 12 items; Brennan et al., 1998), *Alliance with Therapist/Programme* = I-PEARt/p = Internet Patients Experience of Attunement related to Therapist/Programme (Zalaznik et al., 2021a) *N* = 39.

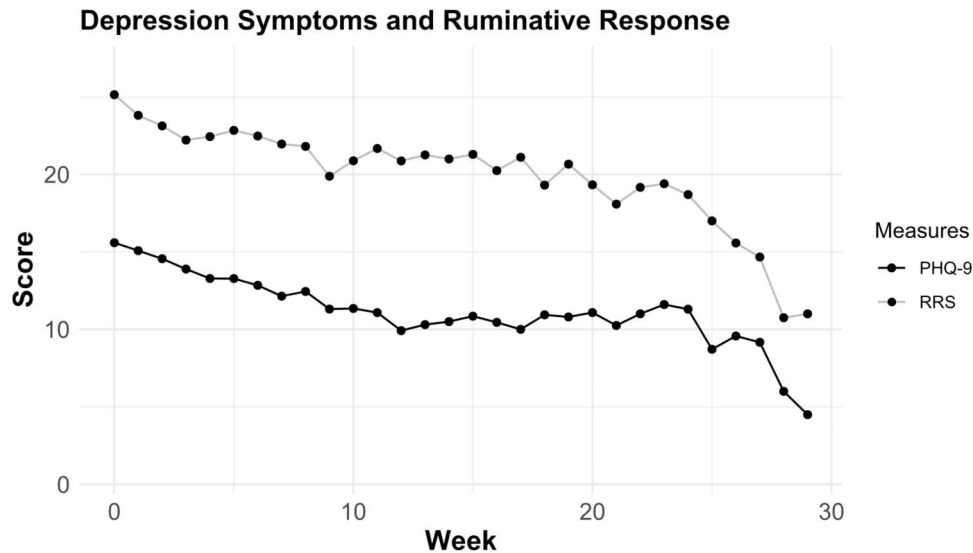


Figure 2. Weekly change in depression symptoms and ruminative response during ICBT for depression. PHQ-9 = Patients Health Questionnaire-9 items (Kroenke & Spitzer, 2002), RRS: Ruminative Response Scale (Treyner et al., 2003), $p < 0.001$.

them 26% (10 patients) who completed, and 20% (8 patients) who dropped out after at least two modules. Clinically significant and reliable change was defined as both reliable change and caseness. At the end of treatment 33% (13 patients) met these criteria, among them 20% (8 patients) who completed treatment and 13% (5 patients) who dropped out after completing at least two modules.

Dropout and adherence rates

Dropout was defined as patients who did not complete all five of the active modules (at least four for those who did not suffer from insomnia) and included 19 patients (49%). In terms of adherence: 69% (27 patients) completed at least 3 modules (psychoeducation, basic cognitive work and behavioural activation or further cognitive work) and 95% (37 patients) completed at least 2 modules (psychoeducation and basic cognitive work). Figure 3 presents the symptom course over time for dropouts (left side) and treatment completers (right side). One can see that most patients (dropouts and completers) experienced symptom improvement early in treatment, but completers continued to improve during treatment.

Interpersonal aspects outcomes: alliance and attachment

Alliance with the programme and with the therapist and depression symptoms. Means and standard deviations at pre and post treatment of working alliance with the programme and working alliance with the therapist are presented in Table I.

Changes over the course of the treatment were measured at post modules and are presented in Table II. Table III presents the results of depression symptoms of PHQ-9 predicting later change in alliance with the programme and alliance with the therapist and, on the right side of the table, alliance with the programme and alliance with the therapist predicting later change in depressive symptoms. Overall, both alliance with the therapist and alliance with the programme improved over time. Decrease in PHQ-9 during treatment predicted improvement in alliance with the therapist as well as improvement in alliance with the programme. Furthermore, improvement in alliance with the therapist predicted later reduction in symptoms but alliance with the programme did not.

Alliance with the programme and with the therapist predict adherence/dropout. We also examined whether alliance with the programme and alliance with the therapist predicted adherence and dropout. Regression analyses revealed that both early alliance with the therapist as well as early alliance with the programme predicted adherence ($r = .38$, $t(36) = 2.47$, $p = 0.018$; $r = .48$, $t(28) = 2.87$, $p = 0.007$, respectively). However, the alliance with the programme predicted somewhat better. As for dropout, logistic regression revealed that early alliance with the programme predicted dropout from ICBT ($b = -1.80$, $SE = 0.75$, $t(29) = -2.42$, $p = 0.01$), but early alliance with the therapist did not ($b = -1.09$, $SE = 0.63$, $t(37) = -1.72$, $p = 0.08$).

Changes in anxious and avoidant attachment style. Means and standard deviations at pre and post treatment of anxious and avoidant attachment

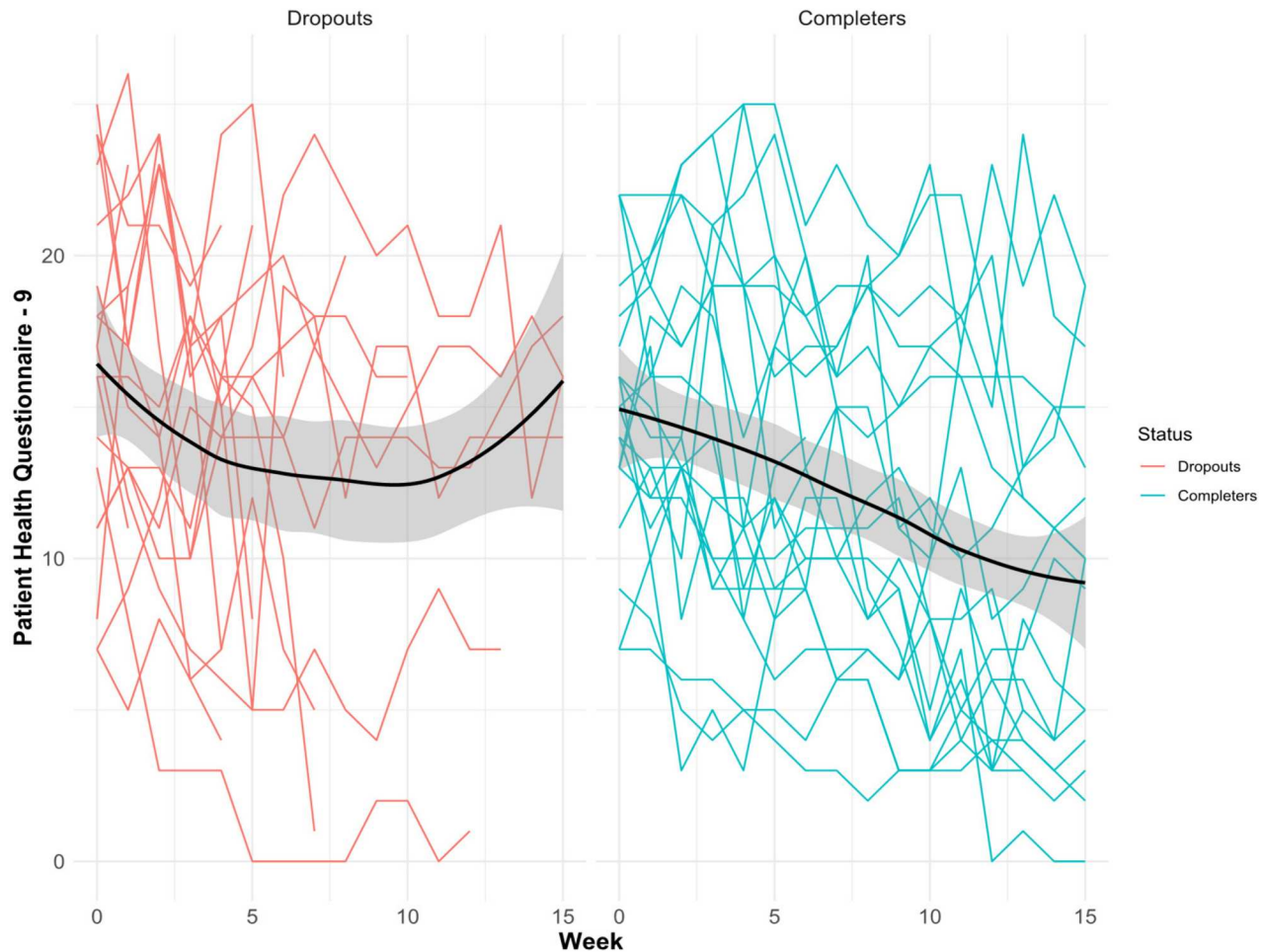


Figure 3. Symptom course of depression for individuals who dropped out of treatment and those who completed treatment. In the dropout group, there is an initial decrease in symptoms while the patients were still in treatment, which tapers off as they drop out. For completers, there is close to a linear change over time. This suggests there is a relation between the more that an individual continues to participate in ICBT and their depressive symptom improvement.

are presented in Table I. Changes over the course of the treatment were measured at post modules and are presented in Table II. Overall, avoidant attachment style significantly improved over time but the change in anxious attachment failed to reach statistical significance.

Anxious and avoidant attachment predict adherence/dropout. In order to examine whether anxious and avoidant attachment styles predicted adherence, we conducted separate linear regression models predicting the number of modules from the average level of pretreatment attachment level.

Table III. Depression symptoms and ruminative response predicting later change in alliances with the programme and alliance with the therapist and vice versa.

						Alliance predicting				
Symptoms predicting alliance						symbols				
Variable	B	SE	<i>F</i>	df	<i>P</i>	b	SE	<i>F</i>	df	<i>P</i>
PHQ-9 and Alliance with Therapist	−0.09	0.02	−3.85	56	<.0001	−2.33	0.81	−2.85	44	=.006
R RS and Alliance with Therapist	−0.09	0.02	−4.02	56	<.0001	−0.89	0.74	−1.20	44	=.234
P HQ-9 and Alliance with	−0.05	0.02	3.08	52	=.003	−1.20	0.96	−1.25	41	=.218
Programme										
R RS and Alliance with Programme	−0.05	0.02	−2.80	52	=.007	−1.37	1.07	−1.27	41	=.285

Notes: *b*: unstandardized coefficient; SE: standard error. PHQ-9-SR: Patients Health Questionnaire-9 items (Kroenke & Spitzer, 2002), RRS-SR: Ruminative Response Scale (Treynor et al., 2003), Alliance with Therapist/Programme = I-PEARt/p = Internet Patients Experience of Attunement related to Therapist/Programme (Zalaznik et al., 2021a), *N* = 39.

Results were not significant either for the ECR-anx ($r = -.20$, $t(77) = -1.82$, $p = 0.07$); nor for the ECR-avoid ($r = -.15$, $t(77) = -1.34$, $p = 0.18$). We also conducted logistic regression analyses to examine whether anxious and avoidant attachment styles predicted dropout. Results indicated that there was no relationship between attachment style and dropout (ECR-anx: $b = -1.44$, $SE = 0.18$, $z = -0.79$, $p = .43$; ECR-avoid: $b = 0.17$, $SE = 0.24$, $z = 0.72$, $p = .47$).

Discussion

The main aim of the current study was too focused on two interpersonal aspects in ICBT for depression: the alliance and attachment styles. Similar to studies of ICBT in other cultures and languages, results suggest that the Hebrew ICBT was effective for depression and insomnia: depression symptoms and insomnia improved significantly over time with large effect sizes for all variables (cf., Effects in Andersson et al., 2019). We examined the development of the alliance and its relation to treatment outcomes while using alliance scales that differentiated the aspects of the alliance in internet interventions from the alliance with the programme and the alliance with the therapist, emphasizing the unique contribution of each scale. In addition, we examined changes in anxious and avoidant attachment styles. Results indicated that both alliance with the therapist and alliance with the programme improved during treatment. A bidirectional, time-lagged relationship between alliance with the therapist and symptoms was revealed, showing that better alliance with the therapist predicted later lower depressive symptoms and lower symptoms of depression over time predicted better alliance (cf., Flückiger et al., 2020, for similar findings in FTF therapy). In terms of the alliance with the programme, lower depressive symptoms over time predicted higher alliance with the programme but not vice versa. This suggests that the alliance with the programme is likely influenced by how well an individual is responding to treatment. Furthermore, alliance with the programme predicted adherence and dropout, whereas the alliance with the therapist was a significant predictor of adherence (though results were marginal for dropout; $p = 0.08$). Dropout rates in internet interventions overall tend to be higher than face-to-face therapy (cf., Hans & Hiller, 2013; Sánchez-Meca et al., 2010; Van Ballegooijen et al., 2014), and the role of the therapist seems crucial, but the role of the programme has been less well investigated. The current study found the alliance with the programme and alliance with the therapist were both predictors of

adherence, and alliance with the programme was also a predictor of dropout. This finding suggests that both aspects of the alliance are important during ICBT. Moreover, as the alliance with the programme was a consistent predictor, the ICBT content (i.e., the programme) might motivate patients with depression to stay in therapy. Given that alliance with the programme was predicted by symptom reduction, it may be that symptom reduction is a predictor of retention in treatment. Indeed, results of the current study suggest that the reliable change was greater for those who completed treatment. However, we cannot determine the causal direction of this finding (i.e., was it that those who were improving stayed in treatment or staying in treatment led to greater improvement?).

Most research and theories of the alliance are focused on the alliance in psychotherapy, but the concept is applicable to any practice involving a person seeking help, and there is evidence to support the idea that face-to-face interaction is not needed to develop a collaborative relationship. In their recent paper *The alliance in mental health care: conceptualization, evidence and clinical applications*, Wampold and Flückiger (2023) based themselves on Bordin's conceptualization of alliance (1979) and described the alliance components that are involved in ICBT. In FTF CBT, the agreement on goal and task are explicitly discussed between the patient and the therapist. Although there is no face-to-face dialogue, in ICBT the patients are screened to ensure that their problem is consistent with the goals and tasks of the treatment. Additionally, the therapist, through asynchronous text messages, orients the patient to the tasks during the programme, describing the sequence of modules to be completed (Wampold & Flückiger, 2023). As for the bond, during the treatment process, the therapist provides personalized comments on patient progress, and answers to their questions. Wampold and Flückiger (2023) argued that a patients' belief that the treatment will be effective for the distress they are experiencing seems to be forged by multiple factors other than the clinician. Based on the current study, we suggest that the patients' belief that ICBT will be effective is forged by multiple factors that relate to the programme as well as to the therapist.

Indeed, although the alliance components exist in ICBT, the experience is very different than FTF psychotherapy. Here, we illustrate this by using a metaphor from the business world. There are small startup companies where the employee is directly in contact with the CEO, who gives them projects to do, and they agree on the goals and the tasks to accomplish this. In such settings, the employee

talks regularly to the CEO, and they develop a relationship related to the job. As the company grows, the CEO will likely add an intermediary position, a project manager, who directly works with a group of employees and is in contact regularly with them. The relationship between the employee and the immediate agent is very important and has a major effect on the employee's job. Still, they have an important relationship with the "super-agent," the CEO: the employee trusts the CEO to determine the vision, goals and superordinate tasks (which are mostly discussed with the immediate agent), and the CEO engages at significant occasions to give feedback directly to the employees. Even though the relationship between the employee and the CEO might be distal with short interactions, it gives the employee the motivation they need to keep moving and make progress, while continuing close contact with the direct agent. We think about ICBT as a startup company with immediate agent (manager) and CEO. In ICBT the patient is in contact regularly with the programme, which is the immediate agent of the treatment. As in the company, the relationship between the patient and the programme is very important and has a major effect on the treatment. Still, the role of the therapist is very significant in the ICBT process.

Indeed, in the current study, both the alliance with the programme and alliance the therapist play an important role in its effectiveness: both appear to drive dropout whereas only alliance with the therapist is related to symptom improvement. Our findings are in line with two meta-analyses of the association of the alliance and outcomes in internet intervention treatments that detected an effect comparable to FTF therapy (Flückiger et al., 2018; Kaiser et al., 2021). However, our findings were inconsistent with Zalaznik and her colleagues (2021) who found that symptom improvement (in ICBT for panic disorder) was predominantly related to alliance with the programme whereas adherence and dropout was related predominantly to the therapist.

In his recent essay, "responsiveness, the relationship, and the working alliance in psychotherapy," Hatcher (2022) described responsiveness as the essence of the working alliance in psychotherapy. Stiles and colleagues (1998) introduced the concept of responsiveness as a general principle of interpersonal interaction. They use the term responsiveness to describe behaviour that is affected by emerging context, and responsiveness implies a dynamic relationship between variables, involving bidirectional causation and feedback. Later, Reis (2014) identified responsiveness as a central feature across many different theoretical models of close relationships in psychotherapy. He views responsiveness as

partners (i.e., therapists) responding supportively to important needs, goals, values, or preferences of the patient. Via responsiveness, emotional well-being is enhanced, and effective emotion regulation is facilitated. We suggest that the experience of the alliance in ICBT with the programme and the therapist is responsive to patients in many ways. Patients feel that their needs are met: they set their goals by themselves and try to achieve them while the therapist and the programme provide direction during the process. Additionally, as in traditional protocols of CBT, ICBT works on various aspect of emotion regulation. Further, there is a space of flexible possibilities even within the framework of the programme which might be considered as "dynamic relationship between variables." First, most worksheets are interactive, and patients might choose their specific need and level and focus on it during the treatment. Moreover, they can go back and forth to accommodate their goal during the process. Second, whereas in FTF treatment the patient might feel that the session is too short/long, in ICBT the specific time that the patient spends on each module, as well as the place that the patient decides to do the treatment (i.e., at home, cafe, etc.) is very flexible according to patient's choice. Finally, whereas in most FTF treatment contact with the therapist is limited to the once-a-week session, in ICBT the patient can write to the therapist in flexible time and receive answers usually within 24–48 hours. It is likely that these aspects of the responsiveness likely increased alliance during treatment.

Results indicated that avoidant attachment style scores improved significantly during ICBT for depression, whereas anxious attachment failed to improve significantly. To the best of our knowledge, this is the first study to examine changes in attachment during ICBT for depression. Though there is no standard clinical cutoff for attachment scores, the post treatment anxious attachment was similar to a non-clinical sample of 3086 in Israel (Midgam project, 2015; $mean = 3.68$ ($SD = 1.30$) vs. $mean = 3.64$ ($SD = 1.49$) at post treatment for ICBT depression; see Zalaznik et al., 2021b). Therefore, the finding that anxious attachment did not significantly change might be due to a floor effect. Nevertheless, it might be that in FTF CBT, when the therapist is physically present during therapy, anxious attachment could improve further. Interestingly, the current findings of the depression sample present different patterns than those shown in a study of ICBT for panic disorder (Zalaznik et al., 2021b). In the panic sample, anxious attachment was higher than the normal population and improved during treatment whereas avoidant attachment was similar to the non-clinical sample. Although

anxious attachment (i.e., seeking for approval, hyper-arousal) is consistently associated with anxiety (e.g., Esbjørn et al., 2012), the findings regarding anxious and avoidant attachment and depression are mixed (e.g., Reis & Grenyer, 2002; Spence et al., 2020) and more research is needed to clarify this issue in psychotherapy in general and in ICBT in particular.

In line with previous FTF studies (Levy et al., 2018; Strauss et al., 2018) and ICBT for panic disorder (Zalaznik et al., 2021b) pretreatment level of anxious and avoidant attachment style did not predict dropout or adherence in ICBT. We conclude that attachment is likely not a predictor of dropout in either FTF therapy including CBT or in ICBT. However, this is only the second study addressing this issue in ICBT, and further research is warranted.

The finding that avoidant attachment style can improve during ICBT for depression, even though the focus of the treatment is not on interpersonal relationships and the involvement of the therapist is limited, supports our theory that the contribution of the emotional and cognitive components of attachment can vary in any psychotherapy, including ICBT. The emotional component involves being cared for and understood by the therapist, and the cognitive component includes the belief in the competence of the therapist to administer an effective treatment. These two components also exist in ICBT and are related to the unique properties of both therapist and programme during ICBT. We propose that, for the first component, tailored feedback provided by the therapist fosters a sense of care and understanding. Additionally, patient engagement with programme content, including relatable patient examples, fosters validation and comprehension of their symptoms. For the second component, the ICBT therapist offers guidance on interventions, feedback on worksheets, and overall progress. This cultivates the patient's confidence in the therapist's competence, reinforced by adherence to a well-defined protocol. The evidence-based nature of the ICBT programme further enhances patient confidence in its efficacy. However, research in this area is still in its initial stages. Future studies should explore changes in attachment styles across a broader spectrum of ICBT programmes (e.g., different disorders) and diverse internet interventions (e.g., guided vs. unguided) to enhance our understanding of this concept.

The rates of dropout for the current study were 49%, which is within the upper range described by Schmidt et al. (2019: 0%–75%). Notably, our definition for dropout was more conservative than many previous studies, which could have led to the increased rates (cf., Strauss et al., 2022).

Indeed, guided self-help internet interventions such as ICBT require considerable self-discipline and motivation throughout treatment, which can be particularly challenging for depressed patients. In terms of adherence, 69% completed at least 3 modules (psychoeducation, basic cognitive work and behavioural activation or further cognitive work) and 95% completed at least 2 modules (psychoeducation and basic cognitive work). As illustrated in Figure 3, the longer patients stay in ICBT the better their improvement in depression symptoms. Given enhanced treatment effects for completers, exploring possible predictors of dropout (e.g., Edmonds et al., 2018) and developing methods to enhance adherence are important for future implementation of ICBT (e.g., Pihlaja et al., 2018).

The current study has some limitations. First, the sample size was modest. Post-hoc power calculations using G*Power (Faul et al., 2009) determined that we had sufficient power ($1-\beta > .9$) to detect effect sizes of both within group changes (effect size $f = .27$) and also within group effects of repeated measures (effect size of $f = .17$) in of our longitudinal analyses. The latter is a reasonable estimate of the lower limit of power in the HLM models we used. This was true for a range of estimated correlations between variables. Future studies should attempt to replicate these findings on larger samples. Second, this study was an open trial without a control group, which prevents the determination of how specific the findings are to internet-based treatments for depression. Moreover, without a waitlist control group, we cannot rule out alternative interpretations of regression to the mean or spontaneous improvement for all measures that improved. However, the depression outcomes were in line with previous studies of CBT and ICBT for depression disorder (Cuijpers et al., 2021). Furthermore, nonrandom samples such as the one used here may more reflect the general population of patients, who may be reluctant to participate in research or be randomized to control conditions. Third, whereas the findings indicate a significant improvement in avoidant attachment style, it seems that even after the improvement, the average avoidant attachment at the end of treatment was still high compared to the general population. Third, given that we did not randomize patients to unguided ICBT vs. guided ICBT, we were unable to determine the role of alliance with the programme without the therapist facilitating and helping the process. Future studies should examine this question in a randomized study, especially given our intriguing findings regarding outcome and dropout (cf., Bur et al., 2022). Fourth, the measures of alliance and attachment

have the risk of self-report biases; future studies should utilize additional implicit or independent methods to capture alliances and attachment during ICBT interventions. However, this risk is lower for the depression and insomnia findings, given that independent evaluations were administered. Finally, although we attempted to collect follow-up data at 3, 6, and 12 months, we were unable to acquire a sufficient sample size to justify reporting the results. Future studies should ensure infrastructure to conduct systematic follow-up with all participants.

To conclude, the current study emphasized the importance of examining aspects of interpersonal relationship in internet interventions. The experience of the working alliance with the therapist and with the programme is distinct, and each of them is established during the process of ICBT, and improves over time. These alliances were related to different treatment outcomes and therefore both aspects of the alliance are highly important during ICBT. Moreover, even with the limited role of the therapist, therapist-guided ICBT has the potential to facilitate improvement in attachment styles via the emotional and cognitive components of ICBT.

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