

**What is Important for the Sustained Implementation of Evidence-Based Brief  
Psychotherapy Interventions in Psychiatric Care? A Quantitative Evaluation of a Real-  
World Programme.**

Lars H. Lindholm<sup>a,b,\*</sup>, Antti Koivukangas<sup>a,b</sup>, Antero Lassila<sup>a</sup>, Olli Kampman<sup>a,b</sup>

Author Note

<sup>a</sup>Department of Psychiatry; South Ostrobothnia Hospital District; Seinäjoki; Finland.

<sup>b</sup>University of Tampere; Faculty of Medicine and Life Sciences; Tampere; Finland.

\*Corresponding author is Lars H. Lindholm

E-mail addresses of all authors:

[lars.lindholm@fimnet.fi](mailto:lars.lindholm@fimnet.fi) (L.H. Lindholm),

[antti.koivukangas@epsh.fi](mailto:antti.koivukangas@epsh.fi) (A. Koivukangas),

[antero.lassila@epshp.fi](mailto:antero.lassila@epshp.fi) (A. Lassila),

[olli.kampman@staff.uta.fi](mailto:olli.kampman@staff.uta.fi) (O. Kampman).

Word count:

5279 words

## **Abstract**

**Purpose:** Behavioural activation and motivational interviewing, both evidence-based treatments (EBTs), were implemented in secondary psychiatric care. This longitudinal evaluation of a real-world programme focused on the penetration of EBT adoption and its associations with therapist-related and perceived intervention-related variables. The implementation plan was also compared to sub-processes of Normalization Process Theory.

**Material and Methods:** Six participating units employed 72 therapists regularly and they comprise the target group. Due to staff turnover, a total of 84 therapists were trained stepwise. Three survey points (q1, q2, q3) were set for a four-year cycle beginning a year after the initial training and completed 4-5 months after closing patient recruitment. The implementation plan included two workshop days, one for each EBT, and subsequent case consultation groups and other more general strategies.

**Results:** Fifty-seven (68%) of programme-trained therapists responded to one or more of three questionnaires. The self-reported penetration covers about a third of the target group a few months after the completion of the programme. Therapists' favourable perceptions of the EBTs regarding relative advantage, compatibility and complexity were associated with their sustained adoption. Therapists' background factors (e.g. work experience) and positive adoption intention at q1 did not predict the actual adoption of the EBTs at q3. No specific sustainment strategies were included in the implementation plan.

**Conclusion:** Brief but multi-faceted training with subsequent case consultations promoted the adoption of EBTs in a real-world setting. Adding specific sustainment strategies to the

implementation plan is proposed to ensure the long-term survival of the implementation outcomes.

**Keywords:** Brief psychotherapy, Evidence-based practice, Mental healthcare, Programme evaluation, Sustained implementation.

## Introduction

Implementing evidence-based treatments (EBTs) in real-world health care settings and conducting their evaluations are both complex processes addressing open or changing systems (1–3). Implementation programmes entail solutions that are feasible and effective in achieving sustainable outcomes (4–7). Drawing on appropriate theories and frameworks such as Normalization Process Theory (NPT) and the Conceptual Framework of Implementation Outcomes facilitates balancing the process evaluation between scientific rigour and relevance (3,8,9). This serves to ensure applicability in informing future programmes.

NPT introduces three sub-processes – implementation, embedding and integration – through which an innovation, like an EBT, is put into practice, routinized and sustained over time among staff in an organization (3). All different actions, perceptions of and changes in attitudes pertaining to the EBT, its implementation and delivery fall into these three sub-processes. The Conceptual Framework of Implementation Outcomes defines several possible implementation outcomes for evaluation (9). The penetration and sustainability of an EBT among the target group are relevant measures when a programme is launched to achieve maximal outreach and permanent adoption of the EBT.

Factors related to staff, the EBT, the organization and the programme affect attitudes and changes in the target group as a programme progresses. These, in turn, have an impact on the sustainability and scaling up of implementation outcomes after the initial introduction of the programme (2,6,10–12). The staff's positive attitude towards a recently introduced EBT has been found to be a variable predicting its future sustainability (11). However, healthcare professionals' initial enthusiasm towards novel EBTs has been shown to decline as programmes proceed, which challenges the programmes' pursuit of the sustainable adoption of EBTs (11–14).

The best-proven EBT related features promoting sustainable adoption are relative advantage, usefulness or compatibility, and ease of use or complexity as perceived by the staff (see the Info box for definitions for terms) (2,9,10,15). The concepts of usefulness and compatibility also take into account the organizational viewpoint, namely the interaction between the organization and the EBT, referred to as the innovation-system fit (Info box) (9,14,16–18).

Ample evidence is available from earlier implementation studies in mental health care settings that training involving both active and passive learning strategies is superior in supporting the implementation of EBTs (6,13,19). Also, case consultations have been shown to be important in ensuring that adequate skills are acquired in delivering the EBTs introduced (13,20). Actual implementation outcomes arise from complex interactions between the programme, its target group and the organization involved (21).

The Ostrobothnia Depression Study (ODS) related Implementation Programme (ODS-I) was a regional real-world implementation programme for two EBTs, behavioural activation (BA) and motivational interviewing (MI), with therapists in secondary psychiatric care as a target group. There is within health care a call for naturalistic longitudinal evaluations of the success of real-world implementation programmes (22,23). Accumulating information on the actual impacts of the possible predictors of success will help the planning of future programmes. In spite of evidence that some of the therapists could implement some therapeutic techniques effectively after brief training (6), there remains a need to learn more about how much effort invested in training would be sufficient or optimal in various real-world conditions (23).

The ODS-I was intended to achieve maximal penetration of BA and MI among the target group. The present study, the first part of the overall evaluation of the ODS-I, was intended to evaluate the quantitative reach of the programme and test certain possible

explanatory factors. The following research questions were set: 1) how did the therapists' views on the usefulness of BA and MI change over the course of their implementation programme, 2) what extent of penetration was achieved by the implementation plan applied among the participating units a few months after the termination of programme support and 3) how was the penetration associated with therapist-related and perceived intervention-related variables? In addition, the implementation plan was categorized according to the NPT sub-processes.

## **Materials and Methods**

The ODS-I was conducted within secondary psychiatric care in the Finnish region of South-Ostrobothnia as a regional programme related to a nationwide plan for improving mental health care and substance abuse services (24). A local overall aim was to initiate a process to standardize the uneven practices of assessing and treating non-psychotic patients. The treatment of depressive patients with possible comorbid anxiety and substance abuse disorders was chosen as a benchmarking patient group due to its substantial size (25,26). The ODS-I was targeted to increase delivery of BA and MI. All together, approximately 1,000 patients with depression as the main diagnosis are treated annually in these units.

Six psychiatric units of the South Ostrobothnia Hospital District participated in the ODS-I. Five of them were outpatient units, and one was an 18-bed acute inpatient ward. The catchment area population was 200,000. The participating units employed 72 therapists regularly and they as a group (not individually) comprised the target group. The target group was unstable due to staff turnover during the programme (2009-2013). The target group was invited to participate in the ODS-I and respond to the implementation study questionnaires. Enrolment in the ODS-I did not signify automatic enrolment in the ODS-I implementation

study. The therapists were informed verbally about the implementation study, its voluntary nature, anonymity and that responding or not to the questionnaires would not have any effect on their status as employees. The therapists were not asked to provide written consent.

The realization of the ODS-I relied on the organization's in-house human resources and expertise without external funding or other resources. Assigning the programme executives from among the internal staff to ODS-I was also hypothesized to ensure that the programme would be consonant with the organizational focus, which, in turn, has been shown to facilitate innovation adoption (2,27). BA for the treatment of depression and MI for the treatment of comorbid substance abuse were selected as the objects for implementation as they were assessed to have a good innovation-system fit (28,29). Due to staff turnover, altogether 84 ODS-I-enrolled therapists were trained in BA and MI during the time period from September 2009 to April 2012 (Supplementary Figure 1 in Supplement 1). The programme ended at the end of 2013 with the closing of patient recruitment for the clinical study.

The BA treatment was based on a semi-structured format including the following methods: functional analysis, trigger-response avoidance pattern and strategies for change in routine regulation (30), and it was realized as an individual intervention. The distribution of sessions in the sample was  $2.0 \pm 5.0$  (md±IQR) sessions. The structure of MI treatment was individualized according to the Stages of Change Model developed by Miller and Rollnick (31). The distribution of sessions in the sample was  $4.0 \pm 3.0$  (md±IQR) sessions. All other appropriate treatment modalities available, e.g. drug treatment, could be offered to the patient according to needs identified. No experimental treatments were used. The protocol of the clinical research is presented in more detail at ClinicalTrials.gov (Identifier NCT02520271) (32). The outcomes of the clinical study have been reported elsewhere (33).

[Insert Table 1 here]

ODS-I was managed and supported by the administrative staff of the South Ostrobothnia Hospital District. According to the policy activities that constitute research in the South Ostrobothnia Hospital District, ODS-I and the related implementation study met the criteria for operational improvement activities exempt from ethics review. The data is available on request from the following authors, LHL or OK.

### ***Implementation Plan and Programme Executives***

The implementation plan included two training workshop days, one for each EBT, and subsequent case consultation groups and other more general strategies, which are presented in more detail in Table 2. The case consultation groups met after the workshops about once a month for a four-year period until the completion of the programme. The therapists were free to decide to participate the workshops or not. Attending the subsequent case consultation groups and other programme activities were optional.

The programme executives comprised three people, all in-house personnel: a psychiatrist merited in academic work and training, a licenced psychologist merited in training and a psychiatric nurse experienced in clinical work. The psychiatrist and psychologist were both also registered psychotherapists in cognitive behavioural therapy. The executives were responsible for carrying out all operational tasks incorporated in the implementation plan and for collaborating with the participating units and therapists in case of possibly emerging issues. The psychiatrist served as a trainer in collaboration with the psychologist and as a case consultant with the nurse. He also compiled the self-study material.



[Insert Table 2 here]

### ***Setting and Sample***

The ODS-I-enrolled therapists were invited to respond to the implementation study questionnaires. Three survey points (q1, q2, q3) were set to obtain longitudinal data. The first two questionnaires were administered in refresher seminars: q1 one year after the initial training and q2 a year after q1. The final questionnaire, q3, came three years after q2 (i.e. 4-5 months after the programme closed) and was administered at a normal weekly meeting of each unit. Fifty-seven (68%) of the 84 programme-trained therapists responded to one or more of three questionnaires and comprise the present study sample. The flow chart for three survey points of data collection and actualized survey intervals due to the stepwise enrolment of the therapists are presented in Supplementary Figure 1 and Supplementary Table 1 in Supplement 1. The therapists were predominantly female. Most of them had considerable experience; 63% of them had more than ten years in experience and only 6% not more than two years.

### ***Instruments and Terminology***

[Insert Info box here]

Identical questionnaires were administered at q1 and q2 comprising all measures described below except the Intervention Characteristics Scale (ICS) and the Using Activity Index (UAI). For the final survey at q3, ICS and UAI were added and the questions on therapist-related factors were omitted (as this information was gathered at q1 and q2).

### *Therapists' Background Factors*

Therapists' background factors comprised self-reported level of professional education, work experience in years, information on being a registered psychotherapist or not, activity in using previously learned interventions, and perceived need for new training in treating patients with depression and/or substance abuse.

The question on level of professional education had three response options as the target group comprised representatives of these groups: a) vocational college/practical psychiatric nurse, b) university of applied sciences (UAS)/registered psychiatric nurse and c) university level/licenced psychologist. Besides professional specific tasks, they all served as therapists and treated all patient groups. The question on the length of work experience had four options: <2, 2-5, 5-10 and >10 years.

The response options to the question on being a registered psychotherapist or not was two-dimensional: "yes (training completed or over half-way)" or "no". The term 'registered psychotherapist' in Finland refers primarily to a health care professional with officially approved structured additional training in some psychotherapy methodology, e.g. cognitive behavioural therapy, lasting at least three to four years after which that title may be used.

The questions on activity in using previously learned interventions, and perceived need for new training in treating patients with depression and substance abuse had a 6-point Likert-type scale ranging from "never" to "extremely often". The expression 'previously learned interventions' refers to the fact that in Finland professionals employed in psychiatric care usually acquire a variety of additional training in various psychotherapy techniques or interventions during their careers. The duration of such training may vary from some hours to some years.

### *Usefulness Scale*

The usefulness scale was constructed specifically for the evaluation of the ODS-I and it was used to assess the therapists' overall experience of the EBTs. The usefulness scale consists of seven items eliciting the responder's self-assessment of the following subjects: level of proficiency in each EBT adopted (items 1 and 2), own anticipation of frequency of using the EBTs in the future (item 3) and impact of application of EBTs on a set of common factors in psychotherapy (items 4–7).

'Common factors in psychotherapy' refer to the elements of the treatment that are shared between different methodologies despite their different background theories (34). The four common factors relevant in the present study were management of the therapeutic process, meeting of the patient's needs (enriched toolbox), providing empathy and nurturing the hope of a patient (34–36).

### *Adoption Intention*

Adoption intention was assessed with a question, which was also included in the Usefulness scale, on the respondent's anticipation of own future use of BA and/or MI. Responses were on a 6-point Likert-type scale ranging from "never" to "extremely often".

### *Intervention Characteristics Scale*

The ICS consists of three constructs: relative advantage, perceived ease of use and compatibility, which all are recognized as significant in the Consolidated Framework for

Implementation Research (10). The ICS was adopted and revised from the study by Chin and Gopal for the final data collection. The ICS and its factor loadings are presented in Supplementary Table 2 in Supplement 2.

### *Use Activity Index*

The Use Activity Index (UAI) was calculated for each intervention as follows: the sum score of two items, namely frequency of use of given intervention and perceived level of routinization of that intervention on a 6-point Likert scale, was multiplied by the score of the number of patients treated with that intervention during the last three months (Supplementary Table 3 in Supplement 3). Due to the small number of respondents in q3 and eight of these having zero ratings in number of recently treated patients, we dichotomized this index to active and inactive therapist groups. The use of the ICS as a surrogate variable to the UAI is discussed in Supplement 3 under Methodological Consideration.

### *Analysis Methods*

#### *Statistical Methods*

Chi-square tests were used for comparisons in survey participation between the therapists' professional education, work experience, activity in using interventions learned earlier, perceived need for new training and proportion of registered psychotherapists.

The reliability of the ICS items was tested by calculating Cronbach's alpha. To analyse the discriminant validity of the 12 ICS items for BA and MI, factor analysis using a two-factor rotated solution (Varimax) with generalized least squares extraction was

performed. For the Usefulness scale, Cronbach's alpha in q1 was 0.869 (37), in q2 alpha = 0.756 and q3 alpha = 0.738.

Paired samples t-tests with 95% confidence interval (CI) were used in comparisons between q1 and q3, and between q2 and q3 usefulness scale total scores with data from therapists responding to both questionnaires. Independent samples t-tests (95 % CI) were used in comparisons of the usefulness scale (five items; items 1 and 2 omitted from subgroup analyses since they were focused on adoption of BA and MI) and ICS scores between active and inactive users of BA or MI.

Spearman's correlation coefficients ( $r$ ) were calculated for BA and MI UAI and for the usefulness scale and ICS total scores. Pearson's correlations were calculated for UAI and ICS. A therapist inactive regarding either BA or MI was defined as one making no use of the respective EBT during the last three preceding months. Other therapists were defined as active. The normality of the distributions for the usefulness scale and the ICS were tested with Q-Q plots showing normal distributions.

General linear univariate models were used to predict the perceived favourable intervention characteristics of MI and BA at q3. In these models the ICS total score for MI or BA (q3) was used as the dependent variable while therapist's background information (work experience, activity in using previously learned interventions and perceived need for new training) and adoption intention (q1) as independent variables.

The level of statistical significance was set at  $p < 0.05$ . All calculations were performed with SPSS statistical software package (version 22, SPSS Inc.) and with Power and Sample Size Calculator (38).

In the power calculations for the usefulness scale with the present sample of 30 repeated responses and type I error probability of 0.05 a true difference of 2.8 points in the mean response with the power of 0.8 was detected. In comparison between groups of active

and inactive therapists, with a total of 33 responses and type I error probability of 0.05, a true difference of 1.8 points in the mean response with the power of 0.8 was detected.

### *Qualitative Method*

The ODS-I implementation plan was analysed by categorizing the strategies incorporated in the plan according to three NPT sub-processes: implementation, embedding and integration. The categorization was based on how each strategy was appraised to meet the general description of each sub-process (for more detail, see Table 2).

### **Results**

Thirty-three therapists out of the study sample (n=57) completed questionnaire at q3, resulting in a response rate of 58% at the final survey point. In comparisons with survey participations no significant differences were found between the therapists' professional education (university or UAS/vocational college;  $\chi^2=1.62$ ;  $df=2$ ;  $p=0.45$ ), work experience in years (at most ten/more than ten years;  $\chi^2=0.80$ ;  $df=2$ ;  $p=0.67$ ) activity in using interventions learned earlier (at most sometimes/at least quite often;  $\chi^2=0.28$ ;  $df=2$ ;  $p=0.60$ ), perceived need for new training (at most sometimes/at least quite often;  $\chi^2=0.79$ ;  $df=2$ ;  $p=0.37$ ) and proportion of registered psychotherapists (no/yes;  $\chi^2=2.34$ ;  $df=2$ ;  $p=0.31$ ). The following distributions (mean $\pm$ SD) in q1 were obtained for those responding to q3: activity in using interventions learned earlier (3.88 $\pm$ 1.45), perceived need for new training (3.88 $\pm$ 0.93) and adoption intention (3.88 $\pm$ 0.99).

### *Reliability of the Intervention Characteristics Scale*

The Cronbach's alpha for all 24 ICS items was 0.928; for 12 items of BA alpha = 0.954 and of MI alpha = 0.928. The factor analysis resulted in two specific factors, one for the 12 BA items and one for the 12 MI items (rotated factor loadings 0.70–0.91 for BA and 0.55–0.87 for MI; Supplementary Table 2 in Supplement 2).

### *Changes in Usefulness Over Time*

There were no significant differences between the usefulness scale total scores (mean±SD) in the q1 (n=33), q2 (n=30), or the q3 questionnaire (q1 vs. q3: 28.5±5.4 vs. 30.9±5.2;  $t=-1.61$ ,  $df=53$ ,  $p=0.11$ , 95% CI -5.3–0.6; q2 vs. q3: 28.7±4.3 vs. 30.9±5.2;  $t=-1.67$ ,  $df=50$ ,  $p=0.10$ , 95% CI -4.8–0.4, t-test).

### *Penetration and Sustainability of the Use of Interventions*

Of the 33 therapists who completed q3, 23 (40% of the study sample) were active and eight were inactive users of BA (excluding two questionnaires with missing information). Thus these 23 active BA-users indicate self-reported penetration of 32% among the target group (n=72). Of the active therapists, 17 (73.9%) reported having used BA with one or two patients and the remainder with at least three patients during the last three months. For MI, 25 (44 % of the study sample) therapists were active users and eight were inactive users. Thus these 25 MI-users indicate self-reported penetration of 34% among the target group (n=72). Of the active therapists, 12 (48.0%) reported having used MI with one or two patients and the remainder with at least three patients during the last three months.

### *Associations Between Sustained Use of the Interventions and Perceived Intervention*

#### *Characteristics*

Comparisons between active and inactive therapists in BA showed a total score of five usefulness scale items (items 1 and 2 omitted) (mean $\pm$ SD) 23.2 $\pm$ 4.1 for active therapists (n=23) and 18.9 $\pm$ 1.2 for inactive therapists (n=8) ( $t=-4.51$ ,  $df=29$ ,  $p<0.001$ , t-test). In the corresponding comparison of MI, the total scores were 23.2 $\pm$ 3.9 for active therapists (n=25) and 18.9 $\pm$ 1.5 for inactive therapists (n=8) ( $t=-4.61$ ,  $df=30$ ,  $p<0.001$ , t-test). The total ICS score between therapists who were active and inactive in either BA or MI was also compared. The difference was statistically significant for both comparisons: BA: active (n=23) 53.1 $\pm$ 10.1 vs. inactive (n=5) 40.2 $\pm$ 9.3 ( $t=-2.62$ ,  $df=26$ ,  $p=0.02$ , t-test) MI: active (n=25) 58.3 $\pm$ 8.3 vs. inactive (n=8) 49.5 $\pm$ 5.9 ( $t=-2.75$ ,  $df=31$ , t-test,  $p=0.01$ ). The higher scores on the Usefulness scale and ICS signify a more positive experience.

Correlations between the use of BA and MI and the usefulness scale and ICS total scores are presented in Table 3. Correlations between the use of BA and MI in q3 and ICS perceived attributes were significant ( $p=0.01$ ;  $n=23$  for BA and  $n=25$  for MI).

[Insert Table 3 here]

### *Associations Between Therapist-Related Variables and Perceived Intervention*

#### *Characteristics*

The general linear univariate models for BA and MI with ICS perceived attributes in q3 as dependent variables resulted in insignificant models ( $n=18$ ;  $p=0.75$ ,  $F=0.48$ ,  $df=4$ ,  $\eta p^2=0.13$  and  $p=0.80$ ,  $F=0.40$ ,  $df=4$ ,  $\eta p^2=0.11$ , respectively). None of the predictors (work



experience, activity in use of interventions learned earlier, perceived need for new training and anticipated future use of BA and MI at q1) showed a significant effect in either of the models.

### ***Analysis of the Implementation Plan***

The ODS-I implementation plan incorporated several strategies that fell into one or the other of two categories or NPT sub-processes: implementation or embedding. The analysis revealed that strategies for integrating the EBTs into the organizational structures had not been deployed. For more detail, see Table 2.

### **Discussion**

The self-reported penetration of about a third in using the BA and MI within the target group was achieved by the implementation plan applied in ODS-I surveyed a few months after the completion of the programme. Therapists' favourable perceptions of these two EBTs in terms of relative advantage, compatibility and complexity were associated with their sustained adoption. Therapist-related factors, including positive adoption intention even at the one-year stage of the programme proved to be non-significant predictors of sustained adoption. Strategies for integrating the EBTs into the organizational structures for sustaining and scaling up adoption activity after the end of the active programme phase were not included in the implementation plan.

The reliability of the Usefulness scale was acceptable at all three survey time points. The therapists' experiences of the general usefulness of BA or MI tended to improve consistently as the programme proceeded and continued after programme support had ended. However, the longitudinal changes in usefulness ratings did not reach statistical significance in this limited sample.

### ***Sustained Adoption and Penetration of the Use of BA and MI***

The penetration of adoption of BA and MI covers about a third of the target group. Accurate comparison with other studies is not feasible due to differences in settings and ways of reporting (22). However, despite this variation, it seems that the reach of adoption in ODS-I was somewhat less than in some previously reported programmes, e.g. a large system-wide implementation programme for EBTs targeted at post-traumatic disorder (22,23).

Regarding at least the BA, it is likely that the active therapists delivered it less fully (mostly with one or two patients during the preceding three months) than might be appropriate for their usual clientele. This interpretation is consistent with those of earlier studies (23,39).

The ODS-I implementation plan included various training modalities and reinforcing strategies, which have been widely acknowledged and connected to high-quality training in psychotherapy interventions (6,13,19). According to another meticulous study among community therapists, participation in case consultation groups was a specific prerequisite for acquiring adequate skills for the successful delivery of a CBT application after a one-day training workshop (13). In the context of the ODS-I, attending the case consultations were optional and therefore not a prerequisite for a completed training. It is therefore plausible that participation activity in the case consultation groups affected the reach of sustained adoption

of BA and MI in ODS-I, as a similar outcome was reported in a follow-up study on the abovementioned study on implementing a CBT application (40).

The ODS-I succeeded in supporting some of the therapists in introducing BA and MI. This corroborates earlier studies reporting that encouraging results can be obtained from very brief training interventions followed by case consultations (13,20). On the other hand, the ODS-I implementation plan had a strong emphasis on training and consulting the therapists. Strategies for ensuring sustainment and scaling up the implementation outcomes over time after the end of the programme were not included. This contrasts with NPT and other implementation theories or frameworks, e.g. Knowledge to Action Cycle, which both suggest the inclusion of means to ensure the long-term vitality of the implementation outcomes (3,41). Regarding accomplishing the sub-process of integrating the EBTs, ODS-I was dependent on the self-reliance of the participating units.

As the ODS-I pursued a sustainable change in the treatment practices prevailing in the organization, the leadership would have been a central organizational stakeholder group considered in the implementation plan (18,42,43). More than a decade ago, the slowdown of implementation of the Swedish Mental Health reform in one county was evaluated (44). The reform concerned major changes in the prevailing practices in the delivery of treatments. Its evaluation implied that the target staff groups were worried about the possible change in their professional position, which caused them to oppose the cultural change. The researcher recommended investing in careful communication with the main stakeholder groups on how they could preserve their professional identity during a change. This, in turn, is in connection with the organizational structures, such as the management system. Unless innovations are properly integrated into the organization's structures, they tend to fade over time (3,9,12,20,40,41,45). In the case of ODS-I, integration strategies would have required additional, specifically allocated resources right from the beginning. To avoid this kind of

pitfall in the future, several theory-based implementation models or frameworks have been advanced and become more readily available the past decade (46).

### ***Associations between Adoption and Intervention- and Therapist-related Factors***

The observed favourable experiences in terms of relative advantage, compatibility and complexity of BA and MI were associated with their sustained use. This finding concurs with firmly established evidence in the field of implementation science (2,10,11,47–49).

None of the therapist-related background factors (work experience, activity in using interventions learned previously and perceived need for new training) or anticipated future use of the new interventions at the one-year point were associated with ICS score at the final survey point, which is consistent with earlier findings (6,11). The present study could not, however, differentiate reliably between the attitudes of recently qualified and more experienced therapists, as most of them had at least ten years' work experience.

Need for new training and/or positive adoption intention reported at the early stage of the ODS-I was expected to reflect the likelihood of future uptake of the EBTs intended for the most common patient groups (43). However, this assumption proved incorrect. Initial enthusiasm usually shows a decline as a programme proceeds (11,12,40). Moreover, adoption intention has been shown to be a multifactorial concept, which alone is an insufficient predictor of sustained implementation of EBTs (11).

### ***Limitations***

The final survey of the present study was conducted four to five months after programme support had ended, but there remains a need for longitudinal studies lasting for

several years to better determine the fundamentals of programme sustainment (50,51). The primary aim was to gather data on the therapists' perceptions of the usefulness of the EBTs implemented and the extent of their application, so no pre-training assessment was used. It was therefore not possible to assess changes in the therapists' attitudes pre- and post-training. As the ICS was not yet in use at the one-year or mid-term survey points, it was not possible to analyse its predictive impact on the future use of the interventions.

The actual intervals between three questionnaires were subject to some variation in the study sample (Supplementary Table 1 in Supplement 1). This was due to a one-year delay in initiating ODS-I in one of the units engaged and to staff turnover in general. This variation may have resulted in differences in the length of time the interventions were in use before the completion of the questionnaires. Individual therapists cannot be later identified according to the length of their experience of using the interventions. The rate of penetration of the EBTs among the target group could only be calculated by drawing on the voluntarily given responses. The activity of the non-responding therapists remains unknown. They were interpreted as inactive only for purposes of calculating the best possible estimate of the penetrations of the EBTs. This was done to avoid positive bias but it may, in turn, cause some negative bias. The present data permit no assessment of fidelity in delivering the EBTs implemented, which has been shown to be one critical factor impacting patient outcomes (52). However, the clinical effectiveness study ODS recently showed that BA were beneficial in comparison with treatment-as-usual in regard to patient outcomes (33). It is also appropriate to note that there are several other factors, many of them complex or multidimensional, which are influential in implementation programmes but not controlled for in the present study. Such factors may relate, among others, to the therapists (e.g. the individual stage of change), context (e.g. differences between the units) and programme processes (e.g. planning the programme) (10).

The maximum response option for the number of patients a responding therapist had treated was "over five patients". This limited the sensitivity of the measure to any potentially significant variation at higher levels of adoption. The limited option, however, was important because it is hard to recall precise details of patient numbers without checking back.

The response rate for q3 was moderate, but somewhat lower than in previous implementation studies with a naturalistic and test–retest setting (12,53). The response rate prevented us from performing some intended longitudinal analyses, e.g. between the usefulness scores at q1 and activity of use at q3. Not all determinants affecting the response rate could be identified, but the lack of integration strategies, e.g. an engagement strategy for the team leaders, is one possible explanation, as it was also hypothesized that this may undermine the sustaining and scaling up of the implementation outcomes in general.

## **Conclusion and Practical Implications**

The ODS-I was a multi-faceted implementation programme that, despite limited resources, was able to promote the adoption of BA and MI in a real-world setting. Absence of strategies for integrating the implemented EBTs into the organizational structures potentially undermines the long-term survival of the implementation outcomes. A longitudinal approach in this naturalistic evaluation turned out to be a tricky but still valuable ambition. It pinpointed the crucial importance of paying a specific attention to tackling staff turnover as well as difficulties in recruiting therapists to respond to the surveys and nurturing their interest in applying the desired EBTs in their work.

The present findings suggest that the ODS-I can be seen as a pilot that after some improvements offers a feasible base for continuing with the implementation efforts. This study highlights two different levels where improvements could be achieved: the active

adopters and the organization. As activity likely implies motivation, it could be fruitful to collaborate specifically with the active adopters to further elaborate strategies to enhance their skills in the EBTs implemented. Attention to organizational structures is also vital in order to sustain and scale up the delivery of the implemented EBTs after the programme. The leadership is a key structure enacting organizational processes. Therefore, specific strategies for coaching team leaders to contribute a programme could be beneficial. Furthermore, opposing the detrimental effect of staff turnover requires organizational strategies that ensure that newcomers will be provided with training and clinical support in the desired EBTs also after a specific programme has ended.

The research on ODS-I will be continued with two studies, one applying mixed-methods and the other qualitative focus group interview. They will go more deeply into the organizational aspects and programme modalities and also into the programme processes in order to arrive at more precise practical proposals for a more refined programme.

### **Acknowledgments**

We thank all attendees involved in ODS-I and research nurses Susanna Ahola and Marja Koivumäki for their great contributions to this study. We also thank the South Ostrobothnia Hospital District research fund for supporting ODS-I.

### **Disclaimer**

The South Ostrobothnia Hospital District Research Fund supported the present evaluation study of ODS-I. The study sponsor had no role in the study design, data collection,

data analysis, interpretation of the data, or any other contribution. The authors declare that they have no competing interests.



## References

1. Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M. Developing and evaluating complex interventions: new guidance [Internet]. London; 2008. Available from: [www.mrc.ac.uk/complexinterventionsguidance](http://www.mrc.ac.uk/complexinterventionsguidance)
2. Greenhalgh T, Roberts G, MacFarlane F, Bate P, Kyriakidou O. Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations. *Milkbank Q*. 2004;82(4):581–629.
3. May C, Finch T. Implementing, embedding and integrating practices: an outline of Normalization Process Theory. *Sociology*. 2009;43(3):535–554.
4. Proctor E, Landsverk J, Aarons G, Chambers D, Glisson C, Mittman B. Implementation research in mental health services: An emerging science with conceptual, methodological, and training challenges. *Adm Policy Ment Heal Ment Heal Serv Res*. 2009;36(1):24–34.
5. Wolk CB, Marcus SC, Weersing VR, Hawley KM, Evans AC, Hurford MO, et al. Therapist- and Client-Level Predictors of Use of Therapy Techniques During Implementation in a Large Public Mental Health System. *Psychiatr Serv* [Internet]. 2016;67(16):appi.ps.2015000. Available from: <http://psychiatryonline.org/doi/10.1176/appi.ps.201500022>
6. Beidas RS, Kendall PC. Training therapists in evidence-based practice: A critical review of studies from a systems-contextual perspective. *Clin Psychol Sci Pract*. 2010;17(1):1–30.
7. Straus SE, Tetroe J, Graham ID. Knowledge Translation: What it is and what it isn't. In: Straus SE, Tetroe J, Graham ID, editors. *Knowledge Translation in Health Care*. 2nd ed. West Sussex, UK: John Wiley & Sons Ltd.; 2013. p. 3–13.

8. Geng EH, Peiris D, Kruk ME. Implementation science: Relevance in the real world without sacrificing rigor. *PLoS Med.* 2017;14(4):1–5.
9. Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, et al. Outcomes for implementation research: Conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Heal Ment Heal Serv Res.* 2011;38(2):65–76.
10. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. *Implement Sci.* 2009;4(50):40–55.
11. Godin G, Bélanger-Gravel A, Eccles M, Grimshaw J. Healthcare professionals' intentions and behaviours: A systematic review of studies based on social cognitive theories. *Implement Sci [Internet].* 2008;3(1):36. Available from: <http://www.implementationscience.com/content/3/1/36>
12. Ruzek JI, Eftekhari A, Crowley J, Kuhn E, Karlin BE, Rosen CS. Post-training Beliefs, Intentions, and Use of Prolonged Exposure Therapy by Clinicians in the Veterans Health Administration. *Adm Policy Ment Heal Ment Heal Serv Res [Internet].* Springer US; 2015; Available from: <http://link.springer.com/10.1007/s10488-015-0689-y>
13. Beidas RS, Edmunds JM, Marcus SC, Kendall PC. Training and Consultation to Promote Implementation of an Empirically Supported Treatment: A Randomized Trial. *Psychiatr Serv [Internet].* 2012;63(7):660–5. Available from: <http://psychiatryonline.org/doi/abs/10.1176/appi.ps.201100401>
14. Ringle VA, Read KL, Edmunds JM, Brodman DM, Kendall PC, Barg F, et al. Barriers to and Facilitators in the Implementation of Cognitive-Behavioral Therapy for Youth Anxiety in the Community. *Psychiatr Serv [Internet].* 2015;66(9):938–45. Available from: <http://psychiatryonline.org/doi/10.1176/appi.ps.201400134>
15. Chin WW, Gopal A. Adoption Intention in GSS: Relative Importance of Beliefs. Data

- Base Adv. 1995;26(2–3):42–64.
16. Cook JM, Thompson R, Schnurr PP. Perceived Characteristics of Intervention Scale: Development and Psychometric Properties. *Assessment* [Internet]. 2015;22(6):704–14. Available from: <http://asm.sagepub.com/cgi/content/abstract/1073191114561254v1>
  17. Rahm AK, Boggs JM, Martin C, Price DW, Beck A, Backer TE, et al. Facilitators and Barriers to Implementing Screening, Brief Intervention, and Referral to Treatment (SBIRT) in Primary Care in Integrated Health Care Settings. *Subst Abus* [Internet]. 2015;36(3):281–8. Available from: <http://www.tandfonline.com/doi/full/10.1080/08897077.2014.951140>
  18. Sayer NA, Rosen CS, Bernardy NC, Cook JM, Orazem RJ, Chard KM, et al. Context Matters: Team and Organizational Factors Associated with Reach of Evidence-Based Psychotherapies for PTSD in the Veterans Health Administration. *Adm Policy Ment Heal Ment Heal Serv Res*. Springer US; 2017;44(6):904–18.
  19. Herschell AD, Kolko DJ, Baumann BL, Davis AC. The role of therapist training in the implementation of psychosocial treatments: A review and critique with recommendations. *Clin Psychol Rev* [Internet]. 2010;30(4):448–66. Available from: <http://www.sciencedirect.com/science/article/pii/S0272735810000401>
  20. Stirman SW, Pontoski K, Creed T, Xhezo R, Evans AC, Beck AT, et al. A Non-randomized Comparison of Strategies for Consultation in a Community-Academic Training Program to Implement an Evidence-Based Psychotherapy. *Adm Policy Ment Heal Ment Heal Serv Res* [Internet]. 2017;44(1):55–66. Available from: <https://doi.org/10.1007/s10488-015-0700-7>
  21. May CR, Johnson M, Finch T. Implementation, context and complexity. *Implement Sci* [Internet]. *Implementation Science*; 2016;11(1):1–12. Available from: <http://dx.doi.org/10.1186/s13012-016-0506-3>

22. Stirman S, Kimberly J. The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. *Implement Sci* [Internet]. 2012;7(1):17. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/22417162><http://www.biomedcentral.com/content/pdf/1748-5908-7-17.pdf>
23. Rosen CS, Matthieu MM, Wiltsey Stirman S, Cook JM, Landes S, Bernardy NC, et al. A Review of Studies on the System-Wide Implementation of Evidence-Based Psychotherapies for Posttraumatic Stress Disorder in the Veterans Health Administration. *Adm Policy Ment Heal Ment Heal Serv Res*. Springer US; 2016;43(6):957–77.
24. Work group of Ministry of Social Affairs and Health of Finland. Plan for Mental Health and Substance Abuse Work. PROPOSALS FOR DEVELOPMENT OF MENTAL HEALTH AND SUBSTANCE ABUSE WORK 2015 [Internet]. 2014. Available from: <http://urn.fi/URN:ISBN:978-952-00-3472-6>
25. Markkula N, Suvisaari J, Saarni SI, Pirkola S, Peña S, Saarni S, et al. Prevalence and correlates of major depressive disorder and dysthymia in an eleven-year follow-up – Results from the Finnish Health 2011 Survey. *J Affect Disord* [Internet]. Elsevier; 2017;173:16–7. Available from: <http://dx.doi.org/10.1016/j.jad.2014.10.015>
26. Wittchen HU, Jacobi F, Rehm J, Gustavsson A, Svensson M, Jönsson B, et al. The size and burden of mental disorders and other disorders of the brain in Europe 2010. *Eur Neuropsychopharmacol* [Internet]. Elsevier B.V.; 2011;21(9):655–79. Available from: <http://dx.doi.org/10.1016/j.euroneuro.2011.07.018>
27. Hunter SB, Han B, Slaughter ME, Godley SH, Garner BR. Associations between implementation characteristics and evidence-based practice sustainment: a study of the Adolescent Community Reinforcement Approach. *Implement Sci* [Internet].

- Implementation Science; 2015;10(1):173. Available from:  
<http://www.implementationscience.com/content/10/1/173>
28. Cuijpers P, van Straten A, Warmerdam L. Behavioral activation treatments of depression: A meta-analysis. *Clin Psychol Rev.* 2007;27(3):318–26.
  29. Lundahl B, Burke BL. The effectiveness and applicability of motivational interviewing: A practice- friendly review of four meta-analyses. *J Clin Psychol.* 2009;65(11):1232–45.
  30. Jacobson NS, Martell CR, Dimidjian S. Behavioral Activation Treatment for Depression: Returning to Contextual Roots. *Clin Psychol Sci Pract [Internet].* 2001;8(3):255–404. Available from: <http://doi.wiley.com/10.1093/clipsy.8.3.255>
  31. Miller RW, Rollnic S. *Motivational interviewing: Preparing people for change.* 2nd ed. New York: Guilford Press cop.; 2001. 428 p.
  32. ClinicalTrials.gov Identifier NCT02520271. Ostrobothnia Depression Study (ODS). A Naturalistic Follow-up Study on Depression and Related Substance Use Disorders. [Internet]. Available from: <https://clinicaltrials.gov/ct2/show/NCT02520271>
  33. Luoto KE, Lindholm LH, Paavonen V, Koivukangas A, Lassila A, Leinonen E. Behavioral activation versus treatment as usual in naturalistic sample of psychiatric patients with depressive symptoms : a benchmark controlled trial. *BMC Psychiatry.* *BMC Psychiatry;* 2018;18:1–7.
  34. Lambert MJ. Early response in psychotherapy: Further evidence for the importance of common factors rather than “placebo effects.” *J Clin Psychol.* 2005;61(7):855–69.
  35. Baldwin SA, Wampold BE, Imel ZE. Untangling the alliance-outcome correlation: exploring the relative importance of therapist and patient variability in the alliance. *J Consult Clin Psychol.* 2007;75(6):842–52.
  36. Snyder CR. Conceptualizing, Measuring, and Nurturing Hope. *Journal of Counseling*

- & Development. 1995. p. 355–60.
37. Lindholm LH, Koivukangas A, Lassila A, Kampman O. Early assessment of implementing evidence-based brief therapy interventions among secondary service psychiatric therapists. *Eval Program Plann* [Internet]. 2015;52:182–8. Available from: <http://www.scopus.com/inward/record.url?eid=2-s2.0-84935030297&partnerID=tZOtx3y1>
  38. Dupont WD, Plummer WD. Power and sample size calculations: A review and computer program. *Control Clin Trials* [Internet]. 1990;11(2):116–28. Available from: <http://www.sciencedirect.com/science/article/pii/019724569090005M>
  39. Shiner B, D’Avolio LW, Nguyen TM, Zayed MH, Young-Xu Y, Desai RA, et al. Measuring use of evidence based psychotherapy for posttraumatic stress disorder. *Adm Policy Ment Heal Ment Heal Serv Res*. 2013;40(4):311–8.
  40. Edmunds JM, Read KL, Ringle VA, Brodman DM, Kendall PC, Beidas RS. Sustaining clinician penetration, attitudes and knowledge in cognitive-behavioral therapy for youth anxiety. *Implement Sci* [Internet]. 2014;9(1):89. Available from: <https://doi.org/10.1186/s13012-014-0089-9>
  41. Davies B, Edwards N. Sustaining knowledge use. In: Straus SE, Tetroe J, Graham ID, editors. *Knowledge Translation in Health Care*. 2nd ed. West Sussex, UK: John Wiley & Sons Ltd.; 2013. p. 237–48.
  42. Taylor CB, Chang VY. Issues in the dissemination of cognitive - Behavior therapy. *Nord J Psychiatry*. 2008;62(SUPPL. 47):37–44.
  43. Moser BLL, Deluca NL, Bond GR, Rollins AL. Implementing Evidence-Based Psychosocial Practices : Lessons Learned from Statewide Implementation of Two Practices. *CNS Spectr*. 2004;9(12):926–36.
  44. Aberg J. Communication problems in Swedish Mental Health reform. *Nord J*

- Psychiatry. 2005;59(6):522–7.
45. Karlin BE, Cross G. From the laboratory to the therapy room: National dissemination and implementation of evidence-based psychotherapies in the U.S. Department of Veterans Affairs Health Care System. *Am Psychol* [Internet]. 2014;69(1):19–33. Available from: <http://doi.apa.org/getdoi.cfm?doi=10.1037/a0033888>
  46. Nilsen P. Making sense of implementation theories, models and frameworks. *Implement Sci* [Internet]. 2015;10(1). Available from: <https://doi.org/10.1186/s13012-015-0242-0>
  47. Cook JM, Dinnen S, Coyne JC, Thompson R, Simiola V, Ruzek J, et al. Evaluation of an Implementation Model: A National Investigation of VA Residential Programs. *Adm Policy Ment Heal Ment Heal Serv Res*. 2015;42:147–56.
  48. Scott SD, Plotnikoff RC, Karunamuni N, Bize R, Rodgers W. Factors influencing the adoption of an innovation: An examination of the uptake of the Canadian Heart Health Kit (HHK). *Implement Sci* [Internet]. 2008;3(1):41. Available from: <http://implementationscience.biomedcentral.com/articles/10.1186/1748-5908-3-41>
  49. Rogers ME. *Diffusion of Innovations*. 5th ed. New York: Free Press; 2003.
  50. Cooper BR, Bumbarger BK, Moore JE. Sustaining evidence-based prevention programs: correlates in a large-scale dissemination initiative. *Prev Sci*. 2015;16(1):145–57.
  51. Stirman SW, Finley EP, Shields N, Cook J, Haine-Schlagel R, Burgess JF, et al. Improving and sustaining delivery of CPT for PTSD in mental health systems: A cluster randomized trial. *Implement Sci. Implementation Science*; 2017;12(1):1–11.
  52. Bond GR, Becker DR, Drake RE. Measurement of Fidelity of Implementation of Evidence-Based Practices: Case Example of the IPS Fidelity Scale. *Clin Psychol Sci Pract*. 2011;18(2):126–41.

53. Fluttert F, van Meijel B, Nijman H, Björkly S, Grypdonck M. Detached Concern of Forensic Mental Health Nurses in Therapeutic Relationships With Patients. The Application of the Early Recognition Method Related to Detached Concern. Arch Psychiatr Nurs [Internet]. Elsevier Inc.; 2010;24(4):266–74. Available from: <http://dx.doi.org/10.1016/j.apnu.2009.09.002>



| <b>Term or construct<br/>(Measured by)</b>  | <b>Definition</b>  |
|---|--|
| Organizational focus <sup>a</sup>   | The essential objectives and tasks that the organization exists to perform and the staff is responsible for performing.  |
| Innovation-system fit <sup>b</sup>  | The degree to which an innovation matches the organizational focus and other factors of an organization's functioning. The term 'innovation fit' has also been used <sup>a</sup> . |
| Adoption intention <sup>c</sup>   | The degree of the strength of an individual's intention to perform [ <i>the innovation</i> ].  |
| Sustained adoption <sup>d</sup> ,<br>programme sustainment<br>(UAI <sup>e</sup> )   | Persistence in maintaining [ <i>the innovation</i> ] as usual practice after the end of the programme support.   |
| Relative advantage <sup>c,f</sup><br>(ICS <sup>g</sup> )  | The degree to which [ <i>the innovation</i> ] is considered superior to existing or usual practices.   |
| Complexity, ease of use <sup>c,f</sup><br>(ICS <sup>g</sup> )   | Level of difficulty in understanding and using [ <i>the innovation</i> ]. The two terms represent opposite poles.  |
| Compatibility <sup>c,f</sup><br>(ICS <sup>g</sup> )   | Consistency of [ <i>the innovation</i> ] with existing values, experiences, needs and organizational focus of the adopter and system.  |
| <sup>a</sup> (Hunter, Han, Slaughter, Godley, & Garner, 2015); <sup>b</sup> (Greenhalg, Roberts, MacFarlane, Bate, & Kyriakidou, 2004); <sup>c</sup> (Chin & Gopal, 1995), <sup>d</sup> (Damschroder, Aron, Keith, Kirsh, Alexander, & Lowery, 2009); <sup>e</sup> Using activity scale; <sup>f</sup> (Cook, Thompson, & Schnurr, 2014); <sup>g</sup> Intervention characteristics scale. |  |

Info box. Definition for key terms or constructs.

Table 1. Distribution of participating therapists' professional education.

| <b>Professional role</b>     | Completed q1 <sup>a</sup>  | Completed q2 <sup>a</sup> | Completed q3 <sup>a</sup> |
|------------------------------|----------------------------|---------------------------|---------------------------|
| Licensed Psychologist        | 3<br>(6.7%)                | 3<br>(10.0%)              | 5<br>(15.2%)              |
| Registered psychiatric nurse | 32 <sup>b</sup><br>(71.1%) | 22<br>(73.3%)             | 24<br>(72.7%)             |
| Practical psychiatric nurse  | 10<br>(22.2%)              | 5<br>(16.7%)              | 4<br>(12.1%)              |
| All                          | 45<br>(100%)               | 30<br>(100%)              | 33<br>(100%)              |

<sup>a</sup>There were no differences in the distributions of education level by questionnaire (q1, q2 and q3).

<sup>b</sup>Includes two forms with missing information.

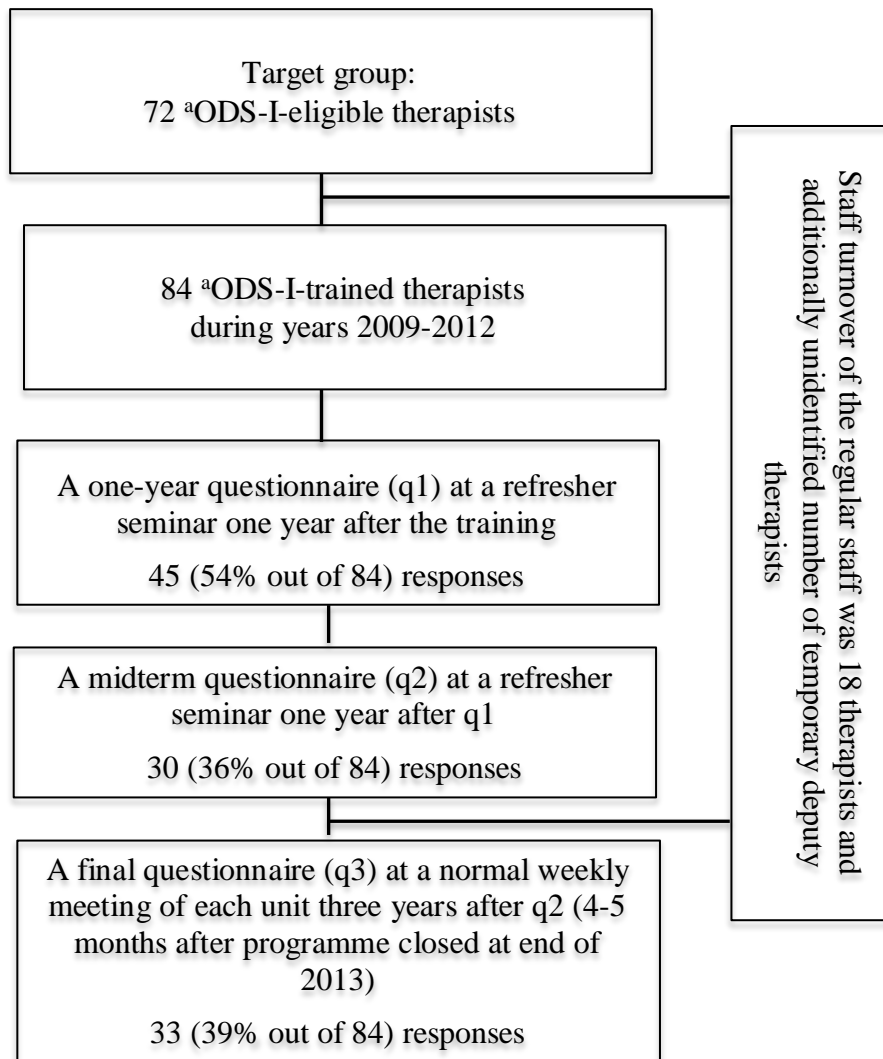
Table 2. Strategies used in the implementation plan of the Ostrobothnia Depression Study related Implementation Programme categorized according to the sub-processes of Normalization Process Theory for the sustainable introduction of new treatment practices in routine care (May and Finch, 2009).

| <b>NPT Sub-process</b> | <b>General description</b>   | <b>Strategies used in ODS</b>                        | <b>Description</b>  |
|------------------------|--|--|---|
| Implementation         | Social organization of bringing practices into action.   | Assigning the programme executives                   | The programme executives were nominated from among the internal staff. Their regular job descriptions were matched with the programme.  |
|                        |  | Initial invitation of units                          | The units to invite were selected by the head of administration. The units were free to decide on participation in ODS. Further, they were free to determine how many and who of their therapists would be trained. |
|                        |  | Training workshops                                   | Two one-day workshops in BA and MI, one for each, including lectures and supervised case simulations. Attending the workshops was the only prerequisite for a therapist to be deemed ODS-enrolled.                  |
|                        |  | Self-study material                                  | Written clinical instructions for MI and a semi-structured manual for BA. Training videos for rehearse made available on the employer's website.  |
| Embedding              | The processes through which practices do or do not become routinely incorporated in the everyday work of individuals and groups. | Selecting the evidence-based treatments to implement | The selection criteria were 1) a good innovation-system fit and 2) appropriate brief psychotherapies for the treatment of depression with possible comorbid anxiety and substance abuse disorders.                  |
|                        |  | Case consultations                                   | Once a month 2009-2014. Attendance was voluntary.   |
|                        |  | Research nurse's unit visits                         | Monthly unit visits to address practical issues of the programme.   |
|                        |  | Email bulletins                                      | Information sent about monthly: on the progress of the programme, answers to diverse clinical issues emerging and relevant supportive material.   |
| Integration            | The processes by which practices are reproduced and sustained among the social matrices of an organization.                      | Not applicable                                       |   |

Table 3. Correlations (r) between both behavioural activation (BA) and motivational interview (MI) Using Activity Index (UAI) and, respectively, their perceived attributes according to the Intervention Characteristics Scale (ICS) and the usefulness scale in the final survey.

|   |   | BA UAI | MI UAI  |
|---|---|--------|---------|
| Perceived ICS attributes of<br>BA (sum variable)        | r | 0.67*  | 0.28    |
|   | N | 23     | 25      |
| Perceived ICS attributes of<br>MI (sum variable)        | r | 0.39   | 0.60*   |
|   | N | 23     | 25      |
| Perceived usefulness scale of<br>BA & MI (sum variable) | r | 0.42** | 0.55*** |
|   | N | 20     | 22      |

\*P<0.001, \*\*P=0.067, \*\*\*P=0.008



<sup>a</sup>The Ostrobothnia Depression Study related Implementation Program (ODS-I)

Supplementary Figure 1. Flow chart of the training and data collection. Due to the relatively low participation rate in the refresher seminars the principal investigator collected the q3 responses during the regular weekly meeting at each unit engaged in the programme in order to obtain more comprehensive final stage data.

Supplementary Table 1. The time intervals between the survey points among the ODS<sup>a</sup>-trained therapists who responded to the surveys.

| <b>Time from q1 to q3 (years)</b> | <b>n</b> | <b>%</b> |
|-----------------------------------|----------|----------|
| 4                                 | 26       | 60.5     |
| 3                                 | 10       | 23.3     |
| 2                                 | 7        | 16.3     |
| total                             | 43       | 100      |

| <b>Time from q2 to q3 (years)</b> | <b>n</b> | <b>%</b> |
|-----------------------------------|----------|----------|
| 3                                 | 25       | 83.3     |
| 2                                 | 5        | 16.7     |
| Total                             | 30       | 100      |

<sup>a</sup>Ostrobothnia Depression Study

**Supplement 2**

Supplementary Table 2. Items and factor loadings of the revised Intervention Characteristics Scale: Two identical series of 12 questions were addressed separately for each intervention and this generated two distinct factors.

| Domain                | Item <sup>b</sup>  | Factor loadings <sup>c</sup> |                 |
|-----------------------|--|------------------------------|-----------------|
|                       |  | MI <sup>d</sup>              | BA <sup>d</sup> |
| Relative advantage    | 1. How useful do you find the [ <i>the intervention</i> ] in your work?  | 0.55                         | 0.84            |
|                       | 2. How effective do you find [ <i>the intervention</i> ] when used in your work?                                 | 0.66                         | 0.70            |
|                       | 3. How do you assess the influence of [ <i>the intervention</i> ] on the productivity and outcomes of your work? | 0.79                         | 0.82            |
|                       | 4. How do you assess the influence of [ <i>the intervention</i> ] on your ability to perform therapy?            | 0.81                         | 0.81            |
| Perceived ease of use | 5. How do you find the operational use of [ <i>the intervention</i> ]?   | 0.71                         | 0.91            |
|                       | 6. How adaptable do you find [ <i>the intervention</i> ] when treating different kinds of patients?              | 0.77                         | 0.83            |
|                       | 7. How did you find starting to operate with [ <i>the intervention</i> ]?  | 0.59                         | 0.83            |
|                       | 8. Was it easy to acquire the skills for performing [ <i>the intervention</i> ]?                                 | 0.81                         | 0.83            |
| Compatibility         | 9. Is using [ <i>the intervention</i> ] readily compatible with the work you are currently doing?                | 0.62                         | 0.82            |
|                       | 10. How do you find the applicability of [ <i>the intervention</i> ] in treating your most usual patients?       | 0.85                         | 0.85            |
|                       | 11. How does [ <i>the intervention</i> ] match your preferences regarding therapy?                               | 0.87                         | 0.78            |
|                       | 12. How does [ <i>the intervention</i> ] match you personal working style?                                       | 0.78                         | 0.74            |

<sup>a</sup>Adapted from Chin and Gopal (1995).

<sup>b</sup>Each item was revised to suit the purposes of the Ostrbothnia Depression Study.

<sup>c</sup>Significant when value is  $\geq 0.50$ .

<sup>d</sup>MI: motivational interview (factor 1); BA: behavioural activation (factor 2).

Note: A 6-point Likert scale was used to score each item, with the response options: (negative to positive poles) “Extremely poorly”, “quite poorly”, “modest poorly”, “modest well”, “quite well”, and “extremely well”. In addition, a separate neutral option (“does not have influence”) was used for questions 3 and 4.

**Supplement 3**

Supplementary Table 3. Using Activity Index was calculated by multiplying the sum score of items 2 and 3 by the score of item 1. If the response to item 1 was “No”, the respondent was regarded as inactive.

| Item <sup>a</sup>  | Response options   |
|--|--|
| 1. Have you used [ <i>the intervention</i> ] during the last 3 months? | <input type="checkbox"/> No → omit questions 2 and 3<br><input type="checkbox"/> Yes, with 1–2 patients<br><input type="checkbox"/> Yes, with 3–5 patients<br><input type="checkbox"/> Yes, with over 5 patients |
| 2. How often do you use [ <i>the intervention</i> ]?                   | <input type="checkbox"/> Less often than once per month<br><input type="checkbox"/> 1–3 times a month<br><input type="checkbox"/> About once a week<br><input type="checkbox"/> Several days a week              |
| 3. How do you feel you adopted [ <i>the intervention</i> ]?            | A 6-point Likert scale with response options of: “not at all”, “so-so”, “moderate good”, “nearly good”, “good”, and “extremely good”.  |

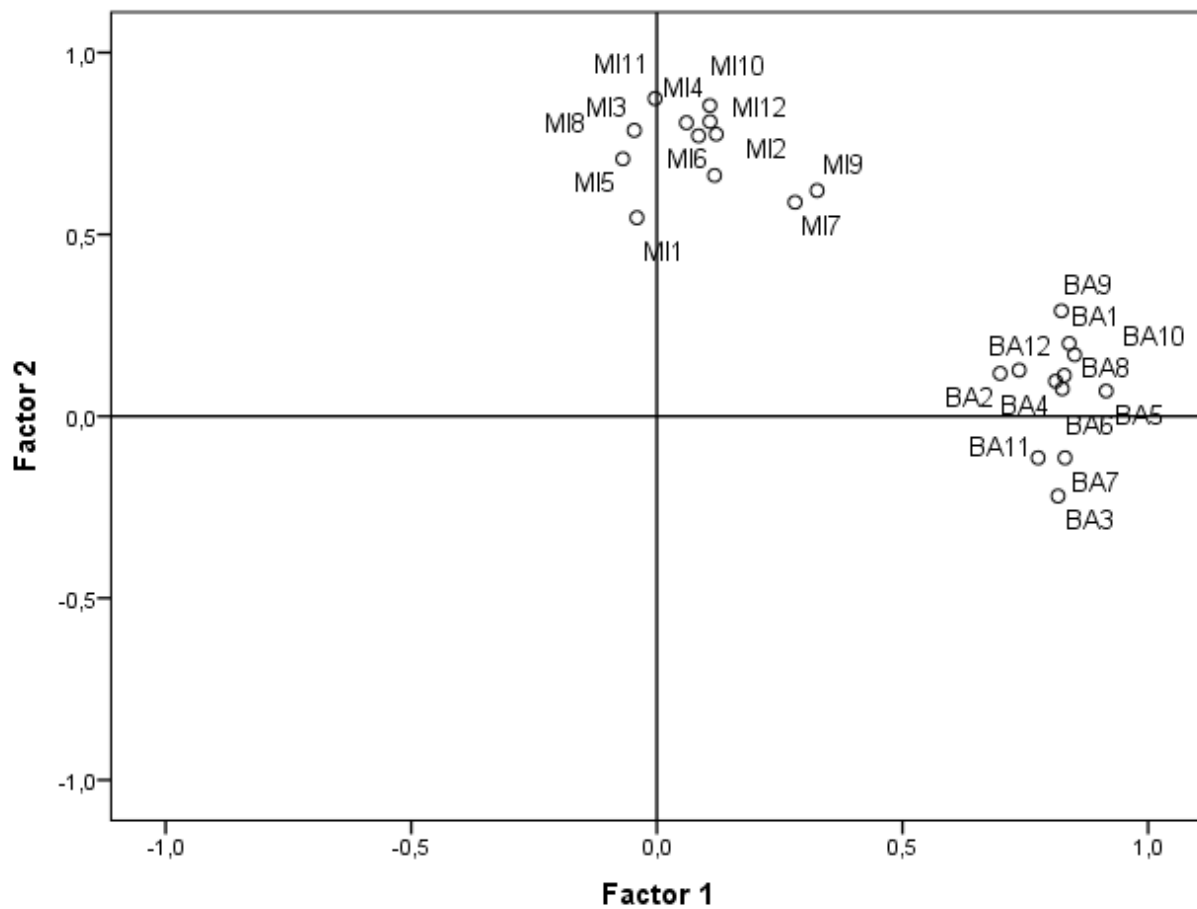
<sup>a</sup>Motivational interview and behavioural activation had separate question sets.

**Methodological Considerations**

As a part of the study, we validated the ICS to examine how the therapists perceived relative advantage, ease of use and compatibility of BA and MI separately. The reliability and factor structure of the ICS appeared to be satisfactory. The total score for the scale showed excellent internal consistency for each intervention, and the two resulting factors were subject-specific (Supplementary Figure 2).

For both interventions, the strong correlation between the UAI and perceived favourable intervention characteristics allowed us to use the ICS as a surrogate variable instead of the UAI. This was necessary because of the skewed distributions in the use of MI and BA. The ICS showed normality in distribution and appeared to be more reliable for analysis as a target variable in this relatively small sample.





Supplementary Figure 2. Factor plot for intervention characteristics scale. Question numbers refer to corresponding numbers in Supplementary Table 1. MI= motivational interview, BA=behavioural activation.

OK