Piloting Memory Specificity Training in Flemish Routine Clinical Practices using a Web-Based Self-Directed Training Protocol for Practitioners: Exploring Effectiveness, Fidelity and Feasibility.

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Declarations

Ethics approval and consent to participate

The study received institutional ethical approval of the Social and Societal Ethics Committee of the University of Leuven and all patients/users filled out and signed an Informed Consent form.

Consent for publication

Not applicable.

Availability of data and material

Data for effectiveness (memory specificity, depressive symptomatology, dose), fidelity (assessed by users and first author) and attitudes on feasibility by care providers and users are available via a view-only link for review:

https://osf.io/6fskj/?view_only=728d46adea724d7aa2ac764453b3297c

Competing interests

The following facts which may be considered as potential conflicts of interest. FR is one of the developers of the original in-group face-to-face MeST. KT, KM and FR are the developers of the Web-based computerized MeST (c-MeST). KM and FR additionally receive payments for training workshops and presentations related to MeST. We wish to confirm that there are no other known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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Authors' contributions

FR is the principal investigator for the study protocol. KM and FR generated the idea and designed the study. KM was responsible for the dissemination and implementation of MeST and the acquisition of data. KT made substantial contributions to the analysis and interpretation of data. KM drafted the manuscript. TB, KT and FR substantively revised it. All authors read and approved the final manuscript.

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Abstract

Background: Memory Specificity Training (MeST) is a cognitive training program targeting a transdiagnostic vulnerability factor: a reduced ability to recall specific autobiographical memories, called reduced Autobiographical Memory (rAMS). Due to the simplicity of this intervention and its foundation in basic science, training practitioners how to deliver MeST in Routine Clinical Practices might be a scalable and low-cost strategy. The current study explores if MeST can be disseminated and implemented using a Web-based self-directed training protocol for practitioners. **Methods:** We explored effectiveness, fidelity and feasibility of the training protocol; i.e., whether the protocol led to remediation of rAMS of 24 users (i.e. patients) in 5 settings using pre- and post- intervention measurements of memory specificity (effectiveness); whether trainers showed fidelity to the protocol by scoring recorded sessions and by checking with users (fidelity); how users experienced the training using a post-intervention measurement of attitudes, and how attitudes of care providers (i.e. psychiatrists, psychologists, therapists, nurses), including trainers, evolved throughout the implementation process (feasibility). **Results:** Implementing MeST using the training protocol led to an increase in memory specificity, trainers were able to deliver MeST with fidelity to the protocol, users appreciated the intervention, and attitudes of care providers were in general positive throughout implementation. **Conclusions:** The results of this explorative study indicate that MeST can be disseminated using a Web-based self-directed training protocol at low-cost. This result might also be generalizable to similar brief autobiographical training programs.

Trial registration: ISRCTN registry, IDISRCTN16178120, registered on June 11, 2019.

Retrospectively registered.

Keywords: Memory Specificity Training; Autobiographical Memory; Fidelity; Effectiveness;

Feasibility; Consolidated Framework for Implementation Research.

Purpose

As the research-to-practice gap is keeping patients from receiving evidence-based psychological treatments (Clark, 2018), more research is focusing on how to implement interventions in routine clinical practices (RCPs; Mchugh, Barlow, & Kathryn, 2010) and how to scale up the training of trainers (Fairburn & Patel, 2014). Parallel to these evolutions it is suggested that one route to increasing the efficacy of psychological treatments is to develop interventions that are personalized and that target risk factors (Craske, 2017). The current study combined the three approaches described above: we explored if a Web-based self-directed training protocol for trainers resulted in the effective implementation of a cognitive training program targeting one specific transdiagnostic vulnerability factor in RCPs in Belgium.

The cognitive training in question, *Memory Specificity Training* (MeST) (Raes, Williams, & Hermans, 2009), was designed to remediate a vulnerability factor: reduced autobiographical memory specificity (rAMS). rAMS is the tendency to recall personal events in a non-specific way. We consider rAMS a transdiagnostic vulnerability factor as it has been found in several forms of psychopathology such as unipolar depression (Farina, Barry, van Damme, van Hie, & Raes, 2019), bipolar disorder (Young, Bodurka, & Drevets, 2016), post-traumatic stress disorder (Ono, Devilly, & Shum, 2016), eating disorders (Dalglish et al., 2003) and schizophrenia (Barry, Del Rey, & Ricarte, 2019). A recent meta-analytic review supports the finding that rAMS predicts the course of depressive symptoms (Hallford, Rusanov, Yeow, & Barry, 2020, PREPRINT).

A recent meta-analysis and review (Barry, Sze, & Raes, 2019) indicated that MeST as a group training program is associated with substantial improvement in memory specificity and

depressive symptoms, but that the evidence is mixed regarding other cognitive processes associated with reduced specificity. MeST's effectiveness has also been examined in other populations such as people with posttraumatic stress disorder (Maxwell et al., 2016). For a theoretical overview of the link between remediating rAMS and as a result improving depressive symptoms, we refer to Williams et al (2007). We note that MeST could not be regarded as an Empirically Supported Treatment (Tolin & McKay, 2015) at the time of this study. Instead, MeST represents an *experimental* training program that can be used as an add-on intervention to care as usual.

The current study is the first to examine the training of practitioners in MeST in RCPs. We define RCPs as settings with less resources than those involved in research and with care providers with a variety of professional backgrounds, often a higher clinical workload and less expert supervision (Shafran et al., 2009). In a previous study (Martens, Barry, Takano, & Raes, 2019) the transportability of MeST for Belgian RCPs was examined by adapting MeST in a joint decision-making process for several RCPs. This process resulted in adaptations to the training protocol, such as the development of a version of the training that could be offered continuously so that users were able to join and stop the training whenever they wished to and in which dose could be tailored to the user. A comparison of pre- and post-intervention measurements of memory specificity indicated that although users received a lower dose of training than in more standardized previous examinations of MeST, *voltage drop* (Chambers, Glasgow, & Stange, 2013), the phenomenon in which interventions yield lower benefits in RCPs, did not occur. However, a transportability study (Martens, Barry, et al., 2019) implemented by training practitioners in-person and in an unstandardized way. Training practitioners via the internet

(Fairburn & Cooper, 2011) might offer a scalable method for disseminating the principles and practices of MeST to a wider cohort of care providers.

We note that the focus for the current study was of researchers involved in efficacy research, testing dissemination and implementation of an intervention derived from basic science to RCPs. For the current study design, the outcome measures that were chosen were inspired by the Consolidated Framework of Implementation Research (CFIR; Damschroder et al., 2009) and implementation outcomes as described by Proctor et al. (2011; see also Hayes & Hofmann, 2018), both illustrated in Figure 1.

Figure 1. Consolidated Framework for Implementation Research (Damschroder et al., 2009) and outcome measures as described by Proctor et al. (2011).

For each factor it is indicated if and how it is measured in the current study: ^a = assessed in questionnaire of attitudes of care providers; ^e = assessed by pre- and post- measurement of memory specificity and depressive symptoms; ^s = assessed by questionnaire of attitudes of users post-intervention; ^{fp} = assessed by questionnaire of fidelity of users post-intervention; ^{fc} = assessed by fidelity check of recorded sessions; ^d = assessed by tracking dose; ⁿ = not assessed.

Looking at the CFIR-framework, which offers an overarching typology to promote implementation theory development, the domain *Characteristics of the intervention* sums up the constructs in which we were primarily interested as intervention developers: *Intervention Source*, *Evidence Strength and Quality*, *Relative Advantage*, *Adaptability*, *Trialability*, *Complexity*, *Design Quality* and *Cost*. Exploring these constructs in an implementation study could generate useful information which could lead to adaptations to the protocol. The other four domains of the CFIR-framework (*Inner Setting*, *Outer Setting*, *Individuals involved* and the *Implementation Process*) are less under the influence of researchers involved in efficacy research, but nonetheless some of these factors were assessed as well. Compared to the constructs as described by Proctor et al. (2011), we assessed *Implementation*, *Service* and *Client* outcomes at both the level of the provider (i.e., care providers in RCPs: psychiatrists, psychologists, therapists, nurses), including trainers, and of the users. Figure 1 lists all factors of both frameworks (Damschroder et al., 2009; Proctor et al., 2011) and shows which factors were assessed with which measures in the present study.

These factors were clustered into three research questions exploring the quality of the implementation of MeST in RCPs. The first research question was if the implementation of MeST via the use of a Web-based self-directed training protocol would lead to a similar increase in memory specificity as in previous research, using pre- and post-intervention measurements of memory specificity. This research question concerned a *Service Outcome* – Effectiveness (Proctor et al., 2011). The second research question was if the use of the training protocol would lead to a correct delivery of MeST by the trainers. Fidelity to the protocol (an *Implementation outcome*; Proctor et al., 2011) was assessed by checking for crucial MeST behaviours using session recordings, and by use of the post-intervention questionnaire for users in which they

indicated which components of MeST they had received. The third research question was to explore if MeST would be feasible to implement as assessed by attitudes of care providers (psychiatrists, psychologists, therapists, nurses) throughout the implementation of MeST in RCPs, and by attitudes of users at post-intervention. This concerned a variety of factors, as illustrated in Figure 1.

Methods

Participating Settings and Users

In this study *users* refer to patients participating in MeST, *care providers* are all team members of the multidisciplinary teams in which MeST was implemented, *trainers* are the individuals of those teams who provided MeST after learning how to do so via the web-based self-directed training protocol. In communication with care providers we refer to users as patients (e.g. in questionnaires).

Twenty-three settings showed interest in implementing MeST, of which 11 RCPs provided at least a baseline assessment of attitudes by care providers. Attitudes were assessed at baseline by 149 care providers (psychiatrists, psychologists, therapists, nurses) across 11 settings; after the information on MeST was disseminated via the training protocol by 61 care providers (7 RCPs); and after one month of implementation by 49 care providers (of 4 RCPs). MeST was implemented (delivered to users) in five settings: three inpatient psychiatric settings, one inpatient ward of a general hospital and one outpatient private practice. The reasons why the six RCPs that showed interest in MeST eventually did not implement MeST, varied from lack of resources (staff and time), to unexpected change of staff, to a more complex study design than they expected (rather about the required outcome assessments than the protocol itself).

Pre- and post- intervention measurements of memory specificity of twenty-four users (18 women, 75%) were available. Users' ages ranged between 23 and 62 ($M = 43.35$, $SD = 11.74$) years. No diagnoses were provided by the RCPs, but RCPs were instructed to provide MeST to users showing rAMS and RCPs were informed about the evidence base of MeST at the time of the study, with most research focused on the treatment of people with depressive symptoms. Fidelity was scored for 11 session recordings (of 4 RCPs) by the first author and by 21 users (of 4 RCPs). Feasibility was scored by 21 users. Table 1 shows a description of all RCPs and the number of assessments of the different measures, including the type of RCP and timing of the assessment. Users in RCPs are described in Table 2.

Table 1

Description of Settings Involved

Setting	1	2	3	4	5	6	7	8	9	10	11	Total
Name	Alexianen Tienen	Vzw Sint Annendael Diest – Grauwzusters	Private Practice	Karus - Melle	Mariaziekenhuis Noord-Limburg	Sint-Jozef Pittem	De Keerkring - Mortsel	UZ Gent	Kortenbergh	CGG VAGG	PAAZ AZ Turnhout	
Inpatient and/or outpatient	Inpatient	In- and outpatient	Outpatient	Inpatient	Inpatient	Inpatient	Inpatient	Inpatient	Inpatient	Outpatient	Inpatient	
Timing	7/2017 – 10/2018	3/2017 – 12/2018	5/2017 – 6/2017	2/2017 – 12/2018	4/2016 – 12/2018	5/2017 – 01/2018	8/2017 – 1/2018	12/2015 - 09/2016	3/2016 – 6/2017	3/2016 – 6/2017	2/2017 – 12/2018	
<u>Attitudes</u>												
Pre Information	<i>n</i> = 9	<i>n</i> = 27	<i>n</i> = 1	<i>n</i> = 11	<i>n</i> = 21	<i>n</i> = 22	<i>n</i> = 7	<i>n</i> = 20	<i>n</i> = 20	<i>n</i> = 2	<i>n</i> = 9	149
Post Information	<i>n</i> = 7	<i>n</i> = 13	<i>n</i> = 1	/	<i>n</i> = 20	<i>n</i> = 14	/	<i>n</i> = 3	/	/	/	61
Post Implementation	<i>n</i> = 9	<i>n</i> = 14	/	<i>n</i> = 9	<i>n</i> = 17	/	/	/	/	/	/	49
<u>Fidelity</u>												
Sessions scored	<i>n</i> = 3	<i>n</i> = 2		<i>n</i> = 3	<i>n</i> = 3	/	/	/	/	/	/	11
Questionnaire Users ^a	<i>n</i> = 3	<i>n</i> = 5		<i>n</i> = 9	<i>n</i> = 4	/	/	/	/	/	/	21

^a This is the same questionnaire as used to measure feasibility by users.

Table 2

Description of Users of MeST

Setting ^a	1	2	3	4	5	Total
Users assessed	11	9	1	23	4	48
Eligible for Training	5	5	1	11	4	26
Drop out before post-intervention measurement	1	0	1	0	0	2
Pre- and post-measurements available	3	5	1	11	4	24
Female	3	5	0	6	4	18 (75%)
Age of users of which pre- and post-measurements are available <i>M (SD)</i>	31.00 (7.55)	49.60 (6.11)		44.64 (10.85)	41.25 (17.37)	43.35 (11.74)
Number of users for whom number of sessions is known	3	5		4	4	16
Minimum number of sessions	5	3		4	3	3
Maximum number of sessions	5	8		5	6	8
<i>M (SD)</i>	5	6.11 (2.17)		4.33 (.58)	4.75 (1.5)	5.38 (1.69)
Number of users for whom number of completed exercises is known				4	3	7
Minimum number of sessions				17	8	8
Maximum number of sessions				59	32	59
<i>M (SD)</i>				39.25 (18.01)	21.67 (12.34)	31.71 (17.36)

^a 1 = Alexianen Tienen; 2 = vzw Sint Annendael Diest - Grauwzusters; 3 = Private RCP; 4 = Karus - Melle; 5 = Mariaziekenhuis, Noord-Limburg

The platform – a Web-Based Self-Directed Training protocol.

The training protocol (which can be viewed online; Martens & Raes, 2019) included (a) general information on rAMS and MeST; (b) information on, and an overview of, the several steps of MeST from the users' perspective: a pre-intervention assessment, receiving an informed consent, psycho-education on memory problems in depression, sessions using specificity exercises, the STOP model and STOP-sessions aimed at noticing and tackling overgeneral thinking in everyday situations, a post-training assessment and a take home message and planning for the future; (c) information on the pre-intervention measurement of memory specificity: instructions and several versions of the AMT (see below for more information), including two videos on how to deliver the instructions of the AMT and on how to score answers; (d) instructions on how to measure depressive symptoms, including the PHQ-9 questionnaire (see below for more details); (e) instructions on how to provide the informed consent (including one instruction video) and to provide practical information on MeST; (f) instructions on how to deliver psycho-education on memory problems in depression (including an instruction video); (g) instructions on specificity exercises, including working materials of different specificity exercises; (h) general instructions for trainers of MeST, such as how to evaluate homework assignments (including an instruction video), how to instruct users to complete homework assignments and how to react to often occurring situations such as users retrieving specific but not personal memories; (i) information and working materials for delivering the STOP-model (including one instruction video); (j) instructions for the post-intervention assessment of memory specificity, depressive symptoms and feasibility; (k) general practical instructions, such as the ideal number of users and which working materials are necessary; and (l) a short manual on how to implement MeST based on several questions such as

‘which patients can be included in MeST?’, ‘When is it decided which patient can be included?’, ‘Who can deliver which part of MeST?’ and ‘Is the team sufficiently informed about MeST?’.

For this last question, the training protocol also includes a PowerPoint presentation to be delivered to the team prior to the start of MeST.

Memory Specificity Training (MeST)

Throughout the training protocol two versions of MeST are referred to: one *closed* version similar to the original MeST protocol (Raes et al., 2009) with a fixed set of 5 sessions (and thus *one* workbook for all users) and a slightly adapted *open* version in which users are able to join and stop MeST whenever they wish to and in which each user receives tailored homework exercises (and, thus, including several different working materials for different kinds of specificity exercises). This distinction is the result of a previous study on the transportability of MeST (Martens, Barry, et al., 2019). Both versions of the intervention are described in more detail in that paper, but the core mechanism (improving memory specificity by retrieving memories using cue words and adding detail by follow-up questions) and all components are similar for both versions: (a) a pre-measurement of memory specificity, (b) psycho-education on memory problems linked to rAMS, (c) completing specificity exercises in group, (d) homework assignments in between sessions, (e) discussing homework assignments in the following sessions, (f) psycho-education on noticing and tackling overgeneral thinking in everyday life using the STOP model and including STOP exercises, (g) a take home message, (h) a post-intervention measurement.

Procedure

Settings were first selected using a snowball procedure, as RCPs expressed interest to the first and fourth author in implementing MeST as a result of a previous study (Martens, Barry, et

al., 2019). However, in a second phase an e-mail inviting RCPs was sent by an umbrella organization for health care providers in Belgium¹, describing the study as an implementation study of an experimental add-on training derived from basic research, free of charge. The first author (KM) replied to e-mails and telephone conversations by care providers interested in the training protocol. The implementation process consisted of three phases. First, a questionnaire on attitudes of care providers was sent by e-mail. Second, upon receipt of the completed questionnaires the link of the training protocol was shared to the settings. Third, when settings were ready to start the training, a second questionnaire on attitudes was given and respondents were required to fill these out before the start of MeST. After this, settings received a login to the training protocol and could start the training based on the information in the training protocol. Implementation involved: (1) assessing memory specificity and secondary measures of possible users; (2) delivering MeST and recording session 2, 3 and 4; and (3) assessing memory specificity, secondary measures and providing the post-intervention measurement of fidelity and feasibility to users. After one month, a questionnaire assessing post-implementation attitudes of care providers was sent to the settings. Figure 2 shows the study design with the different measures in chronological order at three time points: before RCPs receive the login to the training protocol, after they received the login and did not start MeST, and after MeST was implemented.

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¹ We like to thank Ann Moens of Zorgnet-Icuro for helping to reach out to RCPs.

Figure 2. Study design with different measures (effectiveness, feasibility and fidelity) in chronological order. RCP = Routine Clinical Practice.

The protocol included the instruction to only include users who experienced rAMS, which was operationalized as a performance of recalling fewer than 70% specific memories relative to the total number of cue words in the AMT (in line with Martens, Barry, et al., 2019; Werner-Seidler et al., 2018). No other inclusion or exclusion criteria were instructed.

The study received institutional ethical approval of the Social and Societal Ethics Committee of the University of Leuven. All users filled out and signed an Informed Consent form, which was included in the training protocol.

Measures

Effectiveness.

Autobiographical Memory Specificity. The Web-based self-directed training protocol instructed trainers to measure Autobiographical Memory Specificity pre- and post- intervention using an oral version of the Autobiographical Memory Test (AMT; Williams & Broadbent, 1986). The instructions stated that users should be orally instructed to retrieve a specific memory for each of ten cue words (five positive, five negative) presented. The instructions included that

the retrieved memory needed to be specific, happened once, lasted shorter than a day, happened a week ago but did not have to be an important event. Within the instructions, after examples of specific and non-specific responses were given, a practice trial with three cue words with feedback should have taken place. Throughout the test non-specific and unclear answers were followed by prompts until users succeeded in retrieving a specific answer or until one minute passed. To control for an effect of the cue words, trainers were instructed to counterbalance two versions (version A and B) of the AMT as pre- and post- intervention assessment. Two other versions (version C and D) were included to serve as back-up. The trainer was instructed to score the AMT as the number of first answers coded as a specific autobiographical memory.

Depressive symptomatology. The training protocol included the instruction to measure self-reported depressive symptomatology pre- and post- intervention with the Patient Health Questionnaire 9 (PHQ-9; Dutch translation) (Kroenke, Spitzer, Williams, & Löwe, 2010) or with similar measures already in use by RCPs. Two settings used the Beck Depression Inventory II (BDI-II) (Beck, Steer, & Brown, 1996; van der Does, 2002). The PHQ-9 is a nine-item self-report measure of depressive symptoms, scoring the nine DSM-5 Major Depressive Episode items. Scores can vary from 0 to 27. The BDI-II assesses severity of depressive symptoms and consists of 21 questions, whose scores range from 0 to 63. For both the PHQ-9 and BDI-II users were asked to mark the statements best describing how they felt during the past two weeks.

Dose. The training protocol included the recommendation to count the number of sessions and exercises (dose) completed per user.

Fidelity

Fidelity check by external rater.

A fidelity check included three categories of behaviour to score: specific MeST behaviours (21 items), forbidden MeST behaviours (2 items) and general therapeutic behaviours (13 items). Items for the first two categories were created by the first and last author with consulting two experts on MeST², for example *‘The trainer asked participants about their experiences during homework assignments’* and *‘The trainer has challenged participants to ask questions to each other to make memories more specific’*. Items for the general therapeutic behaviour were based on the Interpersonal Psychotherapy Adherence and Quality scale (Stuart, 2009, Dutch translation, as cited in Bruijnicks et al., 2015 and received via personal communication). All items are shown in Table 3. A parallel version was created for trainers to offer the opportunity to rate themselves after each session and was included in the training protocol.

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² We thank Eline Eigenhuis and Hanne Schoofs for their input.

Table 3

Fidelity Check by External Rater

<u>Specific MeST behaviours</u>	<i>n</i>	Yes (%)			
Q1. The trainer repeated the psycho-education on memory problems on depression briefly	11	54.55			
Q2. The trainer asked participants about their experiences during homework assignments	11	100.00			
Q3. The trainer has given at least 2 examples of specific memories	11	9.09			
Q4. The trainer has at least discussed 2 homework assignments	11	100.00			
Q5. The trainer has reinforced correct answers	11	100.00			
Q6. The trainer has challenged participants to give more concrete answers	11	100.00			
Q7. The trainer has challenged participants to ask questions to each other to make memories more specific	11	100.00			
Q8. The trainer has given participants sufficient time and space to actively think to make memories more specific	11	100.00			
<u>Behaviours related to STOP-model</u>	<i>n</i>	Yes (%)			
Q9. The trainer has discussed the transition from specific to overgeneral thinking	6	83.33			
Q10. The trainer has given an example of overgeneral thinking in everyday life	6	83.33			
Q11. The trainer has introduced the STOP model	6	83.33			
<u>Forbidden MeST behaviours</u>	<i>n</i>	Yes (%)			
Q12. The trainer explored the emotional meaning and content of specific memories	11	9.09			
Q13. The trainer linked the content of difficult memories with personality of the participant	11	0.00			
<u>General therapeutic behaviours (<i>n</i> = 11), scoring quality from 1 (very low) to 5 (very high)</u>					
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
	<u>(very low)</u>				<u>(very high)</u>
Q14. The trainer appeared trustworthy.	0	0	0	10 (90.91%)	1 (9.09%)

Q15. The trainer appeared sincere	0	0	0	6 (54.55%)	5 (45.45%)
Q16. The trainer appeared empathetic.	0	0	0	6 (54.55%)	5 (45.45%)
Q17. The trainer expressed appreciation.	0	0	0	6 (54.55%)	5 (45.45%)
Q18. The trainer was actively supportive.	0	0	1 (9.09%)	6 (54.55%)	4 (36.36%)
Q19. The trainer expressed warmth.	0	0	0	6 (54.55%)	5 (45.45%)
Q20. The trainer led the session appropriately.	0	0	1 (9.09%)	6 (54.55%)	4 (36.36%)
Q21. The trainer gave participants appropriate advice.	0	0	1 (9.09%)	8 (72.73%)	2 (18.18%)
Q22. The trainer was sufficiently directive.	0	1 (9.09%)	3 (27.27%)	2 (18.18%)	5 (45.45%)
Q23. The trainer used humor.	0	1 (9.09%)	7 (63.63%)	3 (27.27%)	0
Q24. The trainer appeared sufficiently confident.	0	0	0	11 (100.00%)	0
Q25. The trainer challenged participants adequately.	0	0	1 (9.09%)	7 (63.63%)	3 (27.27%)
Q26. The trainer reinforced attempts of participants sufficiently positive.	0	0	0	9 (81.82%)	2 (18.18%)

Fidelity check by users.

A fidelity check of 8 items to test if the RCP delivered all crucial steps of MeST was offered to users as part of the post-intervention questionnaire. These items are shown in Table 4.

Table 4

Fidelity and Feasibility Questionnaire for Users at the End of Their MeST-Trajectory

<u>Fidelity check</u>	<i>n</i>				% Yes
Q1. Pre- intervention measurement of memory specificity	21				100.00
Q2. Informed consent	21				100.00
Q3. Psycho-education memory problems in depression	21				100.00
Q4. Psycho-education STOP model	21				90.48
Q5. Homework specificity exercises cue words	21				100.00
Q6. Homework specificity exercises of the day	21				100.00
Q7. Post-intervention measurement of memory specificity	21				100.00
Q8. Feedback on results	21				100.00
<u>Feasibility – Practical organization</u>					
Q9. How satisfied were you by the practical organization of the training (timing, location, context)?	0 Very dissatisfied	0 Dissatisfied	3 (14.29%) Neutral	10 (47.62%) Satisfied	8 (38.10%) Vary satisfied
Q10. If we would change the duration of the training, which option would you prefer?	3 (15.79%) Less, shorter sessions	1 (5.26%) Less, longer sessions	6 (31.58%) More, shorter sessions	7 (36.84%) More, longer sessions	2 (10.53%) Same number of sessions, longer
<u>Feasibility – Working Materials (Q11)</u>					
Q11. How do you evaluate the working materials (exercises) you received?	0 Very dissatisfied	1 (4.76%) Dissatisfied	3 (14.29%) Neutral	10 (47.62%) Satisfied	7 (33.33%) Vary satisfied

Feasibility – Content of training

Q12. Was the content of the training in line with what you were expecting?	0 Definitely no	0 Somewhat no	3 (16.67%) Unsure / No idea	12 (66.67%) Somewhat yes	3 (16.67%) Definitely yes
Q13. To what extent do you think you acquired new skills and insights?	1 (5.56%) Definitely no	0 Somewhat no	4 (22.22%) Unsure / No idea	9 (50.00%) Somewhat yes	4 (22.22%) Definitely yes
Q14. To what extent did you notice a positive effect of the training on your daily functioning?	0 Definitely no	0 Somewhat no	8 (44.44%) Unsure / No idea	9 (50.00%) Somewhat yes	1 (5.56%) Definitely yes

Feasibility – General evaluation

Q15. How satisfied are you about the training in general?	0 Very dissatisfied	0 Dissatisfied	0 Neutral	12 (66.67%) Satisfied	6 (33.33%) Very Satisfied

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Feasibility

Questionnaire for care providers.

A questionnaire was designed based on the constructs as shown in Figure 1. Compared to the CFIR-framework the main focus was on *Intervention Characteristics* (e.g., ‘I think Memory Specificity Training will be sufficiently flexible and adaptable to the setting I’m working in’ – Adaptability). Questions about factors from the domain *Inner Setting* (e.g., ‘I think our therapy program needs to change urgently’ – Implementation climate, tension for change), *Characteristics of individuals* (e.g., ‘I know what overgeneral autobiographical memory is’ – Knowledge and beliefs about intervention) and *Process* (e.g., ‘I think the planning for implementation will be sufficiently clear to implement MeST in our setting’ – Planning) were added.

Three versions of the questionnaire were designed for the three time points, mainly changing the tense of the verbs and adding two questions for the third time point on *Penetration* (‘MeST is sufficiently known by different colleagues of our multidisciplinary team’) and *Sustainability* (‘MeST was sufficiently continuously available to patients’). The first two questionnaires included 21 items, the third one 23 items. Every question was scored on a 5-point Likert scale from *definitely yes* to *definitely no*. All questionnaires started with asking the date, the respondent’s professional role and their role in implementation (‘unclear if involved in delivering MeST’, ‘involved’ or ‘not involved’) and ended with one open question asking for any other feedback. Figure 3 shows all questions including the factor (Damschroder et al., 2009; Proctor et al., 2011) the question intended to measure.

■ Most certainly no   ■ Somewhat no   ■ In doubt/ No idea   ■ Somewhat yes   ■ Most certainly yes

Q1. I know what an overgeneral autobiographical memory is (sometimes referred to as an overgeneralized autobiographical memory).

= Characteristics of individuals – knowledge and beliefs about intervention / Acceptability

Q2. I know what Memory Specificity Training contains.

= Characteristics of individuals – knowledge and beliefs about intervention / Acceptability

Q3. Given that an overgeneral autobiographical memory is considered a vulnerability factor for depression, and that Memory Specificity Training can remediate this vulnerability, I think the patient group I'm working with would benefit from this training.

= Characteristics of individuals – knowledge and beliefs about intervention / Acceptability

Q4. I think implementing Memory Specificity Training in our setting will be easy to do.
(Implementing MeST in our setting is easy.)

= *Intervention characteristics: complexity / Feasibility & Cost*

Q5. I think the Memory Specificity Training will be sufficiently flexible and adaptable for our setting.
(MeST is sufficiently flexible and adaptable for our setting.)

Intervention characteristics: adaptability / Feasibility

Q6. I think if we test Memory Specificity Training in a small group of patients, we will quickly learn of we can continue with this in our setting or not.

(If we tested MeST in a small group, we would have learned quickly if we would have continued with this in our setting or not.)

Intervention characteristics: trialability / Feasibility

Q7. I think if it would turn out that if Memory Specificity is not a good fit for this setting, we can easily stop the implementation of this training.

(If it would turn out that MeST wasn't a good choice for us, or if MeST isn't a good choice no longer for our setting, we can easily stop the training.)

Intervention characteristics: trialability/ Feasibility

Q8. I think implementing MeST in our setting will be affordable.
(Implementing MeST is affordable for our setting.)

Intervention characteristics: cost / cost

Q9. I think we will sufficiently have access to information and knowledge on MeST to deliver it well.
(We have sufficient access to information and knowledge on MeST to deliver it well.)

Inner setting: readiness for implementation – acces to information and knowledge /Feasibility – Cost

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Q10. I think MeST is the best choice as an addition to our therapy program for the moment.
(When we started MeST, it was the best choice as an addition to our therapy program.)

Intervention characteristics: relative advantage / Appropriateness -acceptability

Q11. I think our patients will get better because of MeST.
(Our patients get better because of MeST.)

Intervention characteristics: evidence strength and quality / Acceptability

Q12. I think our patients will consider MeST enjoyable and interesting.
(Our patients consider MeST enjoyable and interesting)

Intervention characteristics: adaptability / Feasibility

Q13. I think we have enough logistical resources (i.e., rooms, time, training, ...) to deliver MeST well.
(We have enough logistical resources (i.e., rooms, time, training) to deliver MeST well.)

Inner setting: readiness for implementation – available resources / Feasibility

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Q14. I think the working material related to MeST is going to be qualitative (the manual, worksheets, ...).
(The working materials related to MeST are of a high level quality (the manual, worksheets, ...).)

Intervention characteristics: design quality & packaging / Feasibility

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Q15. I think MeST is going to be in line with my norms and values.
(MeST is in line with my norms and values.)

Inner setting: implementation climate - compatibility / Appropriateness

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Q16. I think I have the necessary skills as a clinician to deliver MeST to participants.

Characteristics of the individual - self-efficacy / Feasibility

Q17. I'm enthusiastic to deliver MeST to participants.

Characteristics of the individual - individual stage of change / Feasibility

Q18. I think the planning will be sufficiently clear to implement MeST in this setting.
(The planning is/was sufficiently clear to implement MeST in this setting.)

Process – planning / Feasibility

Q19. I think there urgently needs to change something about our therapy program.
 (At the time when we decided to implement MeST, there urgently needed to change something about our therapy program.)

Inner setting: implementation climate – tension for change / Acceptability

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Q20. I think the use of interventions based on sufficiently scientific evidence (so called ‘evidence based’ interventions) important.

Characteristics of the intervention: knowledge and beliefs about intervention / Acceptability

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Q21. I trust the source of MeST (drs. Kris Martens and supervisor prof. dr. Filip Raes of the Center of Learning Psychology and Experimental Psychopathology, KU Leuven).

Intervention characteristics – intervention source / Acceptability

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/ Penetration

/ Sustainability

Figure 3. 100% stacked bar charts of attitudes of team members concerning MeST at three time points; (1) before receiving information, (2) after receiving information, (3) after MeST was implemented, on a Likert scale from most certainly no to most certainly yes. For each question it is indicated which CFIR-item (Damschroder et al., 2009) and which implementation outcome factor (Proctor et al., 2011) inspired the creation of this item. Sometimes the question at timepoint 3 was adapted, this version is shown in brackets.

^a Question 22 and 23 are only included at timepoint 3.

Feasibility Questionnaire for users.

An 8-item questionnaire on feasibility was created and presented to users at the end of their MeST-trajectory, in combination with the questions on fidelity as described earlier.

Questions are shown in Table 4.

Results**Effectiveness****Impact on the core mechanism: memory specificity.**

MeST implemented via the Web-based self-directed training protocol was effective at increasing memory specificity with an overall improvement across RCPs in the mean number of specific memories retrieved from 5.08 ($SD = 1.77$) at pre-intervention to 7.71 ($SD = 1.99$) at post-intervention, $t(23) = 6.31$, $p < .001$. Using a mean of pre-post difference score and a 95% CI using a pooled SD of pre-intervention scores resulted in a mean difference of 2.61, 95% CI [1.90 – 3.32]. Detailed results are shown in Table 5.

Table 5

Specificity scores and depressive symptomatology for all settings

Setting ^a	1	2	3	4	5	Total
<u>Memory Specificity – AMT</u>						
Pre-, <i>M (SD)</i>	5.33 (.58)	3.40 (2.30)	5.00	6.00 (1.18)	4.50 (1.92)	5.08 (1.77)
Post-, <i>M (SD)</i>	9.33 (1.16)	7.20 (2.39)	9.00	8.09 (1.51)	5.75 (2.22)	7.71 (1.99)
<i>t</i>	6.93**	2.73		4.08**	5.00*	6.31***
<i>Mean difference, 95% CI^b</i>	4.00	1.22		1.23	2.50	2.61 [1.90 – 3.32]
<i>n</i>	3	5	1	11	4	24
<u>Depressive symptoms – BDI-II</u>						
Pre-, <i>M (SD)</i>	37.00	36.20 (11.76)				36.33 (10.52)
Post-, <i>M (SD)</i>	34.00	14.80 (7.56)				18.00 (10.35)
<i>n</i>	1	5				6
<u>Depressive symptoms – PHQ-9</u>						
Pre-, <i>M (SD)</i>				16.45 (5.17)	17.50 (5.07)	16.73 (4.98)
Post-, <i>M (SD)</i>				13.09 (5.65)	12.25 (3.59)	12.87 (5.07)
<i>n</i>				11	4	15

Note. AMT = Autobiographical Memory Test; BDI-II = Beck Depression Inventory II; PHQ-9 = Patient Health Questionnaire 9.

^a1 = Alexianen Tienen; 2 = vzw Sint Annendael Diest - Grauwzusters; 3 = Private RCP; 4 = Karus - Melle; 5 = Mariaziekenhuis, Noord-Limburg

^b A mean of pre-post difference scores is calculated per setting. A 95% CI is calculated for the total sample by using a pooled SD of the pre-intervention scores.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Given that depressive symptoms are associated with reduced autobiographical memory specificity (Williams et al., 2007) and that depressive symptoms were expected to decrease as a result of routine care, it was important to rule out whether any decrease in depressive symptoms due to routine care in RCPs explained increases in memory specificity. A repeated measures ANCOVA was run, using standardized residual change score of depressive symptoms as a covariate. Changes in memory specificity remained significant after controlling for changes in depressive symptoms, $F(1, 13) = 27.84, p < .001$, for 15 users whose PHQ-9 change scores were available; and $F(1, 4) = 9.62, p = .036$ for 6 users whose BDI-II change scores were available. Users' memory specificity improved from pre- to post- intervention and this was independent of any changes in depressive symptoms.

Dose-effect relation.

Checking for an association between dose of MeST (see Table 2 for range of number of sessions and exercises per setting) and increases in memory specificity (see Table 5 for pre- and post-intervention results), a statistically significant association was found for the number of sessions ($n = 16, r = .61, p = .012, CI\ 95\% [.17 - .85]$) but not for number of exercises ($n = 7, r = -.13, p = .79, CI\ 95\% [-.80 - .17]$).

Fidelity

Fidelity assessed by users.

All users ($n = 21$) indicated at post-intervention to have received most elements of MeST: they recognized receiving a pre- and post- intervention measurement of memory specificity, receiving an informed consent, psycho-education on memory problems in depression, homework assignments of specificity exercises both with cue words and exercises of the day, and feedback on results. Two users (9.52%) indicated not to have received psycho-education on the STOP-

model. This result can be explained by the fact that in the *open* version of MeST users can come and go, and RCPs were not instructed to discuss the STOP model every session. As a result, this could have led to users only attending a series of sessions in which the STOP model was not discussed. All results are shown in Table 4.

Fidelity assessed by first author.

The first author (KM) scored 11 recorded MeST sessions of 5 RCPs, all items and results are shown in Table 3. Six of the 8 *specific MeST behaviours* were observed in each (100%) recorded session. In about half of the sessions (54.55%) the psycho-education on memory problems in depression was repeated, even though the training protocol instructed RCPs to repeat this *every* session. And only in one session the trainer provided two examples of specific memories. In sessions in which *the STOP-model* was discussed, the three items regarding the STOP model were present in 5 of the 6 sessions (83.33%).

Of the two *forbidden MeST behaviours* (exploring the emotional meaning and content of specific memories and linking the content of difficult memories with personality of the user), only in one session ($n = 11$) the first forbidden behaviour was found. *General therapeutic behaviours* were scored and in general trainers scored high to very high in quality on all items. The use of humor was limited, even though this seems compatible with MeST.

Feasibility

Feasibility as perceived by care providers.

In Figure 3 stacked bar charts of attitudes of care providers at three time points are shown: before receiving the login to the training protocol ('pre-information'), after receiving the login ('post-information'), and one month after the start of MeST ('post-implementation'). For all settings results of the baseline assessment were in line with what was expected (shown in Figure

3 and Table 6): rAMS and MeST were not very known by all care providers (Q1, Q2, Q11) but when MeST was briefly explained they thought it would be of value for the patient population in their RCP (Q3). They were agnostic to how easily MeST would match with the setting and the individuals involved (Q4, Q5, Q8 – Q19). Some results were more pronounced: MeST scored good at trialability (Q6, Q7), most (125/152, 82.24%) care providers considered the use of evidence based interventions important (Q20) and care providers (112/145, 77.24%) indicated ('somewhat' to 'most certainly yes') to trust the source of the intervention.

Table 6

Mean Scores of Attitudes on a Likert Scale from 1 to 5 (for Questions and Scales, see Table 5).

	<u>Pre- information</u>		<u>Post- information</u>		<u>Post- implementation</u>	
	<i>n</i>	Mean (<i>SD</i>)	<i>n</i>	Mean (<i>SD</i>)	<i>n</i>	Mean (<i>SD</i>)
Q1	149	3.26 (1.05)	58	3.91 (1.03)	49	4.02 (.90)
Q2	149	2.11 (1.00)	57	3.95 (.90)	49	3.65 (1.05)
Q3	148	4.01 (.76)	58	4.19 (.66)	49	4.16 (.69)
Q4	149	3.17 (.53)	58	3.57 (.82)	49	3.69 (.68)
Q5	149	3.22 (.45)	58	3.59 (.70)	49	3.63 (.70)
Q6	149	3.79 (.60)	58	4.02 (.55)	49	3.67 (.72)
Q7	149	3.73 (.71)	58	4.05 (.61)	49	4.10 (.68)
Q8	143	3.21 (.53)	57	3.63 (.67)	49	3.78 (.77)
Q9	143	3.47 (.61)	58	3.97 (.67)	49	3.37 (.95)
Q10	143	3.13 (.49)	58	3.53 (.71)	49	3.76 (.78)
Q11	143	3.42 (.57)	58	3.71 (.65)	49	3.65 (.66)
Q12	143	3.28 (.50)	58	3.60 (.62)	49	3.78 (.74)
Q13	143	3.21 (.72)	58	3.66 (.85)	49	3.59 (.86)
Q14	143	3.29 (.49)	58	3.55 (.78)	49	3.41 (.61)
Q15	143	3.32 (.53)	58	3.90 (.67)	49	3.78 (.69)
Q16	143	3.20 (.67)	58	3.74 (.72)	49	2.67 (1.20)
Q17	141	3.21 (.76)	55	3.60 (.88)	49	2.86 (1.16)
Q18	143	3.34 (.60)	56	3.66 (.75)	49	3.69 (.96)
Q19	143	3.02 (.90)	57	3.21 (1.07)	49	3.41 (1.08)
Q20	143	4.21 (.76)	57	3.96 (.95)	49	4.45 (.65)
Q21	145	4.01 (.68)	58	4.26 (.64)	49	4.22 (.72)
Q22					49	3.06 (1.13)
Q23					49	2.80 (1.14)

After information was disseminated through the use of the training protocol in five settings, the attitudes of the care providers either did not change significantly (Q3, Q19, Q20) or significantly changed in a positive direction (Q1, Q2, Q4 – Q18 and Q21), as shown in Table 7. Comparing attitudes after receiving the login of the training protocol and after one month of implementation, so to evaluate the impact of the implementation of MeST on attitudes of care providers, most attitudes did not change significantly (Q1, Q2, Q3, Q4, Q5, Q7, Q8, Q10, Q11, Q12, Q13, Q14, Q15, Q18, Q19, Q21), changed positively (Q20) or changed negatively (Q6, Q9, Q16, Q17). These last two items (Q16 and 17) covered items of characteristics of the individual (care providers) involved; whether they thought they had the skills to deliver MeST (Q16; from $M = 3.74$, $SD = .72$ at post-information to $M = 2.67$, $SD = 1.20$ post implementation) and were enthusiastic about delivering MeST (Q17; from $M = 3.60$, $SD = .88$ at post-information to $M = 2.86$, $SD = 1.16$ post implementation). At the start of the implementation it was unclear for many care providers what their role would be in the implementation of MeST, but by the third time point, after implementation, this of course had changed. When analyzing only the attitudes of involved trainers ($n = 7$ for time point 2 and $n = 5$ for time point 3) for Q16 (thinking to have the skill to deliver MeST) and Q17 (being enthusiastic about delivering MeST), there was no negative change in attitudes. Question six is about trialability of MeST and question nine on having sufficient access to information and knowledge on MeST. With mean scores of 3.67 ($SD = .72$) for Q6 and 3.37 ($SD = .95$) for Q9 these results can still be considered acceptable.

Table 7

Change Scores between Timepoints of Attitudes of Stakeholders.

T1 – T2 Mean difference		T2-T3 Mean difference		T1 – T3 Mean difference	
Q1	-.66***	Q1	-.11	Q1 ^V	-.77***
Q2	-1.83***	Q2 ^V	.29	Q2	-1.54***
Q3	-.18	Q3	.03	Q3	-.16
Q4 ^V	-.39**	Q4	-.13	Q4 ^V	-.52***
Q5 ^V	-.37***	Q5	-.04	Q5 ^V	-.41***
Q6 ^V	-.23**	Q6 ^V	.34**	Q6 ^V	.11
Q7 ^V	-.32**	Q7	-.05	Q7	-.37**
Q8 ^V	-.42***	Q8	-.14	Q8 ^V	-.57***
Q9 ^V	-.50***	Q9 ^V	.60***	Q9 ^V	.10
Q10 ^V	-.40***	Q10	-.22	Q10 ^V	-.62***
Q11	-.29**	Q11	.05	Q11	-.23*
Q12 ^V	-.32**	Q12	-.17	Q12 ^V	-.50***
Q13	-.45***	Q13	.06	Q13 ^V	-.38*
Q14 ^V	-.26*	Q14	.14	Q14 ^V	-.11
Q15	-.58***	Q15	.12	Q15	-.45***
Q16	-.55***	Q16 ^V	1.07***	Q16 ^V	.52**
Q17 ^V	-.39**	Q17	.74***	Q17 ^V	.36*
Q18	-.32**	Q18	-.03	Q18 ^V	-.35*
Q19 ^V	-.19	Q19	-.20	Q19 ^V	-.39*
Q20	.25	Q20	-.48**	Q20	-.24
Q21	-.25*	Q21	.03	Q21	-.22

Note. ^V = equal variance not assumed.* $p < .05$. ** $p < .01$. *** $p < .001$.**Feasibility as perceived by users.**

Results for the 7 items regarding the feasibility of the post-intervention questionnaire for users are shown in Table 4 and indicate that users appreciated MeST; they were satisfied about the practical organization of MeST sessions (Q9; 18/21 ‘satisfied’ to ‘very satisfied’) and the working materials (Q11; 17/21 ‘satisfied’ to ‘very satisfied’), and the content was in line with

what they expected (Q12; 15/18 ‘satisfied’ to ‘very satisfied’). However, only a minority of users thought they acquired new skills and insights (Q13; 5/19 ‘somewhat yes’ to ‘definitely yes’ and 9/19 are unsure or have no idea), but most did notice a positive effect of MeST on their daily functioning (Q14; 10/18 ‘somewhat yes’ to ‘definitely yes’). Users varied in the extent to which they would have preferred a change in dose (Q10, $n = 19$); 3 preferred fewer, shorter, sessions; 1 preferred fewer, longer, sessions; 6 preferred more, shorter, sessions; 7 preferred more, longer sessions and 2 preferred the same number of sessions but longer. All users indicated that they were satisfied with MeST in general (Q15, $n = 18$), 12 were satisfied and 6 very satisfied. No additional feedback was given via the open questions.

Discussion

MeST is regarded as a promising add-on intervention (Barry et al., 2019) targeting a transdiagnostic risk factor: reduced autobiographical memory specificity (rAMS). Until now no examination of training trainers in MeST had taken place. The goal of this study was to explore the dissemination and implementation of MeST using a Web-based self-directed training protocol. As our focus was one of researchers involved in efficacy research evaluating the implementation of an intervention derived from basic science to RCPs, a successful implementation was defined as one which resulted in good effectiveness, fidelity and feasibility.

The results indicated that RCPs using the Web-based training protocol implemented MeST in such a way that the core mechanism of MeST was kept intact. Comparing pre- and post- measurements of memory specificity showed that MeST modified reduced memory specificity. The absence of a control group limits the conclusions that one can draw from this investigation, but comparing the current effect (a mean difference of 2.61 on the AMT, 95% CI [1.90-3.32] with effects in other similar studies (from a mean of 5.2 (SE = 0.4) to a mean of 8.0

(SE = 0.4) in Werner-Seidler et al., 2018; a mean difference of 2.70, 95% CI[1.90-3.50] in Martens, Barry, et al., 2019) shows that using a Web-based training protocol which includes both the *open* and *closed* version of MeST (Martens, Barry, et al., 2019) did not seem to decrease the effectiveness of MeST in a significant way. Although the results support the idea that MeST is still effective when a lower dose is provided, the current study cannot provide a clear answer regarding *how* much training is needed as results are mixed; a positive correlation between number of sessions and increase in memory specificity was found, but not between number of exercises and increase in memory specificity. It is difficult to interpret these results as the number of participants for whom the number of exercises ($n = 8$) and sessions ($n = 16$) were known was limited. For example; a few users with a fairly limited potential to increase in memory specificity might have been able to complete many exercises in few sessions without it resulting in an increase on the AMT at post-intervention measurement.

Fidelity to the protocol by trainers was good, as indicated by scoring sessions and by asking users which parts of the MeST-procedure they received. Although trainers were instructed to repeat the psycho-education on memory problems in depression and to provide examples of specific memories in each session, these behaviours occurred the least of all scored behaviours. This might be explained by the fact that trainers assumed the rationale and the goal of MeST was sufficiently clear to users. Nevertheless, adaptations to the training protocol can be made to emphasize these behaviours more.

Of the five RCPs, in at least two, MeST was given by psychologists in training. In a previous study, healthcare workers with different backgrounds (such as nurses or occupational therapists) provided MeST (Martens, Barry, et al., 2019). As a result, the current data of these two studies support the idea that MeST is sufficiently straightforward so that care providers from

a variety of backgrounds can provide MeST and thus training care providers in MeST should not be limited to clinical psychologists or people who have been trained in-person.

Feasibility as scored by care providers and users provides a reason to be confident about the implementation of MeST. MeST appears to be an acceptable intervention for care providers, in each phase of the implementation process. Users indicated that they appreciated MeST, although in general they did not notice a big impact of MeST. As MeST seemed acceptable for both trainers and users, there seems to be no risk for underuse which is the case in more challenging interventions such as exposure therapy (Waller & Turner, 2016). Finding the optimal dose per session of MeST seems to be difficult; users showed large variability in what they consider to be the optimal number and length of sessions. By creating a slightly adapted open version and showing this did not result in a decline of effectiveness (Martens, Barry, et al., 2019) and creating an online version of MeST (Takano, Ueno, Moriya, & Mori, 2017) we are already providing a mix of options to deliver MeST. Examining a combination of in-person and online MeST (Martens, Takano, et al., 2019; Takano et al., 2017), such that users can continue their training at home if they wish, might be an interesting route for future research.

Although at the time of this study the quality of evidence was not sufficient for MeST to be considered as a recommended intervention according to the GRADE system (Tolin & McKay, 2015), we decided to already examine the potential of MeST to be implemented in RCPs. As clinical psychology progresses towards tailoring interventions to psychological mechanisms (Craske, 2017), the question arises when one should evaluate the potential for dissemination for add-on interventions derived from basic science. If in an early stage of the development of such interventions, the interventions do not seem acceptable to care providers and users, or training trainers seems to come with a high cost, this information can be crucial for further basic research.

For this reason, we decided to already examine transportability in a previous study (Martens, Barry, et al., 2019) and training trainers in MeST in the current study.

Results of both studies indicate that research on MeST can continue. In the field of autobiographical memory training several alternatives to MeST have been proposed, such as concreteness training (Watkins, Baeyens, & Read, 2009), combining memory specificity with life review (Leahy, Ridout, Mushtaq, & Holland, 2017), enhancing the flexible retrieval of both specific and general memories (Hitchcock et al., 2016) or future-oriented episodic autobiographical processing (Pile et al., 2018). One might interpret the results of the current study as somewhat generalizable to those training protocols as well, as the complexity and tone of such interventions seems to be quite similar.

As implementation is context-specific, we want to note some features of the Belgian context at the time of the current study. First, there is no national institute providing information about the evidence base of psychological treatments or (multidisciplinary) guidelines for care as usual. As a result, it was unclear for users and care providers what the evidence base was for care as usual. Second, evaluating the implementation of psychological interventions in a standardized way such as in the current study was rare or none existent. Third, a lot of RCPs mentioned that they were in the process of reorganization (fusions) or in the process of attaining a first quality accreditation label, which were the main reasons why RCPs dropped out before or after the assessment of the baseline attitudes of care providers. Some also indicated that the extra work for such implementation was a barrier, such as asking for permission from their local ethical committee. As a result of the aspects described above, it was a challenge for us as researchers involved in efficacy research to frame MeST as an experimental add-on intervention in comparison to care as usual and to convince RCPs to participate in this study. Only when an

umbrella organization agreed to disseminate our call to participate in this study, the interest by RCPs increased rapidly, probably because this improved the reach, and the perception of some intervention characteristics: the intervention source and the evidence strength and quality. In our opinion, in an ideal situation, a central institute would systematically disseminate and implement treatments with the strongest evidence base, generating results on the effectiveness of the implementation. In such a context, piloting the dissemination and implementation of an add-on experimental training could take place with fewer barriers. The discrepancy of requirements for interventions being tested on the one hand and care as usual on the other, at the time of this study in Belgium, was striking. For this study we needed an approval of the ethical committee of our university, and of almost every RCP. In addition, informed consents needed to be provided to each user. The therapeutic program that RCPs offer to users, on the other hand, is not checked by any institute, no guidelines are provided, and users are rarely informed about the evidence base. In such a context it is difficult to persuade RCPs to evaluate the dissemination and implementation of an intervention in a standardized way, using measures such as recordings of sessions and questionnaires to assess attitudes of care providers and users.

The main limitation of this study is a potential sampling bias; that is, only highly motivated RCPs with a specific interest in MeST carried out all steps of implementation. It is unclear if more challenges would arise when the evidence base for MeST would increase and more RCPs are asked to implement MeST. In addition, even in these highly motivated RCPs a significant amount of data is missing (for example post-intervention measurements of participants), which can be attributed to the clinical nature of this study. The data collection was not under the influence of the authors, but of the practitioners trained via the web-based protocol. In such settings, patients suddenly being dismissed in RCPs are an inherent problem. Another

limitation is the lack of a priori hypotheses. Previous MeST literature did not provide an indication as to what could be considered *good* fidelity or feasibility. However, the results of the current study confirm that MeST can be regarded as an intervention low in complexity, easy to train trainers in and compatible with a variety of RCPs.

Conclusions

Training care providers in MeST using a Web-based self-directed protocol leads to an effective implementation of MeST in which trainers show fidelity to the protocol, users with reduced autobiographical memory specificity show an increase in memory specificity and MeST is appreciated by most care providers and users.

Abbreviations

AMT: Autobiographical Memory Test; BDI-II: Beck Depression Inventory II; CFIR: Consolidated Framework For Implementation Research; PHQ-9: Patient Health Questionnaire 9; MeST: Memory Specificity training; rAMS: Reduced Autobiographical Memory Specificity; RCP: Routine Clinical Practice;

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