Evaluation of a program for training psychologists in an acceptance and commitment therapy resilience intervention for people with multiple sclerosis: a single-arm longitudinal design with a nested qualitative study

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ABSTRACT

Purpose: This single-arm longitudinal study evaluated the effectiveness of a program for training psychologists in delivering an acceptance and commitment therapy-based program (RESilience and Activities for every DaY; READY) for people with multiple sclerosis (PwMS).

Materials and methods: The training encompassed three phases: (1) training workshop; (2) READY participation; (3) READY delivery to PwMS. Self-report data were collected immediately before the workshop, before and after participation in READY, and at 3- and 15-month follow-ups.

Results: Forty psychologists successfully completed the training. The training was effective in fostering the acquisition of knowledge and skills for effective delivery of READY to PwMS. Participants improved over the course of training in resilience, positive affect, wellbeing, psychological flexibility, and associated processes. These improvements peaked during the participation in READY phase and continued to accrue at a slower rate three months later. Psychological flexibility mediated the improvements in resilience, positive affect, and wellbeing. Qualitative data confirmed the personal, professional, and multiple sclerosis (MS) psychologist community level positive training impacts.

Conclusions: The training fostered positive professional and personal development in trainees and consolidated the integration of READY into a frontline service for PwMS. To date, more than 50 READY groups for PwMS have been conducted in Italy.

IMPLICATIONS FOR REHABILITATION

- Training psychologists in delivering an acceptance and commitment therapy (ACT)-based resilience intervention for people with multiple sclerosis (MS) is associated with positive personal and professional impacts for the trainees.
- The training program strengthened the sense of community among members of the professional network who attended as trainees.
- In ACT training, psychological flexibility plays a key role in improving resilience, positive affect, and wellbeing in trainees, and is therefore an important intervention target.
- ACT training for practitioners fosters the integration of ACT-based interventions into frontline services.

Introduction

Resilience is a psychological protective factor that enables a person to bounce back and sustain good mental health while dealing with adversity [1]. It involves negotiating, managing, and adapting to significant stressors or trauma by activating both internal (i.e., mindfulness, acceptance, cognitive flexibility, and active coping) and external (i.e., social support, financial capital, and community services) resources [2]. Psychological flexibility is closely associated with resilience [3,4]. According to acceptance and commitment therapy (ACT), psychological flexibility involves behaving consistently with one’s chosen values even in the presence of unwanted internal experiences such as emotional discomfort or self-critical thinking and is fostered by six processes [5]: (1) acceptance – openness to experience, (2) cognitive defusion – observing thoughts rather than taking them literally, (3) present moment awareness – mindfulness, (4) self-as-context – contact with a sense of self that is continuous and provides flexible perspective taking, (5) values – freely chosen personally meaningful life directions, and (6) committed action – values-guided effective action [6].

An Australian team developed and evaluated an ACT-based group resilience-training program called RESilience and Activities for every DaY (READY). The READY program is designed to help people become more resilient in their everyday life by learning how to effectively manage the challenges associated with daily stressors [7]. The purpose of the present study is to evaluate a
multi-phased program designed to train psychologists in delivering READY.

The READY program was initially tested in a workplace setting [7,8] and then adapted and successfully applied to different health conditions: cancer [9], multiple sclerosis (MS) [4,10], and diabetes [11]. Evidence shows that the READY for MS modified program has beneficial impacts on resilience, quality of life, mood, and the psychological flexibility processes in people with MS (PwMS) [4,10,12].

Dissemination and uptake of evidence-based practice in clinical settings is essential to ensure optimal care of people with physical and mental health problems. However, there remains a significant disconnection between research validated psychosocial interventions and those used in routine clinical practice [13,14]. Empirically supported psychological interventions are often not adequately disseminated and are seldom integrated into frontline services in the long-term [15]. One way to optimize the uptake of such interventions is to train health professionals in their delivery.

In addition to the advantages of intervention dissemination, reach and uptake achieved through training practitioners in empirically supported interventions, several studies show that training health professionals in ACT produces personal benefits for the trainees [16–18] as well as developing ACT competencies for clinical practice [19]. Results from a recent pilot study investigating the effects of ACT training on psychologists working in the MS field showed that the training was beneficial both personally and professionally [20]. The positive impact of ACT training on psychologists’ self-care and psychological flexibility is particularly important, given that it can protect against burnout [21].

A two-phase project to evaluate an Italian version of READY for MS (hereafter called READY) is currently underway. Consistent with the Medical Research Council framework for developing and evaluating complex interventions [22], the project encompasses two phases: (1) a pilot randomized controlled trial (RCT) with a nested qualitative study [10]; (2) a multi-center phase III cluster RCT (ISRCTN registration number: 67194859), which includes the present ancillary study designed to evaluate the effectiveness of a program for training psychologists in the delivery of READY to PwMS, as well as another published ancillary study on the effectiveness of READY delivered to PwMS via Italian frontline services [12].

The present study has four aims: (1) to examine the effects of READY training on participants’ knowledge of ACT and READY and their competency in delivering READY to PwMS; (2) to assess the effects of READY training on participants’ resilience, positive and negative affect, wellbeing, and psychological flexibility and associated ACT processes; (3) to investigate the theoretical integrity of the training, by testing the mediating role of psychological flexibility; (4) to explore participants’ views on the training program and the READY intervention using qualitative data. In relation to the first three aims, we predicted that over the course of the multi-phase training, participants would increase their knowledge of ACT and READY, successfully run a READY group for PwMS, and show personal improvements in resilience, affect, wellbeing and psychological flexibility and the associated ACT processes, and that these personal training effects would be mediated by increases in psychological flexibility.

Materials and methods
A single-arm longitudinal design with a nested qualitative study was used to evaluate the READY training program for psychologists. The consolidated criteria for reporting a pilot or feasibility trial (CONSORT; Supplementary Appendix A) [23] and qualitative research (COREQ; Supplementary Appendix B) [24] guided the presentation of findings.

The study was carried out in accordance with the recommendations of the Declaration of Helsinki. The protocol received ethical clearance from the Ethics Committees of the Coordinating Centre (Fondazione IRCCS Istituto Neurologico Carlo Besta, 08/11/2017, internal ref: 45; amendment approved 10/01/2018, internal ref: 47; amendment approved 04/03/2020, internal ref: 70) and associated university (University of Queensland, 09/05/2018, clearance number: 2018000943/Review 08112017; 15/04/2020 amendment). All participants gave written informed consent.

Study participants and recruitment
Participant eligibility criteria included: registered psychologist in Italy, member of the psychologist network of the Italian Multiple Sclerosis Association (AISM) working at an MS or AISM Centre, and willingness to attend all training sessions, conduct READY in their region, and mentor colleagues in running READY.

Regarding recruitment, the research project was presented during the 8th Annual Conference of the AISM Psychologist Network in 2017. Subsequently, a flyer describing the study was circulated through the AISM Psychologist Network one month prior to the commencement of training. Interested psychologists were contacted by the project coordinator to check eligibility.

The READY for MS program
READY for MS is an adult ACT-based group resilience training program consisting of 7 weekly 2.5 h sessions plus a 2.5 h booster session 5 weeks after the seventh session. The seven session modules include: introduction to the READY resilience model, mindfulness, acceptance, defusion, self-as-context, values and meaningful action, and review and future planning. The booster session provides a review of program content. The program has a facilitator manual, a participant workbook which includes a personalized READY Personal Plan for recording between-session practice, and audio recordings of mindfulness exercises. READY incorporates a blend of psychoeducation, small group discussion, experiential exercises, readings, and homework exercises (recorded in the READY Personal Plan) [4]. The study coordinator was trained in ACT and READY by one of the program co-developers, translated the program into Italian, and conducted the first evaluation of READY in Italy [10].

Training program
The training program was conducted by the project coordinator (psychologist, psychotherapist) and has the following three phases: (1) introductory ACT and READY training workshop (training workshop); (2) participation in the READY program as a recipient of the intervention (READY participation); (3) supervised delivery of the READY program to PwMS (READY delivery). The maximum number of participants was set at 45 (plus 2 auditors) in accordance with the criteria of the regulatory body for Continuing Education Credits.

Phase 1 – training workshop
The one and a half-day workshop was a modified version of the ACT training curriculum for trainee clinical psychologists at the University of Queensland, developed and evaluated by one of the
study investigators [17]. The workshop also included an introduc-
tion to the READY program [4].

**Phase 2 – READY participation**
The project coordinator conducted the READY Program with the
psychologists as participants. First, two READY groups were con-
ducted in Northern Italy (in a dedicated hospital room), and then
in the following week, two groups in Central Italy (in a dedicated
Rome AISM Centre room). As participants came from different
parts of Italy, the program structure was modified to reduce the
number of sessions and optimize time and travel resources. A
total of 4-one day sessions were run for each training group. Each
one-day session covered two READY modules (seven modules
plus booster). Sessions were delivered in accord with the facilita-
tor manual. Participants were invited to do the prescribed
between-session home practice. This training phase was designed
to help participants personally apply the READY strategies.

**Phase 3 – READY delivery**
Each participant was asked to deliver READY to PwMS at their MS
or AISM Centre, while receiving weekly phone supervision. First,
six participants were selected to deliver READY to PwMS under
the supervision of the project coordinator: two from Central and
four from Northern Italy. The project coordinator selected these
six participants based on the following: high level of participation
in the training; >95 knowledge exam score, and willingness to
supervise colleagues. Once trained in the delivery of READY, these
six participants provided supervision to the other participants in
their locality. We expected that after this phase, all participants
who had successfully run READY under supervision would deliver
READY autonomously and act as a referral point for the delivery
of READY in their region.

**Measures**
Data were collected via hard copy questionnaires immediately
before the phase 1 – training workshop (baseline T0), before
(4 weeks after baseline T1) and immediately after phase 2 –
READY participation (12 weeks after baseline T2), at 3-months fol-
low-up (24 weeks after baseline T3), and at 15-months follow-up
(72 weeks after baseline T4). The personal outcome measures
were included at each assessment point. The knowledge exams
were administered at T1 and T2. Participant Satisfaction
Questionnaires were administered at T2 and T4.

**ACT and READY knowledge and program delivery competencies**
Assessment of ACT and READY knowledge and program delivery
competencies involved completion of a knowledge exam after
phase 1 – training workshop and phase 2 – READY participation,
and the READY session quality checklist and the supervision
checklist during phase 3 – READY delivery.

**Knowledge exams.** A paper exam with multiple-choice questions
was administered at T1 and T2. The T1 exam questions developed
by Pakenham et al. [20] assessed workshop content. The T2 pur-
pose-built exam assessed content presented in phase 2 – READY
participation. For both exams, total scores ranged from 0 to 100
with higher scores indicating better knowledge.

READY session and supervision checklists. After each READY
session for PwMS (phase 3 – READY delivery), trainee participants
completed a purpose-built checklist (Supplementary Appendix C)
and discussed it in weekly supervision. The supervisor completed
a purpose-built checklist (Supplementary Appendix D) after each
supervision session. If the quality of a READY session was rated as
poor, the supervisor contacted the project coordinator to trouble-
shoot options before the next session.

A READY session checklist was developed for each session. The
checklist itemized session components. It was completed by train-
ees immediately after each session and served as a measure of
intervention fidelity. The checklist also prompted the recording of
clinical notes, which were discussed during weekly supervision
(Supplementary Appendix C).

The supervision checklist consisted of seven dichotomous
items covering the following topics concerned with the trainee's
delivery of READY: (1) adherence to the manual, (2) openness to
the supervision process, (3) coherency with ACT, (4) facilitator
engagement with group processes and session content, (5)
engagement with MS group members, (6) accurate delivery of
exercises, and (7) correct delivery of metaphors. A score of ≤3 on
the supervision checklist was deemed the cut-off indicating sub-
standard session delivery (Supplementary Appendix D).

**Personal outcome measures**
All personal outcome measures are standardized, widely used
scales with demonstrated validity and reliability. Resilience was
measured with the Italian version of the Connor-Davidson
Resilience Scale [25]. Positive and negative affect was assessed
using the Italian version [26] of the Positive and Negative Affect
Schedule [27]. Wellbeing was measured with the Italian version
[28] of the Mental Health Continuum-Short Form [29].

Psychological flexibility was assessed using the 23-item com-
prensive assessment of ACT processes. The scale was translated
into Italian for the project (paper in preparation). Items are rated
on a seven-point scale [30]. Assessment of the individual ACT
processes were as follows: mindfulness – Mindful Attention
Awareness Scale [31,32]; values – Valued Living Questionnaire
[33,34], defusion – Drexel Defusion Scale [35]; acceptance –
Acceptance and Action Questionnaire II (AAQ-II) [36,37]. We
reversed the scoring of the AAQ-II so that higher scores indicate
greater acceptance. Validated Italian versions of all ACT process
measures were used except defusion which was translated into
Italian for this study (paper in preparation).

**Nested qualitative study**
Two purpose-built questionnaires (each with eight open-ended
questions; Supplementary Appendix E) obtained participant feed-
back. The T2 Participant Satisfaction Questionnaire invited partici-
pants' views on phase 2 – READY participation. The T4 Participant
Satisfaction Questionnaire invited feedback on phase 3 –
READY delivery.

**Analyses**

**Quantitative analyses**
The normality assumption was tested with the Shapiro–Wilk test.
The two-sided unpaired t-test or the Wilcoxon two sided two-
sample test for continuous variables depending on data distribu-
tion, Welsh’s t-test for unbalanced groups, and the chi-squared
test for categorical variables were used to compare completers
with non-completers on baseline socio-demographics, and per-
sonal outcomes. Data were analyzed according to the intention-
to-treat principle and multiple imputation for missing data was
used [38].

As the temporal spacing between occasions was not identical,
longitudinal changes on the personal outcomes were analyzed by
a mixed effects model [39]. The dataset was organized around the

timing of assessments using the following centering method: baseline (T0) values of time were set at 0, and the number of months from baseline was calculated for each time-point of subsequent data collection [40]. Several models were tested: an unconditional model (model 1), an unconditional growth model (model 2), and two higher-order polynomial models (quadratic and cubic, models 3 and 4) [40]. In addition, we tested the fit of the scaled identity covariance matrix for the repeated measures against other possible covariance structures: scaled identity (level 1), unstructured (level 2); diagonal (level 1), diagonal (level 2); diagonal (level 1), unstructured (level 2); autoregressive errors (level 1), diagonal (level 2). Analyses were performed using the SPSS syntax presented by Heck et al. [41]. Due to the small sample size, the restricted maximum likelihood method was used for model estimation [40].

Group effect was included if the intraclass correlation coefficient (ICC) was >0.20. All tests were two-tailed and considered significant with \( p < 0.05 \). The effect sizes for growth-modeling analysis were calculated as suggested by Feingold [39] and interpreted as small (0.2), medium (0.5), or large (0.8) [42].

The SPSS macro MEMORE for repeated measures bootstrap analyses with a single mediator was used to examine pre- to post-READY participation (T1–T2) change in psychological flexibility as a mediator of significant pre- to post-READY participation improvements on resilience, positive and negative affect, and wellbeing [43]. The percentile bootstrap method was used because it is more robust with small samples [44]. Mediation was significant if the 95% bias percentile bootstrap confidence intervals (CIs) for the indirect effects did not include 0 [43,45]. Statistical analyses were performed using SPSS v26 (SPSS Inc., Chicago, IL).

Qualitative analyses

Content analysis was used to code responses to the open-ended questions in the T2 and T4 Satisfaction Questionnaires and to identify themes that captured key concepts and processes. Participants’ written answers were collected and analyzed as a whole. The study coordinator analyzed the data using an inductive procedure in which codes and categories were derived from narratives. The analysis included three steps. The first level codes came from sentences used directly by participants. This allowed critical and analytical examination of the data, generation of new ideas and indications for further data collection. A second step was used to aggregate data [46]. Finally, codes and categories generated were discussed with the co-authors and further refined. A detailed audit trail is reported in Supplementary Appendix E.

Results

Participants and preliminary analyses

Phase 1 – training workshop

The one and a half-day workshop was conducted 12–13 December 2017. Forty-seven psychologists participated (47% of the total number of active members of the AISM Psychologist Network). Forty-four completed the questionnaires. Most were female (93.2%), the mean age was 42.2 (SD = 8.3), 53.2% were psychotherapists, 4.5% neuropsychologists, and the remainder (40.5%) had both specializations. The median years of work in the MS field was 9 (range = 1–31), 53.2% worked in an AISM Centre, 45.5% in a MS Centre, and one person worked in both settings.

Phase 2 – READY participation

Four READY groups were conducted 15 January to 13 March 2018, two in Central (n = 8 and 9) and two in Northern (n = 12 and 15) Italy. All 44 psychologists participated.

Phase 3 – READY delivery

Four out of 44 (9.1%) psychologists did not deliver READY to PwMS for the following reasons: center organizational problems (n = 2), job resignation (n = 1), and personal problems (n = 1). Details are presented in Figure 1.

Trainee completers and non-completers (four who did not deliver READY plus three who did not complete the T4 assessment) did not differ on baseline socio-demographics, and personal outcomes (p > 0.11). Normality assumptions were met at each time-point except for the following measures: values at T0 and T1, positive affect at T1 and T3 and acceptance at T2. The group effect was not included in the model as the ICCs (overall and within each intervention) were <0.07. Means and standard deviations for the personal outcomes at each time-point are reported in Table 1.

ACT and READY knowledge and program delivery competencies

All participants passed the knowledge exams. All participants who delivered READY to PwMS did so competently. The mean T1 exam score was 91.3 (SD = 5.1; range = 76–98). The mean T2 exam score was 87.4 (SD = 7.8, range = 70–100). All participants achieved above the minimum required (75) by the regulatory body to receive Continuing Education Credits.

Data from the session quality checklist showed that the majority (82.5%; n = 33) of participants conducted each session without missing components. Six participants omitted one mindfulness exercise in one (n = 4) or two (n = 2) sessions due to time restrictions; one participant omitted a defusion exercise in session 4 and a self-as-context exercise in session 5 due to timing difficulties. Overall, a high level of intervention fidelity was evident. Supervisors rated all sessions above the cut-off (≤3) indicating acceptable program delivery. Supervisors rated all participants at least five (out of seven) for each session, and for 70% of trainees, supervisors reported no problems.

Changes in personal outcomes

Growth curve modeling was used to test the prediction that over the course of training participants would evidence personal improvements in resilience, affect, wellbeing and psychological flexibility and the associated ACT processes (defusion, mindfulness, values, and acceptance). The intra-class correlation for each personal outcome (unconditional mean model, model 1) ranged from 0.51 to 0.72 suggesting that at least 51% of the total variation in the outcome variables was due to inter-individual differences and therefore growth curve modeling was appropriate. The quadratic growth curve model improved model fit over the linear model for each outcome measure (p < 0.01), indicating that curvature trajectories were likely to provide the best fit for the data. We found no evidence for cubic model or model with variance matrix other than scaled identity (p > 0.05). All personal outcome measures improved over time, with the exception of negative affect, which remained stable. Improvements across outcomes showed a similar linear and quadratic trend (inverted U-shaped curve). The significant linear effect was positive (p < 0.01), revealing that the rate of linear growth increased over time, while the significant quadratic effect was negative (p < 0.05), showing that
the rate of growth decreased over time. Scores increased at the beginning, particularly between T1 and T2, and this trend slowed after T3 and was maintained long-term (Tables 2 and 3 and Figures F.1–9).

**Mediation analysis**

Increases in psychological flexibility from pre- to post-READY participation mediated improvements in resilience ($ab = -1.5749$; 

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**Participant inclusion flowchart.**

1. Initial expression of interest in training ($n=47$)
   - Withdrew interest from study before assessment ($n=0$)

2. Enrolled in the training ($n=47$)

3. Completed pre-training assessment ($n=47$)

4. Completed post-Workshop (Phase 1) assessment ($n=44$)

5. Completed post-Participation in READY (Phase 2) assessment ($n=44$)

6. Completed 3-month follow-up assessment ($n=44$)
   - Analysed ($n=44$)
   - Excluded from the analysis ($n=0$)

7. Lost to follow-up ($n=7$):
   - Did not participate in Phase 3 ($n=4$)
   - Did not fill in the questionnaires ($n=3$)

8. Completed 15-month follow-up assessment ($n=37$)
   - Analysed ($n=44$)
   - Excluded from the analysis ($n=0$)
Table 1. Descriptive data for the personal outcome measures across training phases (n = 44).

|          | M   | SD  | M   | SD  | M   | SD  | M   | SD  |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|
| Resilience | 59.6| 12.2| 58.7| 14.2| 64.8| 12.8| 66.5| 11.7|
| Positive affect | 34.2| 5.5 | 31.9| 6.5 | 36.1| 5.6 | 35.0| 6.4 |
| Negative affect | 17.7| 4.3 | 18.1| 5.3 | 18.1| 4.1 | 18.1| 5.7 |
| Wellbeing | 45.5| 8.5 | 43.3| 9.6 | 48.7| 8.5 | 48.7| 8.5 |
| Psychological flexibility | 107.4| 12.5| 103.4| 15.6| 109.6| 17.6| 110.8| 14.8 |
| Acceptance | 54.6| 5.8 | 54.8| 6.5 | 56.9| 5.5 | 56.5| 6.1 |
| Cognitive defusion | 29.2| 6.6 | 28.2| 7.2 | 33.0| 6.6 | 33.0| 6.8 |
| Mindfulness | 62.2| 10.0| 60.4| 11.2| 64.8| 10.9| 66.2| 9.6 |
| Values and meaningful action | 54.0| 12.3| 54.2| 14.4| 57.5| 13.2| 61.1| 14.6 |

Table 2. Growth curve modeling for resilience, positive and negative affect, and wellbeing longitudinal data (n = 44).

| Model 1 (df = 3) | Resilience | Positive affect | Negative affect | Wellbeing |
|------|------------|----------------|----------------|-----------|
| **Model 1 (df = 3)** | β | SE | p | β | SE | p | β | SE | p | β | SE | p |
| EFE Intercept | 63.0 | 1.7 | <0.01 | 34.5 | 0.8 | <0.01 | 17.5 | 0.6 | <0.01 | 46.9 | 1.2 | <0.01 |
| ECP Residual variance | 55.7 | 5.9 | <0.01 | 15.4 | 1.6 | <0.01 | 11.2 | 1.2 | <0.01 | 26.0 | 2.8 | <0.01 |
| IC –2 log likelihood | 1610.0 | 34.5 | 19.6 | 1614.0 | 34.5 | 19.6 | 1620.8 | 34.5 | 19.6 |
| AIC | 1314.9 | | 1319.9 | | 1326.7 | |
| BIC | 1236.5 | | 1240.5 | | 1247.3 | |
| Model 2 (df = 6) | β | SE | p | β | SE | p | β | SE | p | β | SE | p |
| EFE Intercept | 61.3 | 1.7 | <0.01 | 34.0 | 0.8 | <0.01 | 17.7 | 0.6 | <0.01 | 45.9 | 1.2 | <0.01 |
| ECP Residual variance | 51.4 | 5.5 | <0.01 | 15.0 | 1.6 | <0.01 | 11.3 | 1.2 | <0.01 | 24.0 | 2.6 | <0.01 |
| IC –2 log likelihood | 1593.2 | 34.5 | 19.6 | 1597.2 | 34.5 | 19.6 | 1604.0 | 34.5 | 19.6 |
| AIC | 1314.5 | | 1321.3 | | 1324.0 | |
| BIC | 1236.0 | | 1242.8 | | 1245.6 | |
| Model 3 (df = 7) | β | SE | p | β | SE | p | β | SE | p | β | SE | p |
| EFE Intercept | 58.7 | 1.8 | <0.01 | 33.3 | 0.8 | <0.01 | 17.7 | 0.7 | <0.01 | 44.5 | 1.3 | <0.01 |
| ECP Residual variance | 22.4 | 3.8 | <0.01 | 5.9 | 2.2 | <0.01 | –0.3 | 0.5 | 0.50 | 2.2 | 0.6 | <0.01 |
| IC –2 log likelihood | 1565.2 | 28.0 | <0.01 | 1302.8 | 7.7 | 0.01 | 1233.8 | 2.2 | 0.14 | 1414.0 | 18.1 | <0.01 |
| AIC | 1306.8 | | 1308.7 | | 1306.8 | |
| BIC | 1237.8 | | 1244.6 | | 1242.8 |

EFE: estimates of fixed effects; ECP: estimates of covariance parameters; df: degree of freedom; IC: information criteria; AIC: Akaike information criterion; BIC: Bayesian information criterion; M: model; L: level.

95% CI [-3.4713, -0.3302]; Figure 2), positive affect (ab = -0.7137; 95% CI [-2.0835, -0.1200]; Figure 3), and wellbeing (ab = -1.6627; 95% CI [-3.9914, -0.3685]; Figure 4) in the same timeframe. The mediation effect on negative affect was not assessed because we detected no statistically significant change in this outcome.

Qualitative results

Qualitative data collected at T2 (n = 44) and T4 (n = 37) were analyzed and organized into two overarching themes: (1) the training; (2) trainees’ views of the READY program. Quotes used to reflect these themes are followed by a code in brackets indicating a participant’s identification number, gender, age, years of work in the MS field, work setting, and area of Italy. Socio-demographic characteristics of each participant, tables presenting the complete list of categories and subcategories for each subtheme, and related quotes are reported in Supplementary Appendix E. The tables provided in Supplementary Appendix E are referred in the text as “table E” followed by the specific table number.

The training

This theme is composed of the following subthemes: (1.1) satisfaction with the training; (1.2) training impacts on participants; (1.3) training active elements (Table 4; Supplementary Appendix E).

All participants were highly satisfied with the training. They described it as an enriching experience both personally and professionally and highlighted the atmosphere and format (Tables E2 and E2.1). It has been an enriching and nourishing experience […] It has made it possible to create and top up relationships between participants. The atmosphere during the training has been steeped in facilitator’s enthusiasm that rub off on all the participants. Progressively the group embodied READY principles. I believe READY can be flexibly applied to everyone. (8, woman, 40, 14, MS Centre, North)

Participants noted that the training had positive and long-lasting impacts on personal, professional, and MS psychologist community levels (Table E2). Personal impacts included enhanced resilience, health, quality of life, and relationships (Table E3.1): “This training allowed me to be more aware of the possibility to create and top up relationships between participants. The atmosphere during the training has been steeped in facilitator’s enthusiasm that rub off on all the participants. Progressively the group embodied READY principles. I believe READY can be flexibly applied to everyone. (8, woman, 40, 14, MS Centre, North)
deepest values. This has improved my life” [42, woman, 52, 15, MS Centre, North].

Professionally, participants learned new skills in relation to working with ACT in both individual and group settings, which they applied in their clinical practice. This professional development enhanced their perceptions of themselves as therapists (e.g., more grounded, present, flexible, creative, effective, and motivated; Table E3.2). “I often integrate ACT and READY, metaphors and experiential exercises, in my clinical practice … in group and individual settings” [28, woman, 58, 30, AISM Centre, Centre].

In addition, the training had positive impacts on the community of MS psychologists by way of strengthening professional

Table 3. Growth curve modeling for psychological flexibility and the ACT processes longitudinal data (n = 44).

| Model 1 (df = 3) | Psychological flexibility | Cognitive defusion | Mindfulness | Values and meaningful action | Acceptance |
|-----------------|--------------------------|-------------------|-------------|----------------------------|------------|
| $eta$ | SE | p | $eta$ | SE | p | $eta$ | SE | p | $eta$ | SE | p |
| EFE | Intercept | 108.5 | 1.9 | <0.01 | 31.4 | 0.9 | <0.01 | 63.9 | 1.4 | <0.01 | 58.1 | 1.7 | <0.01 | 55.9 | 0.8 | <0.01 |
| Residual variance | 85.5 | 9.1 | <0.01 | 18.8 | 2.0 | <0.01 | 34.0 | 3.6 | <0.01 | 83.5 | 8.9 | <0.01 | 14.3 | 1.6 | <0.01 |
| $-2$ log likelihood | 1695.3 | 1365.0 | 1507.4 | 1684.9 | 1626.5 |
| AIC | 1699.3 | 1369.0 | 1511.4 | 1688.9 | 1628.5 |
| BIC | 1706.0 | 1375.7 | 1518.1 | 1695.7 | 1627.2 |

| Model 1 (df = 3) | Psychological flexibility | Cognitive defusion | Mindfulness | Values and meaningful action | Acceptance |
|-----------------|--------------------------|-------------------|-------------|----------------------------|------------|
| $eta$ | SE | p | $eta$ | SE | p | $eta$ | SE | p | $eta$ | SE | p |
| EFE | Intercept | 106.8 | 1.9 | <0.01 | 30.0 | 0.9 | <0.01 | 62.6 | 1.4 | <0.01 | 55.1 | 1.8 | <0.01 | 55.3 | 0.8 | <0.01 |
| Time | 3.7 | 1.1 | <0.01 | 2.9 | 0.5 | <0.01 | 2.9 | 0.7 | <0.01 | 6.4 | 1.0 | <0.01 | 1.3 | 0.5 | <0.01 |
| Residual variance | 80.9 | 8.6 | <0.01 | 15.9 | 1.7 | <0.01 | 31.0 | 3.3 | <0.01 | 68.9 | 7.4 | <0.01 | 13.7 | 1.5 | <0.01 |
| $-2$ log likelihood | 1682.4 | 1343.5 | 1489.2 | 1648.2 | 1256.7 |
| AIC | 1686.4 | 1369.0 | 1511.4 | 1688.9 | 1268.5 |
| BIC | 1693.2 | 1375.7 | 1518.1 | 1695.7 | 1275.2 |

| Model 3 (df = 7) | Psychological flexibility | Cognitive defusion | Mindfulness | Values and meaningful action | Acceptance |
|-----------------|--------------------------|-------------------|-------------|----------------------------|------------|
| $eta$ | SE | p | $eta$ | SE | p | $eta$ | SE | p | $eta$ | SE | p |
| EFE | Intercept | 105.4 | 2.0 | <0.01 | 28.6 | 0.9 | <0.01 | 61.1 | 1.5 | <0.01 | 53.4 | 1.9 | <0.01 | 54.6 | 0.8 | <0.01 |
| Time | 14.2 | 5.0 | <0.01 | 13.1 | 2.1 | <0.01 | 13.6 | 3.0 | <0.01 | 18.9 | 4.6 | <0.01 | 6.3 | 2.1 | <0.01 |
| Time sq | –6.7 | 3.1 | <0.01 | –6.5 | 1.3 | <0.01 | –6.8 | 2.0 | <0.01 | –8.0 | 2.9 | <0.01 | –3.2 | 1.3 | <0.01 |
| IC | Intercept | 1344.3 | 1500.0 | 1659.0 | 1267.4 |
| $-2$ log likelihood | 1673.7 | 1308.0 | 1473.4 | 1636.6 | 1248.3 |
| AIC | 1677.7 | 1312.0 | 1477.4 | 1640.6 | 1252.3 |
| BIC | 1684.5 | 1318.7 | 1484.2 | 1647.3 | 1259.0 |

EFE: estimates of fixed effects; ECP: estimates of covariance parameters; df: degree of freedom; IC: information criteria; AIC: Akaike information criterion; BIC: Bayesian information criterion; M: model; L: level.

Figure 2. Mediation effect of psychological flexibility on resilience.

Indirect effect, ab=–1.5749; 95% CI [-3.4713, -0.3302]
and personal connections among members. At the community level, the training enhanced solidarity, closeness, authenticity, complicity, and a deep sense of belonging (Table E3.3).

Training active elements reported by participants can be distinguished as either ACT-specific or non-specific factors (Tables E4 and E4.1). The data showed that the training targeted important resilience protective factors (psychological flexibility skills, social connectedness, and self-care).

Training participation increased my awareness and contact with the present moment. It shed some lights on the possibility to choose how to behave and act in line with my values in a specific context, moment-by-moment. This makes me feel that I can master my life and my reactions without letting them be guided by my emotions, but by my values. [29, woman, 32, AISM Centre, North]

Encouraging progressive personal involvement, the group setting, and the facilitation style were key factors.
The immersion in both the theory and the experiential activities together with the deep exchanges with the other colleagues (participants) has been “explosive”! By having personally experienced the techniques and exercises I was put on the line, this [training] really transformed me into a better therapist, more effective in the therapeutic relationship. [32, woman, 53, 20, MS Centre, North]

Trainees’ views of the READY program
This theme is composed of the following subthemes: (2.1) READY strengths, weaknesses, and suggested changes; (2.2) READY impacts on PwMS; (2.3) READY active elements (Table 5; Supplementary Appendix E).

Some participants indicated that the READY program required no changes. In general, the sample reported more strengths than weaknesses with some suggesting improvements (Table E5). Major strengths were program comprehensiveness and accessibility, applicability to several contexts, and program format and materials (Table E5.1).

This program is really powerful, it has the following strengths: a) it’s clear, feasible and it focuses on the present moment; b) it promotes participant engagement; c) the READY participant manual is a powerful tool; it helps you learn and consolidate competencies, and can be consulted any time. […] This program is a sort of magnifying glass, at a patient’s disposal, to face difficulties by openly contacting feelings and emotions with empathy. [24, woman, 62; 31, AISM Centre, Centre]

The few weaknesses reported pertained mainly to program duration. In particular, participants were worried that its brevity may act as a barrier to processing and acquiring all intervention strategies (Table E5.2). Hence, the most frequent suggestion was to extend the program duration by increasing time between sessions, increasing the number of sessions or adding a booster (Table E5.3): “I would add two more boosters to strengthen and consolidate the effects of the training” [19, woman, 48, 20, MS Centre, North].

During phase 3, trainees delivered READY to PwMS. They reported significant READY intervention effects on a variety of life domains in PwMS (e.g., daily living, health, personal growth, and relationships; Tables E6 and E6.1): “Participants reported that their participation in READY positively impacted their relationships, particularly within their families” [12, woman, 45, 17, MS Centre, Centre].

Participants reported that PwMS improvements were due to both specific (resilience protective factors) and non-specific factors (e.g., group setting; Tables E7 and E7.1): “The approach inspired mindfulness and values-based living. These are key factors to find a new way to relate to your own suffering and reflect on yourself and your life!” [14, man, 54, 4, AISM Centre, North].

Discussion

ACT knowledge and READY delivery competencies
The first aim of the present study was to examine the effects of READY training on participants’ knowledge of ACT and READY and their competency in delivering READY to PwMS. Both quantitative (knowledge exams, session fidelity checklists, and supervision checklists) and qualitative results showed that the training was effective in fostering the acquisition of knowledge and skills for effective delivery of READY to PwMS. Furthermore, trainee participants reported that they acquired new psychotherapy skills, were more confident clinically (e.g., more grounded, creative, effective, and flexible), and felt less vulnerable to burnout. These results are in line with those from an evaluation of ACT training for health practitioners [19].

Table 4. Theme 1 – the training.

| Satisfaction with the training | Personal improvements | Professional improvements | MS psychologist community improvements | Training active elements |
|--------------------------------|-----------------------|--------------------------|---------------------------------------|--------------------------|
| Enriching                      | Resilience            | New therapeutic skills   | New interpersonal connections          | ACT processes            |
| Inspiring                      | Relationships         | New ACT competencies     | New professional connections           | Social connectedness     |
| Interesting                   | Health                | Better therapist         | More supportive community atmosphere   | Self-care                |
| Engaging                      | Quality of life       | Less vulnerable to burnout| An innovative method for AISM training | Deep personal involvement |
| Supportive atmosphere         |                       |                          |                                       |                          |
| Program format                |                       |                          |                                       |                          |

Table 5. Theme 2 – trainees’ views of the READY program delivered to PwMS.

| READY strengths, weakness, and suggested changes | READY impacts on PwMS life domains | READY active elements |
|---------------------------------------------------|------------------------------------|-----------------------|
| Strong theoretical framework                      | Format                             | Psychological flexibility                 |
| Definition of resilience                          | Challenging content                | ACT processes (ACT processes)            |
| Practice of ACT processes                         | Burdensome study design            | Social connectedness                   |
| Comprehensive                                     | Extend program duration             | Self-care                              |
| Applicable to different contexts/conditions       | More time for experiential activities | Facilitator style                      |
| Concrete and pragmatic                            | More time for some topics           | Deep personal involvement              |
| Clear and accessible                              | Co-facilitation                     |                                      |
| Useable                                           | More balanced group composition     |                                      |
| Useful                                            | Quality of life                     |                                      |
| Effective                                         | Daily living                        |                                      |
| Efficient                                         | Mental health                       |                                      |
| Engaging                                          | Personal growth                     |                                      |
| Program format                                    | Relationships                       |                                      |
| Program materials                                 |                                    |                                      |
| May activate a self-help group                    |                                    |                                      |
In line with the results of a previous evaluation of READY [12], the integration of delivering the READY program within the host organization’s infrastructure was feasible and effective, such that AISM signed a copyright agreement to ensure the ongoing delivering of READY. This integration of READY into frontline services stands in contrast to the often cited lack of uptake of validated psychosocial interventions in routine practice [13–15].

**Personal impacts of training**

The second aim was to assess the effects of READY training on participants’ resilience, positive and negative affect, wellbeing, and psychological flexibility and associated ACT processes (mindfulness, defusion, values, and acceptance). Results showed that participants significantly improved on all personal outcomes over the course of the multi-phase training, except negative affect. Qualitative data and the growth curve modeling trends (Figures F1–9) suggested that participation in READY was associated with a wide range of personal improvements that were maintained in the longer term (15-month follow-up). Personal gains peaked during the participation in READY training phase and continued to accrue three months after this, albeit at a slower rate. Compared to the results of a prior study, which evaluated the two-day ACT and READY workshop that was delivered in the first training phase, findings from the present study demonstrate the extra personal benefits of adding intensive experiential training in ACT and READY [20]. The qualitative data showed that an important element of the training program was the incremental personal engagement, from passive workshop recipient, to READY participant, and finally to delivering READY.

The long-lasting (15-month follow-up) effects of the ACT training are in line with the results of a recent ACT-based workplace intervention [47] and with those of other studies showing the personal benefits of ACT training for health practitioners [16–18]. Importantly, improvements in health professionals’ psychological flexibility and mindfulness have been shown to be associated with greater global wellbeing and self-care [21], better job performance and job-related wellbeing [48,49], lowered job stress [49,50], less burnout [49,51,52], and better client outcomes [21]. Although we did not measure job-related stress or burnout, qualitative data showed that participants reported that the training fostered a sense of meaning related to work activities and protected them from burnout.

**Psychological flexibility as a change mechanism**

The third aim was to explore the theoretical integrity of the training, by testing the mediating role of psychological flexibility on resilience, wellbeing, and affect. Given that significant improvements on the personal outcomes and psychological flexibility occurred immediately after participation in READY (T2) and were then maintained up to the 15-month follow-up, only concurrent mediation could be tested. Results showed that improvements in resilience, wellbeing, and positive affect from pre- to post-participation in READY were mediated by changes in psychological flexibility in the same timeframe. These results are in line with previous ACT training studies in both clinical [4] and workplace settings [47,53]. The mediation findings were also supported by the qualitative data, which showed that participants identified both nonspecific and ACT-specific factors (i.e., the ACT processes) as intervention components that were instrumental in fostering their personal gains.

**Additional insights from participants’ views on the training and on the READY program when delivered to PwMS**

As discussed above, qualitative findings converged with quantitative data, demonstrating that the training positively impacted participants both personally and professionally. Qualitative data also showed that the training affected more areas than those measured by standardized questionnaires, such as health, social connectedness, and quality of life. In addition, the qualitative data showed that the training had positive community level impacts on psychologists working in the MS field. The training facilitated stronger professional connections, which fostered new research collaborations. In particular, the training prompted six participants to deliver READY to health professionals, people with fibromyalgia, caregivers of PwMS or other neurological conditions, and to adolescents with MS. The qualitative data also showed that the training improved interpersonal connections within the psychologist network by nurturing a sense of shared work-related values and meaning.

The nested qualitative study also provided information on trainees’ views of the READY program when delivered to PwMS. These data supported the feasibility of delivering READY to PwMS by highlighting several strengths including the program’s solid theoretical framework, comprehensiveness, and efficacy. In addition, trainees reported that READY positively impacted a wide range of life domains in PwMS and attributed such gains to the enhancement of resilience protective factors (e.g., the ACT processes). These results are in line with the views of PwMS on READY reported in previous studies [4,10,12]. A few trainees suggested expanding the program duration by increasing the number of sessions, adding booster sessions or increasing the interval between sessions. These suggested changes are consistent with those reported in the Italian pilot study that evaluated READY with PwMS [10].

It is important to note that the core READY program content has not been changed in its application across various workplace settings and chronic illnesses (e.g., cancer, diabetes, and MS). Hayes and Hofmann proposed that the ACT processes, along with other cognitive behavior therapy strategies, represent generic therapeutic processes that target fundamental psychopathology dimensions [54]. Hence, ACT is suited to a trans-diagnostic intervention approach that is applicable to clinical and non-clinical groups, as demonstrated in the present study.

**Limitations**

We note the following study limitations. First, this study used a single intervention condition, with no control group. Future research should further evaluate the efficacy of the training program by comparing it to an active control condition, to determine if the training impacts are due to specific elements of the training or general factors such as education per se. However, the meditational analyses support the theoretical integrity of the training and the role of psychological flexibility in mediating improvements in three of the outcomes. Second, the sample size is relatively small. However, the training targeted a specific population, members of the AISM Psychologist Network (approximately 100 active members), and almost 50% of this group participated in the study. In addition, there was a limit of 45 people who could participate in the training, which was imposed by the regulatory body for Continuing Education Credits. Third, this study was conducted with psychologists of the AISM Psychologist Network (i.e., psychologists working in a MS or AISM Centre). Hence, it is possible that psychologists who operate outside this network and...
work setting could respond differently to the training. Fourth, the evaluation of participants’ knowledge of ACT and READY relied on two exams, and the assessment of competencies in delivering READY was limited to participant self-report and supervisor judgment. Sessions delivered to PwMS by the trainees (phase 3 – READY delivery) were not recorded, therefore, intervention fidelity was not assessed by an independent rater. Hence, we cannot exclude the presence of an acquiescence bias. Fifth, work-specific constructs such as burnout or job stress were not directly assessed. Sixth, because personal outcome scores were relatively stable from T2 to T4, it was not possible to examine temporal mediation. Finally, qualitative data were collected through written responses to open-ended questions, which may have provided less in-depth data than might be obtained via interviews. However, responding in writing to open-ended questions offered the scope to express opinions anonymously and free from the interpersonal demands inherent in interviews. We acknowledge that the training program is comprehensive and resource intensive. Future research should explore the effectiveness of cut-down versions of the training.

Conclusions
This study showed that a multi-phased program for training psychologists in the ACT-based resilience READY for MS intervention was effective in teaching participants how to deliver the READY program, and in improving participants’ psychological functioning. In particular, the training had significant and enduring positive effects on participants’ resilience, positive affect, wellbeing, psychological flexibility, and related ACT processes. Consistent with the ACT framework, results of the mediation analyses showed psychological flexibility as the likely mechanism of change in these personal improvements. In addition, the training program strengthened the sense of community among members of the professional network, and emerged as a hub for generating new intervention projects for people with chronic illness, their relatives and health professionals. Moreover, the training consolidated the integration of the READY program into a frontline service for PwMS. To date more than 50 READY groups for PwMS have been conducted in Italy. In these ways, the training maybe viewed as having the proverbial positive “stone in the pond ripple effect”.

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Authors contributions
AMG, AS, and KP conceived and developed the study protocol. AMG and KP conceived and developed The ACT and be READY for MS Training Program. AMG ran the training. AMG performed the data analysis. AMG, AS, and KP drafted the manuscript. All authors approved the final manuscript.

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Data availability statement
Data are available upon request to the corresponding author.

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