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Developing Professional Caregivers' Empathy and Emotional Competencies Through Mindfulness-Based Stress Reduction (MBSR): Results of two Proof-of-Concept Studies

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Developing Professional Caregivers' Empathy and Emotional Competencies Through Mindfulness-Based Stress Reduction (MBSR): Results of two Proof-of-Concept Studies

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ABSTRACT

Objectives: To assess the feasibility and acceptability of an MBSR-based intervention and determine if the intervention is associated with a significant signal on empathy and emotional competencies.

Design: Two pre-post proof-of-concept studies.

Setting: Participants were recruited at the University of Montreal's Psychology Department (Study 1) and the CHU Sainte-Justine Department of Hematology-Oncology (Study 2).

Participants: Study 1: 12 students completed the 8-week program (mean age 24, range 18–34). Study 2: 25 professionals completed the 8-week program (mean age 48, range 27–63).

Intervention: Standard MBSR program including 8-week mindfulness program consisting of 8 consecutive weekly 2-hour sessions and a full-day silent retreat.

Outcomes measures: Mindfulness as measured by the Mindful Attention Awareness Scale (MAAS); empathy as measured by the Interpersonal Reactivity Index (IRI)'s Perspective Taking and Empathic Concern subscales; identification of one's own emotions and those of others as measured by the Profile of Emotional Competence (PEC)'s Identify my Emotions and Identify Others' Emotions subscales; emotional acceptance as measured by the Acceptance and Action Questionnaire-II (AAQ-II) and the Emotion Regulation Scale (ERQ)'s Expressive Suppression subscale; and recognition of emotions in others as measured by the Geneva Emotion Recognition Test (GERT).

Results: In both studies, retention rates (80%–81%) were acceptable. Participants who completed the program improved on all measures except the PEC's Identify Others'

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3 Emotions and the IRI's Empathic Concern (Cohen's d median = .92, range .45–1.72). In
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5 study 2, favourable effects associated with the program were maintained over 3 months
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8 on the PEC's Identify my Emotions, the AAQ-II, the ERQ's Expressive Suppression, and
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10 the GERT.
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12
13 **Conclusions:** The program was feasible and acceptable. It was associated with a
14
15 significant signal on the following outcomes: perspective taking, the identification of
16
17 one's own emotions, and emotional acceptance thus justifying moving towards efficacy
18
19 trials using these outcomes.
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21

22 **Keywords:** Mindfulness-based stress reduction, haematology-oncology, empathy,
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24 emotional competence, professional caregivers
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29 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

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- 31
32 • Two feasibility studies of an MBSR-based intervention in students and
33
34 professionals had high attendance rates and acceptability levels.
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- 37 • Results suggested a significant clinical signal on most measured outcomes in the
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39 domains of emotion regulation and empathy, with effects lasting at follow-up for
40
41 identification of one's own emotions and emotional acceptance.
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- 44 • The same pattern of results was obtained in two independent small-scale studies.
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- 47 • A limitation to these studies is that samples were not randomly selected, had
48
49 limited size, and no control groups were used.
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- 52 • Another limitation is that most outcomes were self-reported and could be subject
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54 to desirability bias.
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INTRODUCTION

In professional caregivers, empathy and its related emotional processes have been recognized as being of utmost importance[1]. Empathy has been described as a multidimensional construct that encompasses the ability to cognitively adopt another person's point of view (perspective taking) and the tendency to experience other-oriented feelings such as compassion and concern (empathic concern)[2]. It has been suggested that higher empathy relates to better health outcomes in patients, including a reduction in the duration and severity of minor conditions, improved adherence to treatment, higher patient satisfaction, and lower psychological distress[3-6]. In professionals themselves, experimental research from social neuroscience has confirmed the long-standing clinical assumption that difficulty maintaining an adequate emotional distance from the suffering of patients could lead to emotional exhaustion, the latter being a core component of burnout[7]. Research has also shown that sharing emotions without regulating effectively one's emotions could lead to a reduced empathy[8]. Abilities to regulate one's emotions and empathy are all the more important in the context of serious paediatric conditions where professionals are even more likely to develop burnout and exhaustion[9-13].

Emotional competencies are particularly important in a context where being empathetic could have an emotional cost to professional caregivers[14]. To avoid emotional confusion, it is essential that professionals distinguish between their own emotions and their patient's emotions[15]. This is based on an adequate identification of one's own emotions and the emotions of others (i.e., identifying the agent of the emotional experience)[16]. An important skill allowing adequate identification of the source of emotion is to accept emotions as they arise rather than trying to avoid or

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2
3 suppress them. In this context, three key emotional competencies have been identified as
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5 core to empathic processes: 1) identifying one's own emotions, 2) identifying the
6
7 emotions in others, and 3) accepting one's own emotions.
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10 Mindfulness-based interventions, including Mindfulness-Based Stress Reduction
11 (MBSR), are deemed to promote a better awareness and acceptance of emotions as they
12 occur and therefore could help develop emotional competencies in professional
13 caregivers[17]. However, despite the importance of empathy in healthcare and the
14 suggested capacity of mindfulness practice to increase empathy and its related emotional
15 competencies, these have seldom been selected as primary or secondary outcomes in
16 previous studies[18]. We conducted two interrelated studies to test for the effect of
17 mindfulness on these outcomes in a population of professionals vulnerable to burnout.
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29 The first objective of the studies was to determine if an MBSR-derived program
30 was a feasible and acceptable intervention for students and professional caregivers
31 working in a tertiary paediatric haematology-oncology treatment centre. The second
32 objective was to determine if the program could achieve a significant clinical signal on
33 empathy and the following emotional competencies: identification of one's own
34 emotions, identification of others' emotions, and emotional acceptance.
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46 **METHODS**

47 **Design**

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49 As recommended in existing program development methodological guidelines
50 when examining new outcomes of a manualized intervention, we performed two Phase
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Ila Proof-of-concept studies focusing on feasibility and clinical signals on the new

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3 domains in an original population[19]. The first study was used to set up the program and
4 the modalities for data collection in a student population; the second was designed to
5 replicate the first in a professional setting, to extend it to a larger scale, and to include a
6 follow-up. Both studies were designed as one-group pretest-posttest studies to inform
7 future trials. Measures were taken at pre and post for Study 1 and at pre, post, and a 3-
8 month follow-up for Study 2.
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17 **Participants and procedure**

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19 Study 1 took place between October 2015 and March 2016 at the University of
20 Montreal and involved university psychology students. Study 2 took place at the CHU
21 Sainte-Justine Department of Hematology-Oncology (Montreal, Canada) from March to
22 May 2016 and involved professional caregivers working in paediatric haematology-
23 oncology. Inclusion criteria for both studies were a) the ability to comply with the
24 requirements of the program, b) no previous participation in MBSR, c) no active
25 substance dependence, d) no psychotic symptoms, and e) no suicidality.
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36 Study 1

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38 Participants were recruited at the University of Montreal Psychology Department.
39 All psychology undergraduate and graduate students ($n = 1,130$) were approached by
40 email to participate in this 8-week stress reduction program.
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46 Study 2

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48 Participants of Study 2 were recruited among day shift professional caregivers
49 and employees working at the CHU Sainte-Justine Department of Hematology-Oncology
50 ($n = 109$). Potential participants were invited to an information meeting. The instructor
51 (ML) met participants who were interested individually.
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3 Participants gave written informed consent before the beginning of the study.
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5 They received \$50 (CAD) for the completion of the program and the surveys. The study
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7 received full approval from the Research Ethics Committees of the University of
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9 Montreal's Faculty of Arts and Sciences and the CHU Sainte-Justine (#2016-1068).
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11

12 13 14 15 **Intervention**

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17 The PEACE Program (French acronym for *Pleine conscience, Empathie,*
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19 *Acceptation et Compétences Émotionnelles*) was modelled on the Mindfulness-Based
20
21 Stress Reduction (MBSR) developed by Jon Kabat-Zinn[17] which had already been
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23 tested in paediatric haematology-oncology (but with other outcomes)[20]. The
24
25 intervention consisted of eight weekly 2-hour sessions and a full-day silent retreat
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27 between session 6 and 7. Participants received a workbook and audio recordings of
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29 guided meditations to help them with home practice. The intervention was led by an
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31 instructor with extended meditation practice and training in MBSR at the University of
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33 Massachusetts Medical School (ML). To ensure the integrity of the program, the
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35 instructor was supervised by a certified MBSR instructor, a pioneer in the field with more
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37 than a decade of experience teaching MBSR to caregivers in Canada and Europe (PD, see
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39 acknowledgments). All sessions were videotaped for that purpose.
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48 49 **Feasibility and acceptability**

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51 We assessed the feasibility of conducting an 8-week mindfulness-based program
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53 with professionals working in paediatric haematology-oncology by evaluating their
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55 interest in the program, the retention rates, and adherence to practice. The interest in the
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3 program was measured by the proportion of professionals interested among those
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5 meeting the eligibility criteria. The retention rate was measured by the proportion of
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7 professionals enrolled in the study who completed the study protocol (at least six of the
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9 eight weekly sessions). The adherence to practice was estimated by the number of hours
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11 of home practice as recorded by the participants, including formal practice (i.e. yoga,
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13 meditation, body scan, walking meditation) and informal practice (e.g., being mindful
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15 while performing daily tasks such as brushing one's teeth).
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20 We also included three open-ended evaluation questions in the post-study
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22 questionnaire to explore the acceptability of the program: (1) "What is your general
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24 appreciation of the program?", (2) "What are the obstacles you have encountered during
25
26 the program?", and (3) "What did you learn from your participation in the program?" In
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28 addition, in the pre-study questionnaire, participants were asked to set three personal
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30 goals for the program. In the post-study questionnaire, they were asked whether the
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32 program had helped them achieve these goals.
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39 **Measures**

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41 At all time points, participants completed validated French-language versions of
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43 self-report questionnaires electronically via SurveyMonkey®. They also completed an
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45 emotion recognition task[21] online via the survey tool of the Qualtrics Research Suite
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47 (Copyright © 2016 Qualtrics, Provo, UT, USA).
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Mindfulness

The Mindful Attention Awareness Scale (MAAS)[22] was used to measure mindfulness. The MAAS is a validated 15-item questionnaire that measures attention to and awareness of the present moment on a 6-point Likert scale (1 = almost always; 6 = almost never)[22, 23]. The total score is the mean of the items (range 1–6). An example of an item is: “I do jobs or tasks automatically, without being aware of what I'm doing”. The internal consistency coefficient for both Study 1 and Study 2 was $\alpha = .84$.

Empathy

Empathy was measured with the Interpersonal Reactivity Index (IRI)[24], a 28-item answered on a 5-point Likert scale (0=does not describe me well, 4=describes me very well). Two subscales of the IRI were used for this study (7 items each): the Perspective Taking (PT) subscale, which measures the tendency to adopt others' viewpoints (cognitive empathy); and the Empathic Concern (EC) subscale, which measures the tendency to feel warmth, concern, and compassion for others (emotional empathy). The score of each subscale is the sum of the items (range 0–28). An example of a PT item is: “When I'm upset at someone, I usually try to ‘put myself in his shoes’ for a while”. An example of an EC item is: “I often have tender, concerned feelings for people less fortunate than me”. In Study 1, the Cronbach alphas were .67 for PT and .75 for EC; in Study 2, the Cronbach alphas were .75 for PT and .73 for EC.

Emotional Competencies

Identification of one's own emotions. Identification of one's own emotions was measured with the Profile of Emotional Competence (PEC)[25], which measures

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3 emotional competencies on a 5-point Likert scale (1 = not at all/never; 5 = very
4 well/often). We used the 5-item subscale 'Identify my Emotions'. The score of the
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6 subscale is the mean of the items (range 1–5). An example of the items include: "I am
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8 aware of my emotions as soon as they arise". The subscale's Cronbach alphas for Study 1
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10 and Study 2 were .81 and .54, respectively.

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15 *Identification of emotions in others.* Identification of emotions in others was
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17 measured with the PEC's 5-item subscale 'Identify Others' Emotions'[25]. The score of
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19 the subscale is the mean of the items (range 1–5). "I am good at sensing what others are
20
21 feeling" ('Identify Others' Emotions'). The subscale's Cronbach alphas for Study 1 and
22
23 Study 2 were .84 and .67, respectively.

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27 *Emotional acceptance.* Emotional acceptance was measured with the Acceptance
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29 & Action Questionnaire-II (AAQ-II), a 10-item questionnaire using a 7-point Likert scale
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31 (1 = never true, 7 = always true)[26]. The scale measures experiential avoidance; items
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33 were reversed to obtain a measure of acceptance. The score of the scale is the sum of the
34
35 items (range 10–70). An example of an item is: "I'm afraid of my feelings". The
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37 Cronbach alphas for Study 1 and Study 2 were .91 and .79, respectively.

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41 We also used the Emotion Regulation Scale (ERQ)[27], a 7-item questionnaire
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43 using a 7-point Likert scale (1=strongly agree, 7=strongly disagree) to assess the
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45 suppression of emotions (4-item Expressive Suppression subscale), reflecting less
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47 emotional acceptance[28]. The score of the 4-item subscale is the mean of the items
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49 (range 1–7). An example of an item is: "I control my emotions by not expressing them".
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51 The subscale's Cronbach alphas for Study 1 and Study 2 were .67 and .84, respectively.
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Recognition of others' emotions task

The Geneva Emotion Recognition Test (GERT)[21] was used to measure the participants' ability to recognize emotions in others. This is a facial emotional recognition task consisting of 83 short videos (with audio recordings) in which actors express 14 different emotions. The task can be completed in approximately 20 minutes (10 minutes for the short version). After each video, participants had to choose which emotion was expressed by the actor on the video[29]. The full 83-item GERT was used for Study 1 and due to time concerns the short 42-item version (GERT-S) was used for Study 2. The score is the sum of the items (range 0–83 for the GERT and 0–42 for the GERT-S).

Statistical analysis

Descriptive statistics were used to describe socio-demographic characteristics of the samples. For Study 1, we performed Student's *t*-tests to compare pre/post differences. For Study 2, we performed General Linear Models (GLM) with three levels (pre, post, follow-up) that included a Mauchly's Test of Sphericity. A Greenhouse-Geisser correction was used when the assumption of sphericity was violated. Pairwise comparisons were performed with a Bonferroni correction for multiple comparisons. Statistical significance was established at $p < .05$. In line with our objectives, we computed Cohen's *d* to assess effect sizes for pre/post, post/follow-up, and pre/follow-up differences. Statistical analyses were performed with IBM SPSS Statistics, version 24.0 (IBM Corp., Armonk, N.Y., USA).

RESULTS

Participants

Participants' demographic characteristics for both studies are shown in Table 1. The mean (*SD*) number of hours of formal practice at home for the entire program was on average 9.8 (6.2) for Study 1 and 24.9 (12.9) for Study 2. Hours of informal practice were on average 2.5 (1.8) for Study 1 and 11.4 (15.3) for Study 2.

Table 1
 Characteristics of Participants

	Study 1 (Students, $n = 12$) n (%) / M (SD)	Study 2 (Professionals, $n = 25$) n (%) / M (SD)
Sex		
Female	11 (92%)	22 (88%)
Male	1	3
Age	24.0 (4.2) range 18–34	48.1 (10.8) range 27–63
Marital status		
Married, civil union, common-law	5 (42%)	12 (48%)
Living alone	7 (58%)	13 (52%)
University Level (Study 1) / Level of Education (Study 2)		
College	-	3 (12%)
Bachelor	7 (58%)	12 (48%)
Master	-	6 (24%)
Doctorate	5 (42%)	4 (16%)
Profession (Study 2)		
Nurse	-	13 (52%)
Physician	-	2 (8%)
Professionals ^a	-	4 (16%)
Support Staff ^b	-	6 (24%)

^a 2 Physiotherapists and 2 Supportive Care Professionals

^b 4 Research Staff and 2 Community Organization Professionals

Feasibility and Acceptability

Study 1

Forty-three students showed interest in participating in the study. Sixteen were interviewed and screened for eligibility, with 15 recruited to take part in the study. Among these, 12/15 completed at least 6 sessions, yielding a retention rate of 80%. Furthermore, 15/15 (100%) completed the pre-intervention survey, 12/15 (80%) completed the post-survey, and 11/12 (92%) attended the one-day silent retreat. Three students (20%) left the program (two after the first

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3 session for personal reasons and one after the fourth session due to a scheduling conflict). The
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5 final sample for analyses was thus composed of 12 students.
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8 Post-intervention data indicated high levels of satisfaction with the PEACE Program.
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10 Thus, 11/12 (92%) reported that the program had helped them achieve the goals they had set for
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12 themselves and 12/12 (100%) reported that the program made them more aware of their
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14 experience of the present moment. Participants reported that the program was (a) “varied”, b)
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16 “structured”, (c) “instructive”, and (d) “beneficial”. Participants’ comments were positive
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18 regarding their overall appreciation of the program (e.g., “I did it to sleep better and it worked”,
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20 “This program helped me improve my stress management skills and I want to continue
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22 meditating”). Students reported that they had learned from the program (e.g., “I learned that it’s
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24 very important to take time for myself”). The most frequent obstacles reported by the students
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26 were as follows: (a) “the length of the daily home practice”, (b) “lack of assiduity”, (c)
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28 “difficulty finding time for home practice”, (d) “motivation for home practice”, and (e)
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30 “sleepiness during the exercises”.
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36 Study 2

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38 Forty-one out of 109 (38 %) eligible employees showed interest in participating in the
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40 study. Among these, 28/41 (68%) were enrolled in the study; 13/41 (32%) could not participate
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42 due to scheduling conflicts or personal reasons. However, 2/28 (7%) left before the beginning of
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44 the program because of scheduling difficulties. Twenty-six employees were therefore eventually
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46 enrolled in the program. Although one participant (4%) abandoned the program after two
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48 sessions due to a scheduling conflict, 21/26 participants completed at least six sessions, leading
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50 to a retention rate of 81%. Furthermore, 19/26 (73 %) attended the one-day silent retreat, 26/26
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3 (100%) completed the pre-intervention survey, 25/26 (96%) completed the post-intervention
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5 survey, and 24/26 (92%) completed the follow-up survey.
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8 All employees (100%) who completed the study reported that the program had helped
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10 them achieve the goals they had set for themselves and had made them more aware of their
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12 experience. Participants reported that the program was (a) “excellent”, (b) “interesting”, and (c)
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14 “a very good initiative”. Participants’ comments were positive regarding their overall
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16 appreciation of the program (e.g., “I would recommend it to others”). They reported that they
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18 had learned many things from their participation in the program (e.g., “The importance of living
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20 the present moment and to put oneself in the shoes of the other in the caregiver-patient
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22 relationship”). Obstacles reported by the participants included (a) “lack of time for home
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24 practice”, (b) “lack of time to participate in the 8 weekly sessions”, and (c) “lack of self-
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26 discipline”.
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34 **Outcome results**

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36 A preliminary analysis checked that the program was actually related to changes on the
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38 mindfulness measure. Results showed very large effect sizes pre-post in Study 1, $d = 1.53$;
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40 $t(11)=5.29, p < .001$ and Study 2 $d = 1.72, p < .001$ (Fig. 1). Changes were also maintained at
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42 follow-up in Study 2, $d = 1.54, p < .001$. In Study 2, a repeated measures ANOVA showed
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44 differences in scores over the three time points, $F(1.43, 32.90) = 35.72, p < .001, \eta_p^2 = .61$. When
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46 exploring the size of changes associated with the program, we observed large effect sizes on
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48 several pertinent outcomes (Fig. 1).
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Study 1

For Study 1 pre/post comparisons, very large effect sizes were observed for the following: Acceptance, $d = 1.39$; $t(11) = 4.81$, $p < .001$; the Emotion Recognition Task, $d = 1.20$; $t(11) = 4.14$, $p < .01$; and Perspective Taking ($d = 1.00$; $t(11) = 3.46$, $p < .01$ (Fig. 1). A medium-to-large effect size was observed for Identify my Emotions ($d = .77$; $t(11) = 2.67$, $p < .05$; and Expressive Suppression, $d = .73$; $t(11) = 2.53$, $p < .05$ (Fig. 1). Empathic Concern and Identify Others' Emotions showed a small-medium effect size but did not reach statistical significance ($d = .49$; $t(11) = 1.70$, $p = .118$ and $d = .31$, $t(11) = 1.09$, $p = .301$ respectively). Table 2 includes full detailed results.

Table 2
 Study 1 and Study 2 Outcomes Scores at Different Time/-Points

Measure	Study 1 (Students, N = 12)				Study 2 (Professionals, N = 25)					
	Pre		Post		PRE		POST		FOLLOW-UP	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Mindfulness (MAAS)	2.76	.56	3.43	.73	2.89	.52	3.79	.53	3.61	.41
Perspective Taking (IRI)	2.58	.52	3.05	.47	2.63	.67	2.94	.56	2.77	.55
Empathic Concern (IRI)	2.79	.31	3.00	.29	2.96	.63	2.98	.44	2.97	.56
Identify my Emotions (PEC)	3.07	.88	3.53	.97	3.47	.64	4.0	.54	4.01	.57
Identify Others' Emotions (PEC)	3.97	.69	4.17	.61	3.86	.60	3.99	.50	3.95	.59
Acceptance (AAQ-II)	42.25	10.83	48.83	9.61	44.08	7.85	51.54	8.21	51.88	8.42
Expressive Suppression (ERQ)	2.75	.81	2.44	.94	3.18	1.09	2.68	1.15	2.74	1.09
Recognition of Emotions (GERT) ^a	58.58	4.01	63.83	6.16	26.75	5.89	29.00	4.00	29.00	5.72

MAAS = Mindfulness Attention & Awareness Scale; IRI = Interpersonal Reactivity Index; PEC = Profile of Emotional Competence; AAQ-II = Acceptance & Action Questionnaire; ERQ = Emotion Regulation Questionnaire; GERT = Geneva Emotion Recognition Recognition Test. ^aThe 83-item original version of the GERT was used for Study 1 and the 42-item short version (GERT-S) was used for Study 2

Study 2

The repeated measures ANOVA showed differences in scores over the three time points. These involved the following: Perspective Taking, $F(1.58, 36.40) = 5.83, p < .01, \eta_p^2 = .20$; Identify my Emotions, $F(2, 46) = 16.64, p < .001, \eta_p^2 = .42$; Acceptance, $F(2, 46) = 25.78, p < .001, \eta_p^2 = .53$ and Expressive Suppression, $F(2, 46) = 4.39, p < .01, \eta_p^2 = .16$ (Fig 1). We did not find significant differences on Empathic Concern $F(2, 46) = .023, p = .977, \eta_p^2 = .001$; Identify Others' Emotions $F(2, 46) = 1.116, p = .336, \eta_p^2 = .046$ and the Emotion Recognition Task $F(2, 46) = 2.91, p = .07, \eta_p^2 = .16$ (Table 2).

Posthoc pairwise comparisons revealed Pre/Post improvements with large effect sizes for Acceptance ($d = .93$) and Identify my Emotions ($d = .90$). A medium effect size was observed for Pre/post differences in Perspective Taking ($d = .50$) and Expressive Suppression ($d = .45$). A medium effect size was also observed on the Emotion Recognition Task ($d = .45$) but that difference was not statistically significant. A small effect size was observed for the Pre/post difference on Identify Others' Emotions ($d = .24$) but the difference was not statistically significant. No effect was noted on Empathic Concern ($d = .04$; Table S1). In study II, we found that effects associated with the program were maintained over 3 months on the following outcomes: Identify my Emotions, Acceptance, Expressive Suppression, and the Emotion Recognition Task (Fig. 1).

When exploring the role of home practice, we did not find correlations between formal practice with changes on outcome measured in Study 1. In Study 2, formal practice (yoga, sitting meditation, and body scan) was moderately correlated with improvements on Identify my Emotions, $r = .42; p < .05$ and Expressive Suppression, $r =$

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–.52, $p < .01$, but did not correlate with other outcomes. Informal practice did not correlate with other outcome changes over time.

DISCUSSION

These two studies are the first to specifically examine the effects of a mindfulness-based program on students' and professional caregivers' emotional competencies. We found that the MBSR-based program is a feasible and acceptable intervention and that it could achieve an important clinical signal across different emotional measures, particularly in a vulnerable population, namely professional caregivers working in paediatric haematology-oncology.

Participants in this program showed improvements in their mindfulness skills, with effect sizes larger than those found in previous studies using the same measure with professionals in training [30-33] and larger than those reported in studies using other mindfulness scales with healthcare professionals [34-36]. Participants also improved on the identification of one's own emotions, with effect sizes larger than those found in other studies [35, 37]. During the program, participants were specifically instructed to attend to their own physical sensations, which allowed them to be more aware of their emotions. Of note, the more professionals practised the formal meditation exercises at home during the program, the more they reported post-intervention improvements on this specific emotional competency (Study 2). Moreover, these improvements were maintained at 3 months post-intervention in Study 2, which suggests that the intervention could have lasting effects.

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There was no significant improvement in the self-reported ability to identify others' emotions. This unexpected result could be due to the fact that participants' pre study scores were already high on this outcome. In both our studies, participants had higher pre study scores on this outcome than the norms reported by the authors of the scale[25], whereas they had lower scores than the norms on the identification of one's own emotions. This could be because all formal meditation exercises focused on being attentive to one's own internal experiences. Perhaps more specific interventions focusing on interpersonal awareness, such as narrative medicine, could be included in the program to teach participants how to attend to others' emotions[34]. In healthcare, correct identification of emotions in patients is crucial for effective communication, good care planning, and patient safety outcomes[38, 39]. Although some of the exercises practised at the weekly meetings were performed in dyads and incorporated mindful communication, this apparently did not spread to the relation to others' emotions, as measured with self-report. This contrasts with results from the emotion recognition task (GERT), a more ecological measure, which allows for a direct measure of participants' ability to recognize a large range of emotions. Interestingly, participants in Study 1 improved significantly on this task with a very large effect size, while the improvement for professionals was not significant. Nevertheless, the latter showed a medium effect size.

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Participants also showed improvements in emotional acceptance and these results were maintained at 3 months post-intervention in Study 2. These results are in line with previous research, which indirectly measured this competence [35, 37, 40, 41]. Mindfulness focuses on the acceptance of one's own experience in the present moment,

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3 whether experienced as positive or negative, without judgment, and with an attitude of
4 openness[17, 42, 43]. Instead of trying to avoid or distract themselves from so-called
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6 negative emotions, participants here were invited to welcome and pay attention to
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8 whatever thoughts and emotions arose in their field of consciousness from moment to
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10 moment. It is essential that professional caregivers learn how to accept their emotions
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12 instead of avoiding or suppressing them. Previous studies have indeed demonstrated that
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14 acceptance was linked to fewer psychological symptoms such as anxiety and
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16 depression[44-46].
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23 Furthermore, participants improved in perspective taking. These results are
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25 consistent with those of Krasner et al. (2009), who reported an increased ability for
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27 perspective taking following an 8-week MBSR-based program amongst primary care
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29 physicians using the Jefferson Scale of Physician Empathy (JSPE)[34]. This study
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31 reported a small-to-medium effect size, similar to the effect size found in our second
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33 study with professional caregivers. Different pathways might explain improvements in
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35 perspective taking in our studies. Firstly, a concurrent improvement in emotional
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37 competencies might help caregivers adopt their patients' point of views. To explore this
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39 hypothesis, we performed additional analyses correlating the emotional competencies
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41 with perspective taking. Interestingly, change in perspective taking were correlated with
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43 change in the PEC total score, which encompasses interpersonal and intrapersonal
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45 emotional competencies (Study 1; $r = .67$; $p < .01$; Study 2: $r = .38$; $p = .059$). Secondly, it
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47 has been suggested that keeping an *emotional distance* is advisable in patient care in
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49 order to maintain professionals' emotional balance[47]. Perhaps the emotional
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51 competencies measured in this study fostered such a distance. Alternatively, they may
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3 prevent professional caregivers from confounding their personal experience with that of
4 the patient. A recent study suggests that concentrating too highly on personal emotions is
5 associated with decreased ability to detect distress in persons affected by cancer[48].
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10 Future studies should explore more systematically the mechanisms underlying the effects
11 of emotional competencies on perspective taking. Participants did not improve on
12 empathic concern. Although this result may appear surprising, it is consistent with the
13 cognitive effect expected from mindfulness training. This result is also in line with
14 previous results on healthcare providers, which found no significant change on the IRI's
15 empathic concern[49, 50]. Perhaps mindfulness does not affect empathic concern: a study
16 found that mindfulness increases perspective taking, but not empathic concern[51].
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Future research should disentangle cognitive and affective aspects of empathy as they seem differently impacted by mindfulness and have been shown to interact when explaining burnout[52].

We should acknowledge certain limitations to our studies. Firstly, participants were self-selected and sample sizes were limited. However, self-selection is relatively ecological as it is a reflection of what would happen if the program were offered. Importantly, a large sample selected at random is not necessary at the proof-of-concept stage[19]. The results of our studies justify progressing toward more rigorous testing with larger samples in randomized controlled trials. Another limitation lies with the use of self-reports as they bear desirability. Future studies should include more tasks like the one used in this study to approach emotional competence before and after training. A final limitation is the low reliability of the 'Identify my Emotions' subscale in Study 2.

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Notwithstanding these limitations, an important strength of this research is the replication of results between Study 1 and Study 2 on very different populations. Another strength is the high attendance rates (80% and 81%, respectively), which could be explained by the fact that potential participants were well informed about the nature and the structure of the PEACE program, as well as the required level of commitment before enrolling. For example, professional caregivers were given the chance to attend an information session where they could try a brief meditation session and ask questions about the program before participating in the study. The instructor also met each participant individually prior to starting the training, in order to evaluate their willingness and readiness to engage in the program.

In conclusion, the results of these two proof-of-concept studies suggest that MBSR could improve professional caregivers' perspective taking skills (the cognitive dimension of empathy), but maybe not their empathic concern (the affective dimension of empathy). MBSR could also improve professionals' emotional competencies, such as identifying and accepting one's own emotions, which could contribute to the prevention of burnout. Furthermore, this research could have interesting applications in the training and continuing education of professionals in the helping professions.

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7 of the manuscript.
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10 11 12 **COMPETING INTERESTS**

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15 We have read and understood BMJ policy on declaration of interests and declare
16
17 that we have no competing interests.
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20 21 22 **DATA SHARING STATEMENT**

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24 Statistical Code and dataset are available on demand.
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43 44 **AUTHORS’ CONTRIBUTIONS**

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46 ML participated in the design of the study, coordinated the study, performed the
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48 statistical analysis, and wrote the manuscript. MD helped design the study and participant
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50 recruitment, and revised the manuscript. PM provided advice for the statistical analysis.
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52 YP revised the manuscript. SS participated in the design of the study and the coordination
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3 of the study, found financial support, and coordinated the writing of the manuscript. All
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5 authors read and approved the final manuscript.
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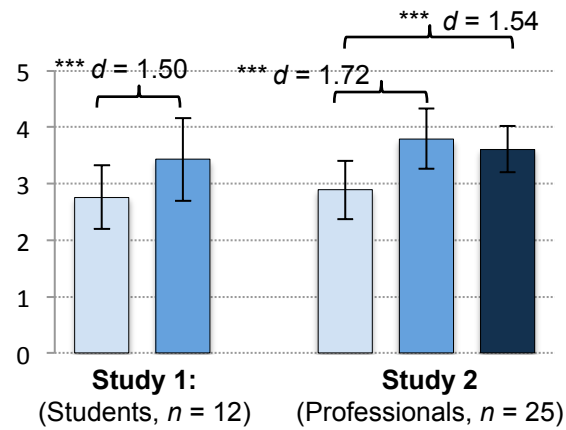
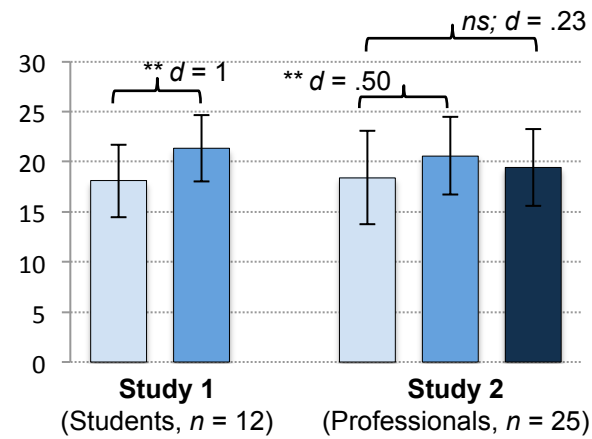
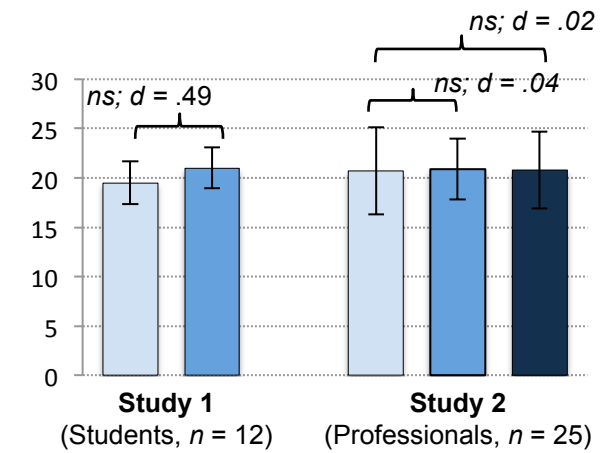
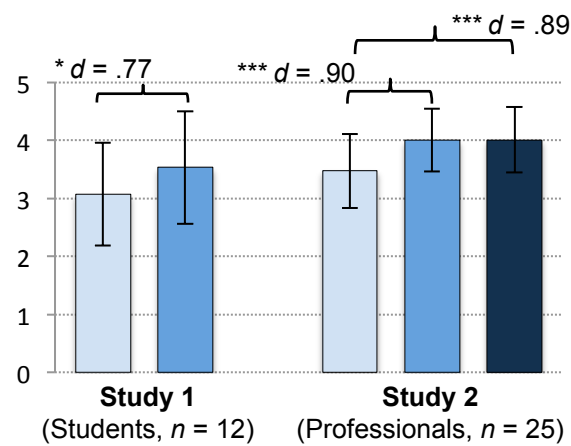
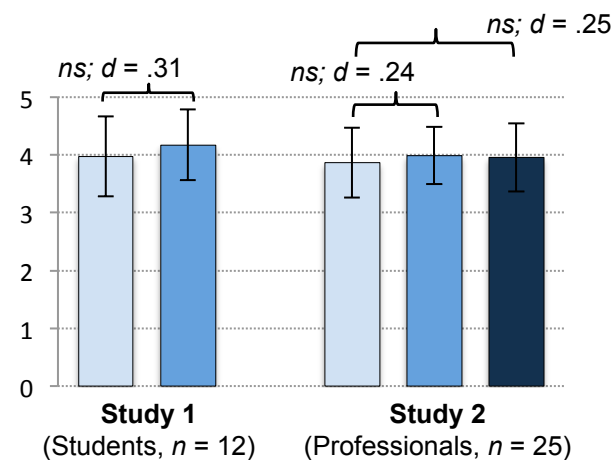
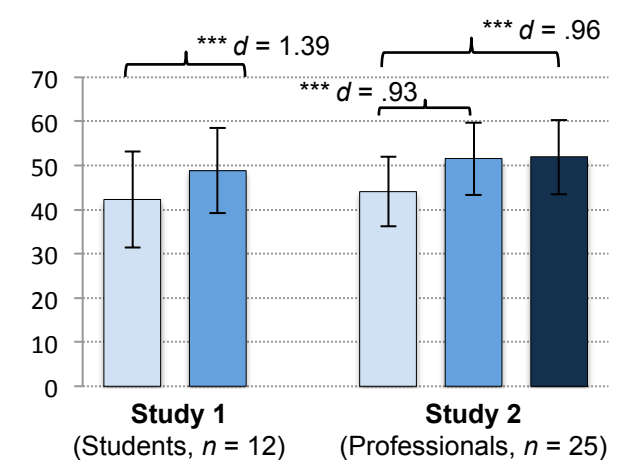
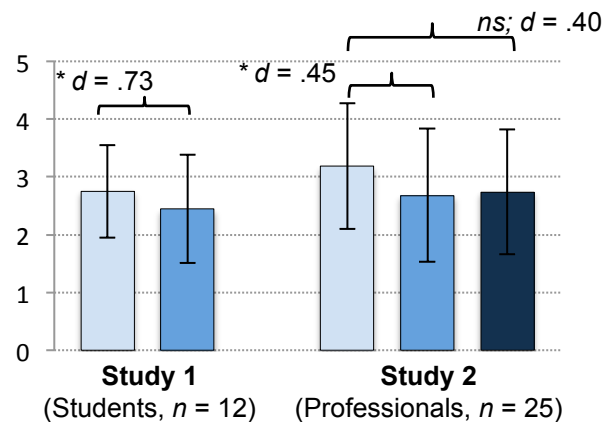
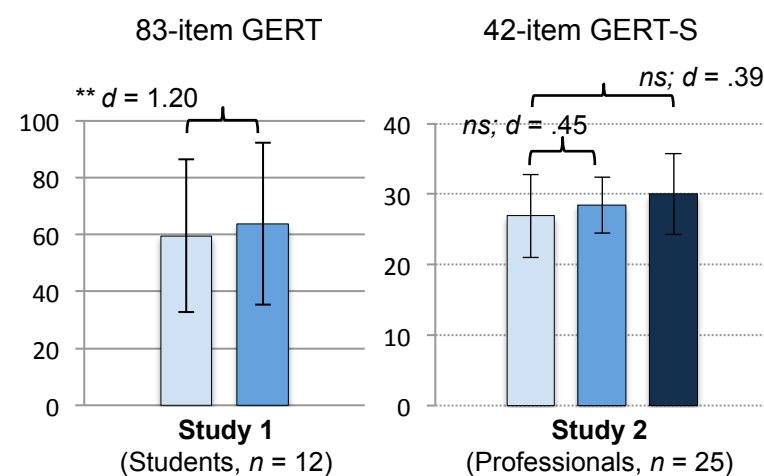
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A. Mindfulness (MAAS)**B. Empathy: Perspective Taking (IRI)****C. Empathy: Empathic Concern (IRI)****D. Identify my Emotions (PEC)****E. Identify Others' Emotions (PEC)****F. Emotional Acceptance (AAQ-II)****G. Emotional Acceptance (Expressive Suppression; ERQ)****H. Recognition of Others' Emotions' Task (GERT)**

PRE
POST
3-MONTH FOLLOW-UP

FIGURE 1. Changes in Outcomes for Study 1 (12 Students) and Study 2 (25 Professionals) following the PEACE Program. The Peace Program is an 8-week intervention based on the Mindfulness-Based Stress Reduction (MBSR). **A.** Change in Mindfulness scores as measured by the Attention Awareness Scale (MAAS). **B.** Change in Perspective Taking scores as measured by the Interpersonal Reactivity Index (IRI). **C.** Change in Empathic Concern scores as measured by the Interpersonal Reactivity Index (IRI). **D.** Change in the ability to identify one's own emotions as measured by the Profile of Emotional Competence (PEC). **E.** Change in the ability to identify others' emotions as measured by the Profile of Emotional Competence (PEC). **F.** Change in acceptance as measured by the Acceptance and Action Questionnaire (AAQ-II). **G.** Change in expressive suppression as measured by the Emotion Regulation Scale (ERQ). **H.** Change in the ability to recognize others' emotions in the face, voice and body as measured by the Geneva Emotion Recognition Test (GERT and GERT-S). *** = $p < .001$; ** = $p < .01$; * = $p < .05$. Cohen's d : .2 = small; .5 = medium; .8 = large; ns = non-significant.

Table S1
 Study 2 Results of Pairwise Comparisons across time on outcomes measured at pre, post, follow-up of an MBSR-based program followed by 25
 paediatric haematology-oncology professionals

Measure	(I) Time	(J) Time	Mean Difference (I-J)	SE	p^a	d	95% confidence interval for difference ^a	
							Lower Bound	Upper Bound
Mindfulness (MAAS)	Pre	Post	-.903*	.140	.000	1.72	-1.264	-.541
	Pre	Follow-up	-.719*	.114	.000	1.54	-1.014	-.425
	Post	Follow up	.183	.075	.069		-.011	.378
Perspective Taking (IRI)	Pre	Post	-.310*	.094	.009	.50	-.551	-.068
	Pre	Follow-up	-.143	.108	.594	.23	-.421	.135
	Post	Follow up	.167	.066	.056		-.337	.003
Empathic Concern (IRI)	Pre	Post	-.024	.102	1.00	.04	-.283	.236
	Pre	Follow-up	-.012	.112	1.00	.02	-.300	.277
	Post	Follow up	.012	.119	1.00		-.294	.318
Identify my Emotions (PCE)	Pre	Post	-.533*	.116	.000	.90	.234	.833
	Pre	Follow-up	-.542*	.121	.001	.89	-.855	-.229
	Post	Follow up	-.008	.081	1.000		-.201	.218
Identify Others' Emotions (PCE)	Pre	Post	-.133	.095	.515	.24	-.377	.111
	Pre	Follow-up	-.092	.104	1.000	.15	-.361	.177
	Post	Follow-up	.042	.072	1.000		-.145	.228
ACCEPTANCE (AAQ-II)	Pre	Post	-7.458*	1.137	.000	.93	-10.395	-4.522
	Pre	Follow-up	-7.792*	1.273	.000	.96	-11.078	-4.506
	Post	Follow-up	-.333	1.266	1.000		-3.603	2.937

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EXPRESSIVE SUPPRESSION
(ERQ)

Pre	Post	.500*	.171	.023	.45	.059	.941
Pre	Follow-up	.438	.209	.143	.40	-.103	.978
Post	Follow-up	-.063	.168	1.000		-.497	.372
EMOTION RECOGNITION (GERT)							
Pre	Post	-2.250	1.213	.250	.45	-5.517	1.017
Pre	Follow-up	-2.250	1.031	.136	.39	-5.027	.527
Post	Follow-up	.000	.970	1.000		-2.614	2.614

* The mean difference is significant at the .05 level.

^a Adjustment for multiple comparison: Bonferroni.

NOTE: We didn't find any checklist specifically for our study design (one group pre-post design)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract: <u>Page 1</u> (b) Provide in the abstract an informative and balanced summary of what was done and what was found: <u>Page 2 & 3</u>
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported: <u>Page 4 & 5</u>
Objectives	3	State specific objectives, including any prespecified hypotheses: <u>Page 5</u>
Methods		
Study design	4	Present key elements of study design early in the paper: <u>Page 5 & 6</u>
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection: <u>Page 6 & 7</u>
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up: <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants <u>Page 6 & 7</u> (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable: <u>Page 9, 10 & 11</u>
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group: <u>Page 8</u>
Bias	9	Describe any efforts to address potential sources of bias: <u>Page 11</u>
Study size	10	Explain how the study size was arrived at: <u>Page 13, 14 & 15</u>
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why: <u>Page 11</u>
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding: <u>Page 11</u> (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed

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Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

(e) Describe any sensitivity analyses

Continued on next page

For peer review only

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed: Page 13, 14 & 15 (b) Give reasons for non-participation at each stage : page 13, 14 & 15. (c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders: Page 13 (b) Indicate number of participants with missing data for each variable of interest NA (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period Page 15, 16, 17, 18 & 19
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion

Key results	18	Summarise key results with reference to study objectives: Page 19
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias: Page 22
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence: Page 19, 20, 22 & 22
Generalisability	21	Discuss the generalisability (external validity) of the study results NA (Proof-of-concept design, not in the objectives)

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based: Page 24
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Developing Professional Caregivers' Empathy and Emotional Competencies Through Mindfulness-Based Stress Reduction (MBSR): Results of two Proof-of-Concept Studies

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Developing Professional Caregivers' Empathy and Emotional Competencies Through Mindfulness-Based Stress Reduction (MBSR): Results of two Proof-of-Concept Studies

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ABSTRACT

Objectives: To assess the feasibility and acceptability of an MBSR-based intervention and determine if the intervention is associated with a significant signal on empathy and emotional competencies.

Design: Two pre-post proof-of-concept studies.

Setting: Participants were recruited at the University of Montreal's Psychology Department (Study 1) and the CHU Sainte-Justine Department of Hematology-Oncology (Study 2).

Participants: Study 1: 12 students completed the 8-week program (mean age 24, range 18–34). Study 2: 25 professionals completed the 8-week program (mean age 48, range 27–63).

Intervention: Standard MBSR program including 8-week mindfulness program consisting of 8 consecutive weekly 2-hour sessions and a full-day silent retreat.

Outcomes measures: Mindfulness as measured by the Mindful Attention Awareness Scale (MAAS); empathy as measured by the Interpersonal Reactivity Index (IRI)'s Perspective Taking and Empathic Concern subscales; identification of one's own emotions and those of others as measured by the Profile of Emotional Competence (PEC)'s Identify my Emotions and Identify Others' Emotions subscales; emotional acceptance as measured by the Acceptance and Action Questionnaire-II (AAQ-II) and the Emotion Regulation Scale (ERQ)'s Expressive Suppression subscale; and recognition of emotions in others as measured by the Geneva Emotion Recognition Test (GERT).

Results: In both studies, retention rates (80%–81%) were acceptable. Participants who completed the program improved on all measures except the PEC's Identify Others'

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3 Emotions and the IRI's Empathic Concern (Cohen's d median = .92, range .45–1.72). In
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5 study 2, favourable effects associated with the program were maintained over 3 months
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8 on the PEC's Identify my Emotions, the AAQ-II, the ERQ's Expressive Suppression, and
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10 the GERT.
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13 **Conclusions:** The program was feasible and acceptable. It was associated with a
14
15 significant signal on the following outcomes: perspective taking, the identification of
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17 one's own emotions, and emotional acceptance thus justifying moving towards efficacy
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19 trials using these outcomes.
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22 **Keywords:** Mindfulness-based stress reduction, haematology-oncology, empathy,
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24 emotional competence, professional caregivers
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29 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

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- 31 • Two feasibility studies of an MBSR-based intervention in students and
32 professionals had high attendance rates and acceptability levels.
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- 34 • Results suggested a significant clinical signal on most measured outcomes in the
35 domains of emotion regulation and empathy, with effects lasting at follow-up for
36 identification of one's own emotions and emotional acceptance.
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- 38 • The same pattern of results was obtained in two independent small-scale studies.
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- 40 • A limitation to these studies is that samples were not randomly selected, had
41 limited size, and no control groups were used.
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- 43 • Another limitation is that most outcomes were self-reported and could be subject
44 to desirability bias.
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INTRODUCTION

In professional caregivers, empathy and its related emotional processes have been recognized as being of utmost importance[1]. Empathy has been described as a multidimensional construct that encompasses the ability to cognitively adopt another person's point of view (perspective taking) and the tendency to experience other-oriented feelings such as compassion and concern (empathic concern)[2]. A recent meta-analysis suggested that the professional-patient relationship impacts health care outcomes [3]. Higher empathy would relate to better health outcomes in patients, including a reduction in the duration and severity of minor conditions, improved adherence to treatment, higher patient satisfaction, and lower psychological distress[4-7]. In professionals themselves, experimental research from social neuroscience has confirmed the long-standing clinical assumption that difficulty maintaining an adequate emotional distance from the suffering of patients could lead to emotional exhaustion, the latter being a core component of burnout[8]. Research has also shown that sharing emotions without regulating effectively one's emotions could lead to a reduced empathy[9]. Abilities to regulate one's emotions and empathy are all the more important in the context of serious paediatric conditions where professionals are even more likely to develop burnout and exhaustion[10-14].

Emotional competencies are particularly important in a context where being empathetic could have an emotional cost to professional caregivers[15]. To avoid emotional confusion, it is essential that professionals distinguish between their own emotions and their patient's emotions[16]. This is based on an adequate identification of one's own emotions and the emotions of others (i.e., identifying the agent of the emotional experience)[17]. An important skill allowing adequate identification of the

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3 source of emotion is to accept emotions as they arise rather than trying to avoid or
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5 suppress them. In this context, three key emotional competencies have been identified as
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7 core to empathic processes: 1) identifying one's own emotions, 2) identifying the
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9 emotions in others, and 3) accepting one's own emotions.
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13 Mindfulness-based interventions, including Mindfulness-Based Stress Reduction
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15 (MBSR), are deemed to promote a better awareness and acceptance of emotions as they
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17 occur and therefore could help develop emotional competencies in professional
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19 caregivers[18]. However, despite the importance of empathy in healthcare and the
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21 suggested capacity of mindfulness practice to increase empathy and its related emotional
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23 competencies, these have seldom been selected as primary or secondary outcomes in
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25 previous studies[19,20]. We conducted two interrelated studies to test for the effect of
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27 mindfulness on these outcomes in a population of professionals vulnerable to burnout.
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32 The first objective of the studies was to determine if an MBSR-derived program
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34 was a feasible and acceptable intervention for students and professional caregivers
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36 working in a tertiary paediatric haematology-oncology treatment centre. The second
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38 objective was to determine if the program could achieve a significant clinical signal on
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40 empathy and the following emotional competencies: identification of one's own
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42 emotions, identification of others' emotions, and emotional acceptance.
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48 **METHODS**

49 **Design**

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52 As recommended in existing program development methodological guidelines
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54 when examining new outcomes of a manualized intervention, we performed two Phase
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Ia Proof-of-concept studies focusing on feasibility and clinical signals on the new domains in an original population[21]. The first study was used to set up the program and the modalities for data collection in a student population; the second was designed to replicate the first in a professional setting, to extend it to a larger scale, and to include a follow-up. Both studies were designed as one-group pretest-posttest studies to inform future trials. Measures were taken at pre and post for Study 1 and at pre, post, and a 3-month follow-up for Study 2.

Participants and procedure

Study 1 took place between October 2015 and March 2016 at the University of Montreal and involved university psychology students. Study 2 took place at the CHU Sainte-Justine Department of Hematology-Oncology (Montreal, Canada) from March to May 2016 and involved professional caregivers working in paediatric haematology-oncology. Inclusion criteria for both studies were a) the ability to comply with the requirements of the program, b) no previous participation in MBSR, c) no active substance dependence, d) no psychotic symptoms, and e) no suicidality.

Study 1

Participants were recruited at the University of Montreal Psychology Department. All psychology undergraduate and graduate students ($n = 1,130$) were approached by email to participate in this 8-week stress reduction program.

Study 2

Participants of Study 2 were recruited among day shift professional caregivers and employees working at the CHU Sainte-Justine Department of Hematology-Oncology

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($n = 109$). Potential participants were invited to an information meeting. The instructor (ML) met participants who were interested individually.

Participants gave written informed consent before the beginning of the study. They received \$50 (CAD) for the completion of the program and the surveys. The study received full approval from the Research Ethics Committees of the University of Montreal's Faculty of Arts and Sciences and the CHU Sainte-Justine (#2016-1068).

Intervention

The PEACE Program (French acronym for *Pleine conscience, Empathie, Acceptation et Compétences Émotionnelles*) was modelled on the Mindfulness-Based Stress Reduction (MBSR) developed by Jon Kabat-Zinn[17] which had already been tested in paediatric haematology-oncology (but with other outcomes)[22]. The intervention consisted of eight weekly 2-hour sessions and a full-day silent retreat between session 6 and 7. Participants received a workbook and audio recordings of guided meditations to help them with home practice (See Supplementary File 1 for a transcript from an audio recording distributed to participants). The intervention was led by an instructor with extended meditation practice and training in MBSR at the University of Massachusetts Medical School (ML). To ensure the integrity of the program, the instructor was supervised by a certified MBSR instructor, a pioneer in the field with more than a decade of experience teaching MBSR to caregivers in Canada and Europe (PD, see acknowledgments). All sessions were videotaped for that purpose.

Feasibility and acceptability

We assessed the feasibility of conducting an 8-week mindfulness-based program with professionals working in paediatric haematology-oncology by evaluating their interest in the program, the retention rates, and adherence to practice. The interest in the program was measured by the proportion of professionals interested among those meeting the eligibility criteria. The retention rate was measured by the proportion of professionals enrolled in the study who completed the study protocol (at least six of the eight weekly sessions). The adherence to practice was estimated by the number of hours of home practice as recorded by the participants, including formal practice (i.e. yoga, meditation, body scan, walking meditation) and informal practice (e.g., being mindful while performing daily tasks such as brushing one's teeth).

We also included three open-ended evaluation questions in the post-study questionnaire to explore the acceptability of the program: (1) "What is your general appreciation of the program?", (2) "What are the obstacles you have encountered during the program?", and (3) "What did you learn from your participation in the program?" In addition, in the pre-study questionnaire, participants were asked to set three personal goals for the program. In the post-study questionnaire, they were asked whether the program had helped them achieve these goals.

Measures

At all time points, participants completed validated French-language versions of self-report questionnaires electronically via SurveyMonkey®. They also completed an

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3 emotion recognition task[23] online via the survey tool of the Qualtrics Research Suite
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6 (Copyright © 2016 Qualtrics, Provo, UT, USA).
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8 Mindfulness

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10 The Mindful Attention Awareness Scale (MAAS)[24] was used to measure
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12 mindfulness. The MAAS is a validated 15-item questionnaire that measures attention to
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14 and awareness of the present moment on a 6-point Likert scale (1 = almost always; 6 =
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16 almost never)[24, 25]. The total score is the mean of the items (range 1–6). An example
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18 of an item is: “I do jobs or tasks automatically, without being aware of what I'm doing”.
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20 The internal consistency coefficient for both Study 1 and Study 2 was $\alpha = .84$.
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24 Empathy

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26 Empathy was measured with the Interpersonal Reactivity Index (IRI)[26], a 28-
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28 item answered on a 5-point Likert scale (0=does not describe me well, 4=describes me
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30 very well). Two subscales of the IRI were used for this study (7 items each): the
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32 Perspective Taking (PT) subscale, which measures the tendency to adopt others’
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34 viewpoints (cognitive empathy); and the Empathic Concern (EC) subscale, which
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36 measures the tendency to feel warmth, concern, and compassion for others (emotional
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38 empathy). The score of each subscale is the sum of the items (range 0–28). An example
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40 of a PT item is: “When I'm upset at someone, I usually try to ‘put myself in his shoes’ for
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42 a while”. An example of an EC item is: “I often have tender, concerned feelings for
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44 people less fortunate than me”. In Study 1, the Cronbach alphas were .67 for PT and .75
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46 for EC; in Study 2, the Cronbach alphas were .75 for PT and .73 for EC.
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Emotional Competencies

Identification of one's own emotions. Identification of one's own emotions was measured with the Profile of Emotional Competence (PEC)[27], which measures emotional competencies on a 5-point Likert scale (1 = not at all/never; 5 = very well/often). We used the 5-item subscale 'Identify my Emotions'. The score of the subscale is the mean of the items (range 1–5). An example of the items includes: "I am aware of my emotions as soon as they arise". The subscale's Cronbach alphas for Study 1 and Study 2 were .81 and .54, respectively.

Identification of emotions in others. Identification of emotions in others was measured with the PEC's 5-item subscale 'Identify Others' Emotions'[27]. The score of the subscale is the mean of the items (range 1–5). "I am good at sensing what others are feeling" ('Identify Others' Emotions'). The subscale's Cronbach alphas for Study 1 and Study 2 were .84 and .67, respectively.

Emotional acceptance. Emotional acceptance was measured with the Acceptance & Action Questionnaire-II (AAQ-II), a 10-item questionnaire using a 7-point Likert scale (1 = never true, 7 = always true)[28]. The scale measures experiential avoidance; items were reversed to obtain a measure of acceptance. The score of the scale is the sum of the items (range 10–70). An example of an item is: "I'm afraid of my feelings". The Cronbach alphas for Study 1 and Study 2 were .91 and .79, respectively.

We also used the Emotion Regulation Scale (ERQ)[29], a 7-item questionnaire using a 7-point Likert scale (1=strongly agree, 7=strongly disagree) to assess the suppression of emotions (4-item Expressive Suppression subscale), reflecting less emotional acceptance. The score of the 4-item subscale is the mean of the items (range 1–

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3 7). An example of an item is: “ I control my emotions by not expressing them”. The
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5 subscale’s Cronbach alphas for Study 1 and Study 2 were .67 and .84, respectively.
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8 9 10 Recognition of others’ emotions task

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12 The Geneva Emotion Recognition Test (GERT)[23] was used to measure the
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14 participants’ ability to recognize emotions in others. This is a facial emotion recognition
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16 task consisting of 83 short videos (with audio recordings) in which actors express 14
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18 different emotions. The task can be completed in approximately 20 minutes (10 minutes
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20 for the short version). After each video, participants had to choose which emotion was
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22 expressed by the actor on the video. The full 83-item GERT was used for Study 1 and
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24 due to time concerns the short 42-item version (GERT-S) was used for Study 2[30]. The
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26 score is the sum of the items (range 0–83 for the GERT and 0–42 for the GERT-S).
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34 **Statistical analysis**

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36 Descriptive statistics were used to describe socio-demographic characteristics of
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38 the samples. We performed Student’s *t*-tests to compare baseline scores of participants in
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40 Study 1 with those of participants in Study 2. For Study 1, we performed Student’s *t*-tests
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42 to compare pre/post differences. For Study 2, we performed General Linear Models
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44 (GLM) with three levels (pre, post, follow-up) that included a Mauchly’s Test of
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46 Sphericity. A Greenhouse-Geisser correction was used when the assumption of sphericity
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48 was violated. Pairwise comparisons were performed with a Bonferroni correction for
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50 multiple comparisons. Statistical significance was established at $p < .05$. In line with our
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52 objectives, we computed Cohen’s *d* to assess effect sizes for pre/post, post/follow-up, and
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3 pre/follow-up differences. Statistical analyses were performed with IBM SPSS Statistics,
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6 version 24.0 (IBM Corp., Armonk, N.Y., USA).
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10 RESULTS

11 Participants

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15 Participants' demographic characteristics for both studies are shown in Table 1.
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17 The mean (*SD*) number of hours of formal practice at home for the entire program was on
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19 average 9.8 (6.2) for Study 1 and 24.9 (12.9) for Study 2. Hours of informal practice were
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21 on average 2.5 (1.8) for Study 1 and 11.4 (15.3) for Study 2.
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Table 1
 Characteristics of Participants

	Study 1 (Students, $n = 12$) n (%) / M (SD)	Study 2 (Professionals, $n = 25$) n (%) / M (SD)
Sex		
Female	11 (92%)	22 (88%)
Male	1	3
Age	24.0 (4.2) range 18–34	48.1 (10.8) range 27–63
Marital status		
Married, civil union, common-law	5 (42%)	12 (48%)
Living alone	7 (58%)	13 (52%)
University Level (Study 1) / Level of Education (Study 2)		
College	-	3 (12%)
Bachelor	7 (58%)	12 (48%)
Master	-	6 (24%)
Doctorate	5 (42%)	4 (16%)
Profession (Study 2)		
Nurse	-	13 (52%)
Physician	-	2 (8%)
Professionals ^a	-	4 (16%)
Support Staff ^b	-	6 (24%)

^a 2 Physiotherapists and 2 Supportive Care Professionals

^b 4 Research Staff and 2 Community Organization Professionals

Feasibility and Acceptability

Study 1

Forty-three students showed interest in participating in the study. Sixteen were interviewed and screened for eligibility, with 15 recruited to take part in the study. Among these, 12/15 completed at least 6 sessions, yielding a retention rate of 80%. Furthermore, 15/15 (100%) completed the pre-intervention survey, 12/15 (80%) completed the post-survey, and 11/12 (92%) attended the one-day silent retreat. Three students (20%) left the program (two after the first

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3 session for personal reasons and one after the fourth session due to a scheduling conflict). The
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5 final sample for analyses was thus composed of 12 students.
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8 Post-intervention data indicated high levels of satisfaction with the PEACE Program.
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10 Thus, 11/12 (92%) reported that the program had helped them achieve the goals they had set for
11
12 themselves and 12/12 (100%) reported that the program made them more aware of their
13
14 experience of the present moment. Participants reported that the program was (a) “varied”, b)
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16 “structured”, (c) “instructive”, and (d) “beneficial”. Participants’ comments were positive
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18 regarding their overall appreciation of the program (e.g., “I did it to sleep better and it worked”,
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20 “This program helped me improve my stress management skills and I want to continue
21
22 meditating”). Students reported that they had learned from the program (e.g., “I learned that it’s
23
24 very important to take time for myself”). The most frequent obstacles reported by the students
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26 were as follows: (a) “the length of the daily home practice”, (b) “lack of assiduity”, (c)
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28 “difficulty finding time for home practice”, (d) “motivation for home practice”, and (e)
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30 “sleepiness during the exercises”.
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36 Study 2

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38 Forty-one out of 109 (38 %) eligible employees showed interest in participating in the
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40 study. Among these, 28/41 (68%) were enrolled in the study; 13/41 (32%) could not participate
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42 due to scheduling conflicts or personal reasons. However, 2/28 (7%) left before the beginning of
43
44 the program because of scheduling difficulties. Twenty-six employees were therefore eventually
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46 enrolled in the program. Although one participant (4%) abandoned the program after two
47
48 sessions due to a scheduling conflict, 21/26 participants completed at least six sessions, leading
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50 to a retention rate of 81%. Furthermore, 19/26 (73 %) attended the one-day silent retreat, 26/26
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3 (100%) completed the pre-intervention survey, 25/26 (96%) completed the post-intervention
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5 survey, and 24/26 (92%) completed the follow-up survey.
6
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8 All employees (100%) who completed the study reported that the program had helped
9
10 them achieve the goals they had set for themselves and had made them more aware of their
11
12 experience. Participants reported that the program was (a) “excellent”, (b) “interesting”, and (c)
13
14 “a very good initiative”. Participants’ comments were positive regarding their overall
15
16 appreciation of the program (e.g., “I would recommend it to others”). They reported that they
17
18 had learned many things from their participation in the program (e.g., “The importance of living
19
20 the present moment and to put oneself in the shoes of the other in the caregiver-patient
21
22 relationship”). Obstacles reported by the participants included (a) “lack of time for home
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24 practice”, (b) “lack of time to participate in the 8 weekly sessions”, and (c) “lack of self-
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26 discipline”.
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34 **Outcome results**

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36 A preliminary analysis checked that the program was actually related to changes on the
37
38 mindfulness measure. Results showed very large effect sizes pre-post in Study 1, $d = 1.53$;
39
40 $t(11)=5.29, p < .001$ and Study 2 $d = 1.72, p < .001$ (Fig. 1A). Changes were also maintained at
41
42 follow-up in Study 2, $d = 1.54, p < .001$. In Study 2, a repeated measures ANOVA showed
43
44 differences in scores over the three time points, $F(1.43, 32.90) = 35.72, p < .001, \eta_p^2 = .61$.
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48 When comparing Study1 and Study 2 scores at baseline, the differences were small,
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50 except for Identify my Emotions and the Emotion Recognition Task (GERT), and none were
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52 statistically significant (Table S1, Supplementary File 2.) When exploring the size of changes
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3 associated with the program, we observed large effect sizes on several pertinent outcomes (Fig.
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6 1).

10 Study 1

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12 For Study 1 pre/post comparisons, very large effect sizes were observed for the
13 following: Emotional Acceptance, $d = 1.39$; $t(11) = 4.81$, $p < .001$ (Fig. 1F); the Emotion
14 Recognition Task, $d = 1.20$; $t(11) = 4.14$, $p < .01$ (Fig. 1H); and Perspective Taking ($d = 1.00$; $t(11)$
15 = 3.46, $p < .01$ (Fig. 1B). A medium-to-large effect size was observed for Identify my Emotions
16 ($d = .77$; $t(11) = 2.67$, $p < .05$ (Fig 1D); and Expressive Suppression, $d = .73$; $t(11) = 2.53$, $p < .05$
17 (Fig. 1G). Empathic Concern (Fig. 1C) and Identify Others' Emotions (Fig. 1E) showed a small-
18 medium effect size but did not reach statistical significance ($d = .49$; $t(11) = 1.70$, $p = .118$ and $d =$
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Table 2
 Study 1 and Study 2 Outcomes Scores at Different Time-Points

Measure	Study 1 (Students, N = 12)					Study 2 (Professionals, N = 25)							
	PRE		POST		<i>p</i>	PRE		POST		<i>p</i>	FOLLOW-UP		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>p</i>	<i>M</i>	<i>SD</i>
Mindfulness (MAAS)	3.11	.67	3.91	.88	< .001	3.27	.62	4.35	.64	< .001	4.13	.49	< .001
Perspective Taking (IRI)	2.58	.52	3.05	.47	.005	2.63	.67	2.94	.56	.009	2.77	.55	.594
Empathic Concern (IRI)	2.79	.31	3.00	.29	.118	2.96	.63	2.98	.44	1.00	2.97	.56	1.00
Identify my Emotions (PEC)	3.07	.88	3.53	.97	.022	3.47	.64	4.00	.54	< .001	4.01	.57	.001
Identify Others' Emotions (PEC)	3.97	.69	4.17	.61	.301	3.86	.60	3.99	.50	.515	3.95	.59	1.00
Acceptance (AAQ-II)	42.25	10.83	48.83	9.61	.001	44.08	7.85	51.54	8.21	< .001	51.88	8.42	< .001
Expressive Suppression (ERQ)	2.75	.81	2.44	.94	.028	3.18	1.09	2.68	1.15	.023	2.74	1.09	.143
Recognition of Emotions (GERT) ^a	58.58	4.01	63.83	6.16	.002	26.75	5.89	29.00	4.00	.250	29.00	5.72	.136

MAAS = Mindfulness Attention & Awareness Scale; IRI = Interpersonal Reactivity Index; PEC = Profile of Emotional Competence; AAQ-II = Acceptance & Action Questionnaire; ERQ = Emotion Regulation Questionnaire; GERT = Geneva Emotion Recognition Recognition Test. ^aThe 83-item original version of the GERT was used for Study 1 and the 42-item short version (GERT-S) was used for Study 2
 p values are for changes over time.

Study 2

The repeated measures ANOVA showed differences in scores over the three time points. These involved the following: Perspective Taking, $F(1.58, 36.40) = 5.83, p < .01, \eta_p^2 = .20$; Identify my Emotions, $F(2, 46) = 16.64, p < .001, \eta_p^2 = .42$; Emotional Acceptance, $F(2, 46) = 25.78, p < .001, \eta_p^2 = .53$ and Expressive Suppression, $F(2, 46) = 4.39, p < .01, \eta_p^2 = .16$. We did not find significant differences on Empathic Concern $F(2, 46) = .023, p = .977, \eta_p^2 = .001$; Identify Others' Emotions $F(2, 46) = 1.116, p = .336, \eta_p^2 = .046$ and the Emotion Recognition Task $F(2, 46) = 2.91, p = .07, \eta_p^2 = .16$ (Table 2).

Posthoc pairwise comparisons revealed Pre/Post improvements with large effect sizes for Emotional Acceptance ($d = .93$; Fig. 1F) and Identify my Emotions ($d = .90$; Fig. 1D). A medium effect size was observed for Pre/post differences in Perspective Taking ($d = .50$; Fig. 1B) and Expressive Suppression ($d = .45$; Fig. 1G). A medium effect size was also observed on the Emotion Recognition Task ($d = .45$; Fig. 1H) but that difference was not statistically significant. A small effect size was observed for the Pre/post difference on Identify Others' Emotions ($d = .24$; Fig. 1D) but the difference was not statistically significant. No effect was noted on Empathic Concern ($d = .04$; Fig. 1C; Table S2, Supplementary File 2). In study II, we found that effects associated with the program were maintained over 3 months on the following outcomes: Identify my Emotions (Fig. 1D), Emotional Acceptance (Fig. 1F), Expressive Suppression (Fig. 1G), and the Emotion Recognition Task (Fig. 1H).

When exploring the role of home practice, we did not find correlations between formal practice with changes on outcomes measured in Study 1. In Study 2, formal practice (yoga, sitting meditation, and body scan) was moderately correlated with

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3 improvements on Identify my Emotions, $r = .42$; $p < .05$ and Expressive Suppression, $r =$
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6 $-.52$, $p < .01$, but did not correlate with other outcomes. Informal practice did not
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8 correlate with other outcome changes over time.
9

10 11 12 13 **DISCUSSION**

14
15 These two studies are the first to specifically examine the effects of a
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17 mindfulness-based program on students' and professional caregivers' emotional
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19 competencies. We found that the MBSR-based program is a feasible and acceptable
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21 intervention and that it could achieve an important clinical signal across different
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23 emotional measures, particularly in a vulnerable population, namely professional
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25 caregivers working in paediatric haematology-oncology.
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29 Participants in this program showed improvements in their mindfulness skills,
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31 with effect sizes larger than those found in previous studies using the same measure with
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33 professionals in training [31-34] and larger than those reported in studies using other
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35 mindfulness scales with healthcare professionals [35-37]. Participants also improved on
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37 the identification of one's own emotions, with effect sizes larger than those found in
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39 other studies [36, 38]. During the program, participants were specifically instructed to
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41 attend to their own physical sensations, which allowed them to be more aware of their
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43 emotions. Of note, the more professionals practised the formal meditation exercises at
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45 home during the program, the more they reported post-intervention improvements on this
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47 specific emotional competency (Study 2). Moreover, these improvements were
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49 maintained at 3 months post-intervention in Study 2, which suggests that the intervention
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There was no significant improvement in the self-reported ability to identify others' emotions. This unexpected result could be due to the fact that participants' pre study scores were already high on this outcome. To test this hypothesis, we performed an additional analysis comparing our studies' average baseline scores on the ability to identify other's emotions (PEC's Identify Others' Emotions) with the norms established by the authors of the scale ($n = 4306$) [27]. Participants in both our studies had very similar baseline scores than the established norms (Study 1: $t(4316) = 1.44, p = .151, d = .42$; Study 2: $t(4329) = 1.36, p = .174, d = .27$). This suggests that the participants in our studies were not better at identifying others' emotions at baseline compared to the general population. Thus, there are reasons to believe that the surprising null result for the PEC's Identify Others' Emotions in both our studies could be because all formal meditation exercises focused on being attentive to one's own internal experiences. Perhaps more specific interventions focusing on interpersonal awareness, such as narrative medicine, could be included in the program to teach participants how to attend to others' emotions[35]. In healthcare, correct identification of emotions in patients is crucial for effective communication, good care planning, and patient safety outcomes[39, 40]. Although some of the exercises practised at the weekly meetings were performed in dyads and incorporated mindful communication, this apparently did not spread to the relation to others' emotions, as measured with self-report. This contrasts with results from the emotion recognition task (GERT), a more ecological measure, which allows for a direct measure of participants' ability to recognize a large range of emotions. Interestingly, participants in Study 1 improved significantly on this task with a very large

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3 effect size, while the improvement for professionals was not significant. Nevertheless, the
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6 latter showed a medium effect size.

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8 Participants also showed improvements in emotional acceptance and these results
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10 were maintained at 3 months post-intervention in Study 2. These results are in line with
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12 previous research, which indirectly measured this competence [36, 38, 41, 42].

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14 Mindfulness focuses on the acceptance of one's own experience in the present moment,
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16 whether experienced as positive or negative, without judgment and with an attitude of
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18 openness[18, 43, 44]. Instead of trying to avoid or distract themselves from so-called
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20 negative emotions, participants here were invited to welcome and pay attention to
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22 whatever thoughts and emotions arose in their field of consciousness from moment to
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24 moment. It is essential that professional caregivers learn how to accept their emotions
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26 instead of avoiding or suppressing them. Previous studies have indeed demonstrated that
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28 acceptance was linked to fewer psychological symptoms such as anxiety and
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30 depression[45-47].
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37 Furthermore, participants improved in perspective taking. These results are
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39 consistent with those of Krasner et al. (2009), who reported an increased ability for
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41 perspective taking following an 8-week MBSR-based program amongst primary care
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43 physicians using the Jefferson Scale of Physician Empathy (JSPE)[35]. This study
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45 reported a small-to-medium effect size, similar to the effect size found in our second
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47 study with professional caregivers. Different pathways might explain improvements in
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49 perspective taking in our studies. Firstly, a concurrent improvement in emotional
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51 competencies might help caregivers adopt their patients' point of views. To explore this
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53 hypothesis, we performed additional analyses correlating the emotional competencies
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3 with perspective taking. Interestingly, change in perspective taking were correlated with
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5 change in the PEC total score, which encompasses interpersonal and intrapersonal
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7 emotional competencies (Study 1; $r = .67$; $p < .01$; Study 2: $r = .38$; $p = .059$). Secondly, it
8
9 has been suggested that keeping an *emotional distance* is advisable in patient care in
10
11 order to maintain professionals' emotional balance[48]. Perhaps the emotional
12
13 competencies measured in this study fostered such a distance. Alternatively, they may
14
15 prevent professional caregivers from confounding their personal experience with that of
16
17 the patient. A recent study suggests that concentrating too highly on personal emotions is
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19 associated with decreased ability to detect distress in persons affected by cancer[49].
20
21 Future studies should explore more systematically the mechanisms underlying the effects
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23 of emotional competencies on perspective taking. Participants did not improve on
24
25 empathic concern. Although this result may appear surprising, it is consistent with the
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27 cognitive effect expected from mindfulness training. This result is also in line with
28
29 previous results on healthcare providers, which found no significant change on the IRI's
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31 empathic concern[50, 51]. Perhaps mindfulness does not affect empathic concern: a study
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33 found that mindfulness increases perspective taking, but not empathic concern[52].
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35 Future research should disentangle cognitive and affective aspects of empathy as they
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37 seem differently impacted by mindfulness and have been shown to interact when
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39 explaining burnout[53].
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48 We should acknowledge certain limitations to our studies. Firstly, participants
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50 were self-selected and sample sizes were limited. However, self-selection is relatively
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52 ecological as it is a reflection of what would happen if the program were offered.
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54 Importantly, a large sample selected at random is not necessary at the proof-of-concept
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3 stage[21]. The results of our studies justify progressing toward more rigorous testing with
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5 larger samples in randomized controlled trials. Another limitation lies in the use of self-
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7 reports as they bear desirability. Future studies should include more tasks like the one
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9 used in this study to approach emotional competence before and after training. Another
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11 limitation is the lack of gender balance in our samples. This should be addressed in future
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13 studies, as research has suggested that men could be less responsive to empathy-related
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15 training than women [54]. A final limitation is the low reliability of the ‘Identify my
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17 Emotions’ subscale in Study 2.
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22 Notwithstanding these limitations, an important strength of this research is the
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24 replication of results between Study 1 and Study 2 on very different populations. Another
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26 strength is the high attendance rates (80% and 81%, respectively), which could be
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28 explained by the fact that potential participants were well informed about the nature and
29
30 the structure of the PEACE program, as well as the required level of commitment before
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32 enrolling. For example, professional caregivers were given the chance to attend an
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34 information session where they could try a brief meditation session and ask questions
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36 about the program before participating in the study. The instructor also met each
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38 participant individually prior to starting the training, in order to evaluate their willingness
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40 and readiness to engage in the program.
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46 In conclusion, the results of these two proof-of-concept studies suggest that
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48 MBSR could improve professional caregivers’ perspective taking skills (the cognitive
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50 dimension of empathy), but maybe not their empathic concern (the affective dimension of
51
52 empathy). MBSR could also improve professionals’ emotional competencies, such as
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54 identifying and accepting one’s own emotions, which could contribute to the prevention
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3 of burnout. MBSR could also be integrated with other forms of interventions to improve
4 professional caregivers' empathic skills [55]. Furthermore, this research could have
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6 interesting applications in the training and continuing education of professionals not only
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8 in paediatric oncology but also in others emotionally challenging specialities, such as
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10 pulmonology, immunology, and rheumatology.
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14 15 16 17 **ACKNOWLEDGEMENTS**

18
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25 of the manuscript.
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39 **COMPETING INTERESTS**

40 We have read and understood BMJ policy on declaration of interests and declare
41 that we have no competing interests.
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48 **DATA SHARING STATEMENT**

49 No additional data available.
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AUTHORS’ CONTRIBUTIONS

ML participated in the design of the study, coordinated the study, performed the statistical analysis, and wrote the manuscript. MD helped design the study and participant recruitment, and revised the manuscript. PM provided advice for the statistical analysis. YP revised the manuscript. SS participated in the design of the study and the coordination of the study, found financial support, and coordinated the writing of the manuscript. All authors read and approved the final manuscript.

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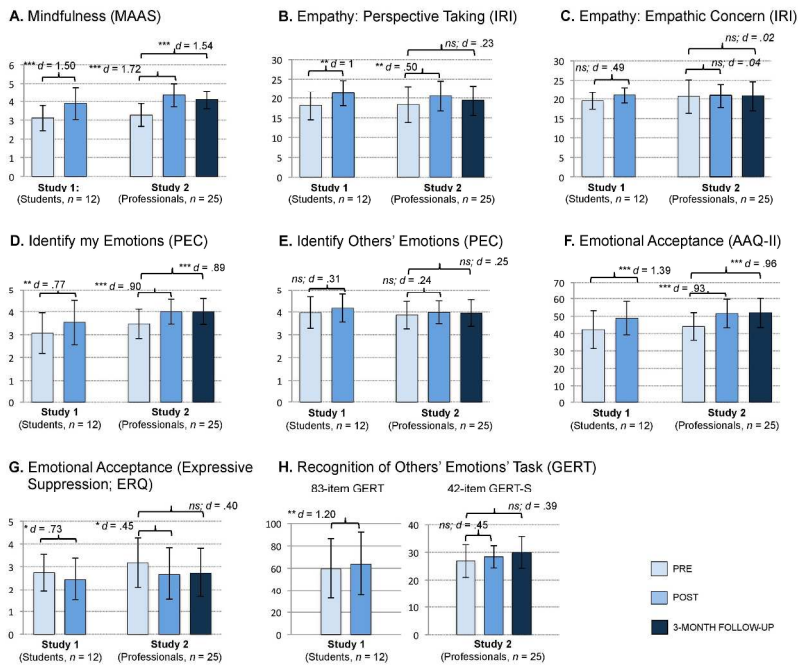
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FIGURE 1. Changes in Outcomes for Study 1 (12 Students) and Study 2 (25 Professionals) following the PEACE Program. The Peace Program is an 8-week intervention based on the Mindfulness-Based Stress Reduction (MBSR). **A.** Change in Mindfulness scores as measured by the Attention Awareness Scale (MAAS). **B.** Change in Perspective Taking scores as measured by the Interpersonal Reactivity Index (IRI). **C.** Change in Empathic Concern scores as measured by the Interpersonal Reactivity Index (IRI). **D.** Change in the ability to identify one's own emotions as measured by the Profile of Emotional Competence (PEC). **E.** Change in the ability to identify others' emotions as measured by the Profile of Emotional Competence (PEC). **F.** Change in acceptance as measured by the Acceptance and Action Questionnaire (AAQ-II). **G.** Change in expressive suppression as measured by the Emotion Regulation Scale (ERQ). **H.** Change in the ability to recognize others' emotions in the face, voice and body as measured by the Geneva Emotion Recognition Test (GERT and GERT-S). *** = $p < .001$; ** = $p < .01$; * = $p < .05$. Cohen's d : .2 = small; .5 = medium; .8 = large; ns = non-significant.

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PEACE PROGRAM SITTING MEDITATION SCRIPT

Adapted from *Guided Mindfulness Meditation, Series 1*
(Jon Kabat-Zinn)

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Université 
de Montréal

40 Min Sitting Meditation (English version)

To practise this meditation, choose a quiet and relaxing place where you won't be disturbed. Allow yourself to set aside your usual mode of operation, which is generally a goal-oriented mode, a 'doing mode'. Allow yourself to be in a 'non-doing-mode' for a few moments. Allow yourself to simply 'be'.

To begin this meditation, sit up straight in a chair, or on a cushion on the floor, your back straight but not tense. Let your eyes close gently, or gaze toward the floor a few feet in front of you. Then simply bring your attention to the fact that you're breathing. Become aware of the movement of the breath, the natural normal breath.

Just be aware of the breath without trying to change it in any way. Focus your attention on your abdomen or on the sensations around your nostrils. If you choose to focus on your nostrils, feel the touch of the breath in that area. If you choose to focus on the abdomen area, feel the sensations in your belly as it expands with each inhalation and falls with each exhalation. Simply stay with the breath.

From time to time you may notice that your attention has shifted to thoughts – memories of the past or worries about the future. When you realize that your attention is no longer here, no longer with your breathing, gently bring your attention back to your breathing, without judging yourself. And just observe the movement of the breath.

Each time you realize that your attention is no longer with your breathing, try to become aware of it, as soon as possible, and gently bring your attention back to your breathing. During meditation, you can use your breathing to refocus your attention. You can use the breath as an anchor, to help you come back to the present moment.

When you realize that your mind is no longer in the present or is preoccupied or 'reactive' you can use your breathing to come back to the present moment.

While observing the breath, you may notice from time to time that sensations in the body enter your field of consciousness. Perhaps feelings of discomfort, tension, or even pain, which can be very intense at times.

And now, while maintaining awareness of the breathing, try to see if you can expand your field of awareness around your breathing, to also include sensations in

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your entire body. Become aware of the physical sensations. Perhaps the contact of your body with the cushion, or with the chair, or with the ground. Perhaps the contact of your feet or legs with the floor. So now expand your awareness to include not only your breathing but also the sense of your body as a whole, with all the sensations that can occur from one moment to another.

At times, sensations in one part of your body can become very intense and dominate your field of awareness. It then becomes very difficult to stay alert and focused. If this happens, you have two options. One option is to consciously adopt a more comfortable posture to release some of the intensity. If you decide to change your posture, try to be aware of the intention to change before doing so and then try to be aware of the sensations in your body as you change your posture. Another option is to focus all your attention on the area of your body where the intensity is and simply breathe with that sensation. Simply inhaling and exhaling with the sensation... Trying not to create tension, but trying to accept the sensations as they present themselves.

Now, if you want, you can change the focus of your attention from the breathing and the body sensations to the sounds in the environment. Perhaps the sounds in the room or outside the room, or perhaps the sounds inside the body. Do not search for sounds, but rather try to be receptive to anything that enters your field of consciousness as sounds. It's not necessary to identify these sounds or to label them. Try not to judge or label them as 'nice' or 'unpleasant' but only observe them for what they are.

Now, once again allow your field of consciousness to expand. We started with the breathing. Then we expanded our awareness to include the body as a whole and the sensations in the body, and then we included the sounds. This time, direct your attention to your thoughts. So now the body's sensations, the breathing, and the sounds are going to be in the *background* of your awareness, bring the thoughts to the *foreground*. Rather than seeing thoughts as interruptions in your meditation, now focus your attention on thoughts themselves, on the process of thought. Do not follow thoughts and do not engage in them, but rather try to perceive a thought as an 'observable event' in your field of consciousness, much like a sound was an 'observable event' previously. Let the thoughts come and go. Thoughts may be neutral or charged with emotions. If thoughts contain fear, be aware of the fear and let the thoughts come and go. Same thing for concerns or worries, thoughts of obligation or thoughts of deadlines.... Just stay present. Don't pursue thoughts or push them away.

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Now, for the remainder of this meditation, let go of any object of attention and simply pay attention to the present moment. Rather than focusing on a particular object, allow yourself to be fully present of everything that happens in the body and in the mind from one moment to another. If thoughts come, observe those thoughts. If sensations come, observe those sensations. If sounds come, observe those sounds. Just stay aware of everything that happens from moment to moment.

And now, as this meditation ends, you can, if you want, take a moment to congratulate yourself for having taken this time to take care of yourself.

Free adaptation of *Sitting Meditation – Guided Mindfulness Meditation, Series 1* (Jon Kabat-Zinn) by Martin Lamothe

40 Min Sitting Meditation (Original French version)

Méditation Assise (40 min.)

Pour pratiquer cette méditation, choisissez un endroit calme et relaxant où vous ne serez pas dérangé. Permettez-vous de mettre de côté votre mode de fonctionnement habituel, qui est en général un mode de fonctionnement dirigé vers l'action. Permettez-vous pendant les instants qui viennent de vous mettre dans un mode de « non-action ». Permettez-vous simplement d'être pendant un moment, de devenir conscient de votre être.

Pour commencer cette méditation, asseyez-vous confortablement sur une chaise ou sur un coussin sur le sol, le dos droit autant que possible, mais non tendu. Laissez les yeux se fermer doucement ou encore baissez le regard et fixez le sol à quelques pieds devant vous. Puis ramenez simplement votre attention sur le fait que vous respirez. Devenez conscient du mouvement de la respiration normale et naturelle.

Soyez simplement attentif à la respiration sans chercher à la modifier d'aucune façon que ce soit. Focalisez votre attention sur l'abdomen ou encore au niveau des narines. Si vous choisissez les narines, sentez le contact de l'air en inspirant et en expirant. Si vous choisissez l'abdomen, sentez le ventre se gonfler à chaque inspiration et se contracter à chaque expiration. Restez simplement avec la respiration.

À l'occasion, votre attention peut se diriger vers des pensées, des inquiétudes, des souvenirs du passé ou des pensées tournées vers le futur. Lorsque vous vous rendez compte que votre attention n'est plus ici avec votre respiration, sans jugement, doucement, ramenez votre attention à votre respiration. Et simplement, observez le mouvement de la respiration.

Et chaque fois que vous vous apercevez que votre attention n'est plus avec votre respiration, essayez d'en être conscient le plus rapidement possible, et tout doucement ramenez votre attention à votre respiration. Durant la méditation, vous pouvez utiliser votre respiration pour recentrer votre attention, pour vous aider à vous ancrer dans le moment présent.

Lorsque vous vous rendez compte que votre esprit n'est plus dans le présent ou est préoccupé ou réactif, vous pouvez utiliser votre respiration pour revenir au moment présent.

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5 Lorsque vous observez votre respiration, vous notez peut-être à l'occasion
6 que des sensations dans votre corps entrent dans le champ de votre conscience.
7 Peut-être des inconforts ou des agitations, qui peuvent être très intenses par
8 moments.
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11 Et maintenant, tout en maintenant la conscience de votre respiration, essayez
12 d'élargir le champ de votre conscience autour de votre respiration afin d'inclure
13 aussi la sensation de votre corps dans son entier. Devenez conscient de toutes les
14 sensations dans votre corps. Peut-être le contact du corps avec le coussin ou avec la
15 chaise, peut-être le contact des pieds ou des jambes avec le sol. Donc maintenant,
16 permettez à votre observation d'inclure, non seulement votre respiration, mais
17 également la perception du corps dans son entier, avec toutes les sensations qui
18 peuvent se présenter d'un moment à l'autre. Et soyez ici, avec tout ce qui se
19 présente, sans le juger ou sans y réagir; soyez simplement présent aux sensations et
20 à la respiration.
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27 Il est possible qu'à un moment des sensations dans une partie du corps
28 deviennent très intenses et dominant le champ de votre conscience. Il devient alors
29 très difficile de rester attentif et concentré. Si cela se produit, vous avez 2 options. La
30 première option est de consciemment adopter une position plus confortable pour
31 laisser aller une partie de l'intensité. Si vous décidez de changer de position, essayez
32 d'être conscient de l'intention de changer avant de le faire et d'être conscient des
33 sensations dans le corps lorsque vous modifiez votre posture. Une autre option est
34 de focaliser toute l'attention sur la région du corps où se trouve l'intensité et de
35 respirer avec cette sensation. Simplement, inspirez et expirez avec la sensation... en
36 essayant de ne pas créer de tension, et en essayant d'accepter les sensations telles
37 qu'elle se présentent.
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44 Maintenant, si vous le désirez, changez le *focus* de votre attention, de la
45 respiration et des sensations du corps, vers les sons dans l'environnement. Peut-
46 être les sons à l'intérieur de la pièce ou à l'extérieur de la pièce, ou peut-être les sons
47 à l'intérieur du corps. Ne cherchez pas quelque chose à écouter, mais soyez plutôt
48 réceptif à tout ce qui entre dans le champ de votre conscience en tant que son. Il
49 n'est pas nécessaire d'identifier les sons, de nommer les sons; tentez de ne pas juger
50 les sons comme « agréable » ou « désagréable », mais observez-les seulement pour
51 ce qu'ils sont.
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56 Maintenant, encore une fois permettez au champ de votre conscience de
57 s'élargir. Nous avons débuté avec la respiration. Ensuite, nous avons élargi la
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conscience pour inclure le corps dans son entier, puis les sensations, et ensuite nous
avons inclus les sons. Cette fois-ci, dirigez votre attention vers les pensées.
Maintenant, les sensations du corps, la respiration et les sons vont être en *arrière*
plan; amenez les pensées à *l'avant-plan*. Plutôt que de voir les pensées comme des
interruptions dans votre méditation, portez toute votre attention aux pensées
comme telles, au processus de la pensée. Ne suivez pas la pensée et ne vous engagez
pas dans la pensée, mais essayez plutôt de percevoir la pensée comme un
« évènement observable » dans le champ de la conscience, un peu comme un son
était un « évènement observable ». Et laissez les pensées aller et venir. Les pensées
peuvent être neutres ou encore très chargées. Par exemple, si des pensées
contiennent de la peur, soyez conscient de la peur. Et laissez aller et venir les
pensées. Même chose pour les préoccupations ou les inquiétudes, les pensées
d'obligation ou de *deadline*... Peu importe la charge de la pensée, restez simplement
présent. Ne poursuivez pas la pensée, mais ne cherchez pas non plus à la repousser.

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Maintenant, pour le temps qui reste, laissez aller tout objet d'attention et
portez simplement attention au moment présent. Plutôt que de focaliser sur un
objet en particulier, permettez-vous d'être pleinement attentif à tout ce qui survient
dans le corps et dans l'esprit d'un moment à l'autre. Si des pensées viennent,
observez les pensées. Si des sensations viennent, observez les sensations. Si ce sont
des sons qui viennent, observez les sons. Simplement, restez attentif à tout ce qui se
présente d'un moment à l'autre.

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Et maintenant, comme cette méditation se termine, vous pouvez, si vous le
voulez, prendre un moment pour vous féliciter d'avoir pris ces instants pour
prendre soin de vous.

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Traduction et adaptation libre de *Sitting Meditation – Guided Mindfulness Meditation*,
Series 1 (Jon Kabat-Zinn) par Martin Lamothe

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17 *Developing Professional Caregivers' Empathy and Emotional Competencies Through*
18 *Mindfulness-Based Stress Reduction (MBSR): Results of two Proof-of-Concept Studies*
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23 **SUPPLEMENTARY TABLES**
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25

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Table S1
Study 1 and Study 2 Participants Compared at Baseline

Measure	Study 1 (Students, N = 12)		Study 2 (Professionals, N = 25)		Study 1 vs Study 2 Scores at Baseline			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
Mindfulness (MAAS)	3.11	.67	3.27	.13	1.166	35	.256	.41
Perspective Taking (IRI)	2.58	.52	2.63	.67	.227	35	.822	.08
Empathic Concern (IRI)	2.79	.31	2.96	.63	.880	35	.385	.31
Identify my Emotions (PEC)	3.07	.88	3.47	.64	1.573	35	.125	.55
Identify Others' Emotions (PEC)	3.97	.69	3.86	.60	.497	35	.622	.18
Acceptance (AAQ-II)	42.25	10.83	44.08	7.85	.586	35	.562	.21
Expressive Suppression (ERQ)	2.75	.81	3.18	1.09	1.212	35	.234	.43
Recognition of Emotions (GERT) ^a	58.58	4.01	52.89	11.29	1.69	35	.106	.59

^a Study 2 GERT's mean was adjusted to take into account the difference in the number of items between the 2 versions of the task (83-item GERT for Study 1 and 42-item GERT-S for Study 2)

Table S2

Study 2 Results of Pairwise Comparisons across time on outcomes measured at pre, post, follow-up of an MBSR-based program followed by 25 paediatric haematology-oncology professionals

Measure	(I) Time	(J) Time	Mean Difference (I-J)	SE	p^a	d	95% confidence interval for difference ^a	
							Lower Bound	Upper Bound
Mindfulness (MAAS)	Pre	Post	-.903*	.140	.000	1.72	-1.264	-.541
	Pre	Follow-up	-.719*	.114	.000	1.54	-1.014	-.425
	Post	Follow up	.183	.075	.069		-.011	.378
Perspective Taking (IRI)	Pre	Post	-.310*	.094	.009	.50	-.551	-.068
	Pre	Follow-up	-.143	.108	.594	.23	-.421	.135
	Post	Follow up	.167	.066	.056		-.337	.003
Empathic Concern (IRI)	Pre	Post	-.024	.102	1.00	.04	-.283	.236
	Pre	Follow-up	-.012	.112	1.00	.02	-.300	.277
	Post	Follow up	.012	.119	1.00		-.294	.318
Identify my Emotions (PCE)	Pre	Post	-.533*	.116	.000	.90	.234	.833
	Pre	Follow-up	-.542*	.121	.001	.89	-.855	-.229
	Post	Follow up	-.008	.081	1.000		-.201	.218
Identify Others' Emotions (PCE)	Pre	Post	-.133	.095	.515	.24	-.377	.111
	Pre	Follow-up	-.092	.104	1.000	.15	-.361	.177
	Post	Follow-up	.042	.072	1.000		-.145	.228
ACCEPTANCE (AAQ-II)	Pre	Post	-7.458*	1.137	.000	.93	-10.395	-4.522
	Pre	Follow-up	-7.792*	1.273	.000	.96	-11.078	-4.506
	Post	Follow-up	-.333	1.266	1.000		-3.603	2.937

EXPRESSIVE SUPPRESSION
(ERQ)

Pre	Post	.500*	.171	.023	.45	.059	.941
Pre	Follow-up	.438	.209	.143	.40	-.103	.978
Post	Follow-up	-.063	.168	1.000		-.497	.372

EMOTION RECOGNITION
(GERT)

Pre	Post	-2.250	1.213	.250	.45	-5.517	1.017
Pre	Follow-up	-2.250	1.031	.136	.39	-5.027	.527
Post	Follow-up	.000	.970	1.000		-2.614	2.614

* The mean difference is significant at the .05 level.

^a Adjustment for multiple comparison: Bonferroni.

NOTE: We didn't find any checklist specifically for our study design (one group pre-post design)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract: <u>Page 1</u> (b) Provide in the abstract an informative and balanced summary of what was done and what was found: <u>Page 2 & 3</u>
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported: <u>Page 4 & 5</u>
Objectives	3	State specific objectives, including any prespecified hypotheses: <u>Page 5</u>
Methods		
Study design	4	Present key elements of study design early in the paper: <u>Page 5 & 6</u>
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection: <u>Page 6 & 7</u>
Participants	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up: <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants <u>Page 6 & 7</u> (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable: <u>Page 9, 10 & 11</u>
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group: <u>Page 8</u>
Bias	9	Describe any efforts to address potential sources of bias: <u>Page 11</u>
Study size	10	Explain how the study size was arrived at: <u>Page 13, 14 & 15</u>
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why: <u>Page 11</u>
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding: <u>Page 11</u> (b) Describe any methods used to examine subgroups and interactions (c) Explain how missing data were addressed (d) <i>Cohort study</i> —If applicable, explain how loss to follow-up was addressed <i>Case-control study</i> —If applicable, explain how matching of cases and controls was addressed

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2 *Cross-sectional study*—If applicable, describe analytical methods taking account of
3 sampling strategy

4 (e) Describe any sensitivity analyses

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6 Continued on next page

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For peer review only

Results

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed: Page 13, 14 & 15 (b) Give reasons for non-participation at each stage : page 13, 14 & 15. (c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders: Page 13 (b) Indicate number of participants with missing data for each variable of interest NA (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period Page 15, 16, 17, 18 & 19
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

Discussion

Key results	18	Summarise key results with reference to study objectives: Page 19
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias: Page 22
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence: Page 19, 20, 22 & 22
Generalisability	21	Discuss the generalisability (external validity) of the study results NA (Proof-of-concept design, not in the objectives)

Other information

Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based: Page 24
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*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.