

Promoting Resilience in Individuals Aging With Multiple Sclerosis: Results From a Pilot Randomized Controlled Trial

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Purpose/Objective: Starting in middle adulthood, individuals living with multiple sclerosis (MS) are confronted with the simultaneous challenge of coping with advancing MS alongside age-related changes. Psychological resilience is thought to play an important role in promoting healthy aging and thus may be important in the context of aging with MS. This study aimed to evaluate whether Everyday Matters, a novel positive psychology program, had a positive effect on resilience and other related outcomes in adults with MS relative to a wait-list control group. **Research Method/Design:** This was a single-center two-group pilot randomized (1:1) controlled trial comparing the Everyday Matters intervention to a waitlist control. Randomized participants were $N = 31$ adults with MS aged ≥ 45 years. The 6-week program, developed by the National MS Society, was delivered via group teleconference and supplemented with readings, videos, and online participation. Participants in both groups completed outcome assessments measuring resilience, satisfaction with social roles, mood, pain, fatigue, and sleep at baseline and posttreatment. **Results:** Analyses on $N = 27$ participants who completed study assessments revealed a significant group effect for resilience and satisfaction with social roles, and trend differences for positive affect and well-being and depressive symptom severity. At posttreatment, participants in the intervention group reported the group to be very helpful, found the telephone-based delivery convenient, and felt the benefits of participating outweighed the effort. **Conclusions/Implications:** These results suggest that the Everyday Matters program shows promise for increasing resilience in adults with MS and that a full-scale randomized controlled trial is warranted.

Impact and Implications

Individuals aging with MS face the simultaneous challenge of advancing MS and age-related changes. This study is the first to examine the potential benefits of a community-based positive psychology intervention for facilitating resilience in this population. This study provides preliminary support for a positive psychology intervention for increasing resilience among adults aging with MS. Delivering the group-based resilience intervention via telephone appears to be a viable option for disseminating a program that is accessible to patients beyond the clinical setting.

Keywords: multiple sclerosis, resilience, clinical trial, aging

Introduction

Multiple sclerosis (MS), a chronic, progressive central nervous system disease, is the most common cause of acquired neurologic disability in young adults (Stern, Sorkin, Milton, & Sperber, 2010). Persons with MS typically experience the first onset of symptoms between the ages of 20 and 40 years (Stern et al., 2010) but

maintain a life expectancy similar (Brønnum-Hansen, Koch-Henriksen, & Stenager, 2004; Compston & Coles, 2008) or equivalent to the general population (Stern et al., 2010). Therefore, individuals with MS often live the majority of their adult life with the condition and transition from middle to older age while also coping with MS-related changes in health and functioning.

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Each individual's experience of MS differs but typically includes a constellation of primary symptoms (such as sensory problems, cognitive difficulties, weakness, spasticity, paresthesias, visual disturbance, heat intolerance, fatigue, bowel/bladder dysfunction, and emotional changes [Stern et al., 2010]), as well as secondary conditions (such as depression, chronic pain, sleep disturbance, and chronic fatigue [Beiske et al., 2007; Kobelt, Berg, Atherly, & Hadjimichael, 2006; Wu, Minden, Hoaglin, Hadden, & Frankel, 2007]; see DeLuca & Nocentini, 2011, for a comprehensive review) that are associated with lower quality of life (QoL). As individuals with MS age, many face new challenges to their health, well-being, and independence due to the ongoing disease progression (Tremlett, Zhao, Rieckmann, & Hutchinson, 2010). They often face additional sensory, physical, and cognitive changes due to their MS in addition to the health changes that occur with typical aging. Many of the secondary conditions associated with MS, such as chronic pain, cognitive changes, and fatigue, also worsen with age (Ehde, Kratz, Robinson, & Jensen, 2013; Ehde, Osborne, & Jensen, 2005).

Beyond physical symptoms, living with multiple chronic symptoms and comorbid conditions also presents psychosocial challenges to healthy aging with MS. For example, physical and cognitive changes result in many individuals ending employment prematurely, losing the sense of productivity, social interaction, and financial stability that employment can provide (Julian, Vella, Vollmer, Hadjimichael, & Mohr, 2008; Roessler & Rumrill, 2003). Older adults with MS report significantly more activity limitations than younger adults with MS (Finlayson, Chitnis, & Hartman, 2013). Social participation is negatively impacted by the many comorbidities in MS that progressively interfere with independence (Overs, Hughes, Haselkorn, & Turner, 2012). Thus, it is not surprising that QoL is significantly lower in individuals with MS relative to healthy controls, the general population, and persons with other chronic diseases (Beiske et al., 2007; Janssens et al., 2003; Kobelt et al., 2006; Putzki et al., 2009; Ruet et al., 2012; Wu et al., 2007).

Despite the multiple challenges associated with aging with MS, many individuals with MS demonstrate *resilience*, which refers to the human capacity to persist in the face of, bounce back from, and flourish when faced with stressors or adversity (Bonanno, 2004). Resilience has also been described as "a set of processes that enables good outcomes in spite of serious threats" (Reivich, Seligman, & McBride, 2011, p. 25). Empirical evidence suggests that resilience is grounded in a diverse array of genetic (Caspi et al., 2003), biological (Charney, 2004), psychological (Ong, Bergeman, Bisconti, & Wallace, 2006; Tugade & Fredrickson, 2004), and environmental (Haskett, Nears, Ward, & McPherson, 2006; King, King, Fairbank, Keane, & Adams, 1998) factors and that it is a dynamic process involving a collection of cognitive, behavioral, and interpersonal skills, many of which can be learned and enhanced (Bonanno, 2004). Although often described in response to an acute stressor, resilience may also play a key role in maintaining well-being while aging by accounting for some individuals' propensity to view their lives and health as satisfactory in spite of age-related disease and disability (Molton & Yorkston, 2017; Montross et al., 2006; Strawbridge, Wallhagen, & Cohen, 2002). For example, a recent study on successful aging reported that higher resilience, lower depression, better physical health, and older age were all associated with greater self-rated health, with

resilience and depression effects being equal to or greater than physical health effects (Jeste et al., 2013).

Prior research has found relevance in the construct of resilience among those aging with physical and neurological conditions that may cause disability, including MS, with qualitative research suggesting that resilience is foundational to healthy aging with MS (Molton & Yorkston, 2017; Ploughman et al., 2012). Several studies have shown that in samples of individuals with medical conditions that may cause disability, resilience scores are lower in middle age relative to older age, presumably due to the interference of symptoms in a time period when life demands are typically high (e.g., family, employment), the impact of secondary conditions, and heightened emotional distress (Jensen et al., 2013; Molton et al., 2008, 2014). Even after controlling for age, symptom severity, and psychological health, resilience has been found to be significantly and positively associated with satisfaction with social roles and with QoL in one large ($N = 1,574$) sample of adults with medical conditions known to cause disability, which included adults with MS (Battalio et al., 2017). Resilience has also been shown to mediate the relationship between symptoms (e.g., fatigue) and QoL, as well as social support and mental health outcomes (Koelmel, Hughes, Alschuler, & Ehde, 2017), and changes in resilience are associated with changes in depression, fatigue, sleep quality, and physical functioning (Edwards, Alschuler, Ehde, Battalio, & Jensen, 2017). A recent study that compared adults aging with different medical conditions that cause disability (MS along with muscular dystrophy, post-polio syndrome, and spinal cord injury), revealed the concerning finding that resilience scores were lowest among people with MS relative to other medical conditions studied (Terrill et al., 2016).

Given the potential impact of resilience on QoL in persons aging with MS, there is an impetus to develop interventions that bolster an individual's ability to be resilient. Such interventions can build from the emerging work on "resilience interventions" that have been developed based upon evidenced-based protective factors that contribute to resilience, including problem-solving, self-regulation, self-efficacy, identifying strengths, and cultivating gratitude, optimism, meaning, and close relationships (Masten, 2001; Reivich et al., 2011). Interventions have been developed to promote resilience across a diverse range of populations, including those with depression and anxiety (Brunwasser, Gillham, & Kim, 2009; Steinhart & Dolbier, 2008), breast cancer (Loprinzi, Prasad, Schroeder, & Sood, 2011), cardiac disease (Burton, Pakenham, & Brown, 2009), college students (Steinhart & Dolbier, 2008), childhood adversity (Nauta et al., 2012), workplace stress (Vuori, Toppinen-Tanner, & Mutanen, 2012), and soldiers (Reivich et al., 2011), with results generally supporting their efficacy in improving a variety of outcomes. There has been one published study of resilience training for persons with MS using acceptance and commitment therapy (Pakenham, Mawdsley, Brown, & Burton, 2018). Unfortunately, there are currently no published, evidence-based resilience interventions to promote healthy aging with MS and other medical conditions associated with disability.

The purpose of this study was to evaluate the feasibility and preliminary effects of a positive psychology intervention on resilience in adults (age 45 or older) living with MS via a pilot randomized controlled trial (RCT). As described in the Methods, we selected an existing positive psychology intervention developed by the National MS Society (n.d.) specifically for people with

MS, the Everyday Matters program, and designed the RCT to determine the feasibility of the intervention and trial design as well as the preliminary effects of the intervention on resilience relative to a wait-list condition. Given the available resilience intervention literature, we hypothesized that participants assigned to the Everyday Matters intervention would show increases in resilience relative to control participants, and that the intervention would result in at least a medium effect (Cohen's *d*) on resilience at posttreatment (primary endpoint). We also aimed to examine the preliminary effects of the intervention, relative to a waitlist control condition, on secondary outcomes (including positive affect, self-efficacy for managing MS, and satisfaction with social role), as well as several exploratory outcomes (depressive symptom severity, anxiety, and overall happiness). As a pilot trial, we also assessed several indicators of feasibility for pursuing a future full-scale trial, including the feasibility of enrolling and retaining participants in the trial, treatment adherence (i.e., the majority of participants would receive the intervention per protocol, that is, not withdraw from the treatment or study), and rate the intervention as at least somewhat helpful on the posttreatment ratings.

Method

Design

This was a multiphase, multimethod project designed to refine and test a resilience intervention to promote healthy aging in persons with MS. We have previously reported on the findings from key aspects of the developmental phase, most notably from qualitative research that refined our definition of resilience in this population and informed the method of treatment delivery (Silverman, Verrall, Alschuler, Smith, & Ehde, 2016). This was followed by a design phase, during which the intervention was trialed for suitability for the project's purpose. Lastly, we engaged in a testing phase of the study, the pilot RCT, a single-center two-group pilot randomized (1:1) controlled trial comparing the resilience intervention to a waitlist control, which is what was reported here. Outcomes were collected at baseline and posttreatment (primary endpoint). The trial was registered at [ClinicalTrials.gov](https://clinicaltrials.gov) (NCT03177785).

Interventions

Resilience intervention: Everyday Matters. A goal of the present study was to develop and test an MS and aging-focused resilience intervention that would be ready for dissemination. As such, we opted to partner with the National MS Society (the "Society"), who had recently developed the Everyday Matters program (Kalb & Koch, 2016), which aligned with the principles of resilience we had identified in our exploratory phase of the study (Silverman et al., 2016).

Everyday Matters was developed by the National MS Society, "as a tool to assist people living with MS [to] find those strategies to support ongoing happiness, even in the face of adversity" (National MS Society, n.d.). The program includes six approximately 90-min sessions that focus on psychoeducation and brief skills training in positive psychology topics, including goal setting, happiness habits, retraining cognitions for positivity, building so-

cial connections, removing barriers to action, and gaining positive momentum. The program provides a leader's manual, participant workbook, eight brief supporting videos illustrating the concepts (available online or DVD), and online links to supplemental worksheets and information (see National MS Society, n.d.). It also supplies a copy of the book, *The Happiness Advantage* (Achor, 2010), a positive psychology book written for the general public and upon which the Everyday Matters program was based. The National MS Society disseminated this program through their network of regional chapters and website but had not conducted a scientific study of the program's efficacy.

Developed initially as an in-person group intervention, the program was subsequently refined by the National MS Society to support the option of teleconference delivery, which was the format used in this study. The original Everyday Matters intervention was designed to be delivered by a variety of health care professionals. For this study, doctoral-level psychologists with MS expertise delivered the program to one group of participants at a midday time to accommodate participation from individuals across different time zones.

We viewed Everyday Matters as a high-quality positive psychology intervention that addressed much of what would be encompassed in a resilience intervention, such that it focused on optimism, happiness, and capitalizing on opportunities for forward movement and positive outcomes. These foci aligned closely with the themes identified in our preintervention stakeholder focus groups on defining and building resilience (Silverman et al., 2016), such that participants believed facilitators of resilience included improving psychological adaptation and coping, social connection, life meaning, and physical wellness. We then supplemented the program by enhancing areas that we believed deserved more time or attention to more wholly represent resilience, such as attending more closely to planning or goal setting, or identifying more specifically how to implement program content in the face of adversity (viewed as "barriers to resilience" in our prestudy focus groups; Silverman et al., 2016).

We enhanced the Everyday Matters program in two ways based upon the feedback we obtained from our stakeholders and preliminary qualitative work (Silverman et al., 2016). First, consistent with much of our prior work, we delivered the intervention via telephone, in this case as a group teleconference. This allowed us to reach a broad audience, including individuals who may not have otherwise had access to the program. Furthermore, we supported the program with a private web-based group page on the msconnection.org website, which allowed for between-session discussion of content, successes, and challenges among the facilitators and participants online. The aim of this online group site was also to encourage interactions among study participants and community, so that they would have a community after the study completion.

Wait-list control condition. We selected a wait-list control comparator because clinical trials methodologists (Hart, Fann, & Novack, 2008; Mohr et al., 2009) argued that waitlist or usual care controls are appropriate for early phase, proof-of-principle trials where the goal is to promote innovation. Participants randomized to the wait-list control condition were offered participation in Everyday Matters following conclusion of the data collection phase of the study (3 months postintervention for the intervention group). They were not provided with any other

treatment, nor were they encouraged or discouraged to pursue any specific treatment or resilience intervention on their own during the trial.

Participant recruitment, enrollment, and randomization procedures. Participants were recruited through mailed invitations and clinic referral. Study invitations were mailed to members of the Greater Northwest Chapter of the National MS Society and to members of the University of Washington Participant Pool Research Registry. Additionally, participants were supplied information about the study by providers in the UW Medicine MS Center. Interested participants ($N = 33$) contacted study staff and were screened for eligibility and enrollment by research assistants over the phone. Eligible participants were 45 years of age or older with a self-reported physician diagnosis of MS, with the ability to read, write and understand English, had regular access to e-mail and the Internet, were willing to create an account of the MSConnection.org website, and were not actively participating in another MS intervention study. We chose to enroll participants aged 45 years or older because this was a subproject within a larger research program focused on enhancing healthy aging in persons with medical conditions that cause disability. Individuals were offered up to \$40 of compensation for completing study surveys.

Enrolled participants ($n = 31$) were randomly assigned to either the Everyday Matters intervention ($n = 15$) or wait-list control group ($n = 16$) 1 month prior to the start of the intervention using the online platform Research Randomizer (Urbaniak & Plous, 2015). Research assistants informed participants of their assignment, and participants assigned to the control group were informed that they would be offered the study intervention after completion of all outcome surveys. Informed consent was obtained from all participants, and all procedures were approved by the University of Washington Human Subjects Division.

Data collection procedures. Assessment administration and data collection were performed electronically using a HIPAA-compliant web-based platform developed and operated by the University of Washington. Assessments were conducted at baseline (approximately one week post randomization and three weeks prior to the first intervention session) and posttreatment (within two weeks after completion of the intervention sessions). Intervention and control participants completed the outcome assessments concurrently; both groups were emailed a link to complete each survey. Reminder phone calls were made in the event that a survey response was not received within 4 days.

Measures

Demographics, disease characteristics, and symptoms. Demographic information included sex, date of birth, ethnicity, occupational status, education level, MS diagnosis date and course, relationship status, health insurance, and disability benefits. Additional descriptive data included MS disease severity (Patient Determined Disease Steps, a brief self-reported assessment that has been found to be a valid measure of disease severity in an MS population; Learmonth, Motl, Sandroff, Pula, & Cadavid, 2013) and severity of common MS symptoms (pain intensity [0–10 Numeric Rating Scale], pain interference [Patient-Reported Outcomes Measurement Information System, or PROMIS, Pain Interference–Short Form], fatigue severity [PROMIS Fatigue–

Short Form], sleep disturbance [PROMIS Sleep Disturbance–Short Form]).

Primary outcome: Resilience: 10-item Connor Davidson Resilience Scale–Short Form. ($\alpha_{\text{BASELINE}} = .94$; $\alpha_{\text{POST}} = .93$). Resilience was the primary outcome and measured using the Connor-Davidson Resilience Scale (CD-RISC) 10-Item Short Form. The CD-RISC is designed to measure the ability to bounce back from challenges that can arise in life, specifically related to factors of hardiness and persistence (Campbell-Sills & Stein, 2007). Participants are asked to indicate how much they agree with 10 statements, as those statements have applied to them over the past month. Responses range from 0 (*not true at all*) to 5 (*true nearly all the time*) with higher scores indicating higher levels of resilience. Total scores are calculated and range from 0 to 50. The CD-RISC has been widely used and shown strong validity and reliability in populations with health conditions that may cause disability, including MS (Black & Dorstyn, 2015; Senders, Bourdette, Hanes, Yadav, & Shinto, 2014).

Secondary outcomes.

Positive affect and well-being ($\alpha_{\text{BASELINE}} = .94$; $\alpha_{\text{POST}} = .95$). Life satisfaction in relation to a sense of well-being was measured using the Neuro-QOL Positive Affect and Well Being short-form questionnaire. This nine-item self-report instrument was developed for use in adults and children with neurologic disorders and can be used to identify differences for an individual subject large enough to motivate treatment changes (Kozlowski, Cella, Nitsch, & Heinemann, 2016). Participants were asked to respond to statements such as “Lately, I had a sense of well-being” using provided options of *never*, *rarely*, *sometimes*, *often*, or *always*, which were assigned a corresponding value of 1–5, respectively. Total raw scores are converted onto a T score metric, centered at 50 (mean of the general U.S. population) with a standard deviation of 10. Higher scores corresponded to greater endorsement of positive affect and well-being. The NeuroQoL Positive Affect and Well Being short form has been found to demonstrate good internal consistency and validity in adults with MS (Miller et al., 2016).

Self-efficacy ($\alpha_{\text{BASELINE}} = .88$; $\alpha_{\text{POST}} = .90$). Self-efficacy was measured using the University of Washington Self Efficacy Scale Short Form, a six-item instrument validated for use in individuals with MS and spinal cord injury. Respondents assess confidence in their ability to manage conditions related to their disability ranging on a scale of 1 (*not at all*) to 5 (*completely*) confident in given situations. Higher scores correspond to higher levels of self-efficacy. Raw total scores are converted to a T score metric, centered at 49.9 (representing the mean of the MS calibration sample) with a standard deviation of 9.3. Higher scores indicate greater self-efficacy for MS management. The University of Washington Self Efficacy Scale was developed in a sample of adults with MS and has shown strong validity and reliability (Amtmann et al., 2012).

Satisfaction with social roles ($\alpha_{\text{BASELINE}} = .94$; $\alpha_{\text{POST}} = .97$). Satisfaction with social roles was measured using the PROMIS Satisfaction with Social Roles and Activities eight-item short form (Cella et al., 2010). Participants were asked to endorse eight statements, such as “I am satisfied with my ability to do things for my family,” with a response ranging from 1 (*not at all*) to 5 (*very much*). Raw scores are totaled and converted to a T score, with higher scores corresponding to higher satisfaction with social

rolses. These measures have been found to have validity in a general population and in a population with chronic health conditions (Hahn et al., 2016; Hahn et al., 2010).

Exploratory outcomes.

Depression ($\alpha_{\text{BASELINE}} = .93$; $\alpha_{\text{POST}} = .91$) and **Anxiety** ($\alpha_{\text{BASELINE}} = .88$; $\alpha_{\text{POST}} = .85$). Depression was measured using the PROMIS Depression six-item short form, and anxiety was measured using the PROMIS Anxiety four-item short form. These assessments ask participants to endorse statements from a scale of 1 (*never*) to 5 (*always*) within a 7-day recall period (Cella et al., 2010; Pilkonis et al., 2011). Raw scores for participant responses are totaled, and converted to a *T* score, centered at 50 ($SD = 10$), with higher raw scores corresponding to higher levels of reported depression or anxiety. These measures have been found to have validity in MS populations (Senders, Hanes, Bourdette, Whitham, & Shinto, 2014).

Happiness ($\alpha_{\text{BASELINE}} = .88$; $\alpha_{\text{POST}} = .85$). Happiness was measured using the Subjective happiness Scale, a four-item measure of global subjective happiness (Lyubomirsky & Lepper, 1999). Individuals were asked to self-report their happiness using Likert scales ranging from 1 to 7 in four areas, including whether they consider themselves generally happy, happy compared to their peers, and whether they agree with statements declaring themselves generally very happy, or generally not very happy. A total of the four items represents a composite score for global subjective happiness. This measure was calibrated with a general population reference sample.

Treatment Satisfaction and Feasibility

At posttreatment, we collected several measures assessing intervention participants' ratings of treatment satisfaction and convenience using a numeric rating scale from 0 (*not at all*) to 10 (*extremely*). They also rated the overall benefit they received from the intervention using a 5-point scale ranging from "the benefits far outweighed the effort" to "the effort far outweighed the benefits." They completed three questions about the usefulness of the MS Connection website using a 1 (*strongly disagree*) to 5 (*strong agree*) scale. Participants were asked if they would refer a friend with MS to the program and to list the benefits and drawbacks of the intervention. Other feasibility indicators were collected by research staff over the course of the study including session attendance, drop-out, and participation through the study MS Connection group web page (including type of post [e.g., new post or reply to existing post] and content of communication). Treatment satisfaction data were collected only from the individuals in the intervention group.

Data Analysis

As a feasibility study, we aimed for a sample size of 30 (15 per group) to allow us to calculate reliable effect size estimates for purposes of informing sample size and statistical power calculations for planning a future full-scale RCT. Although not sufficient for detecting small effects, this sample size is sufficient for detecting at least medium effect sizes (0.5–0.7; approximately .90; two-sided significance tests, $\alpha = .05$), thus providing preliminary information about the intervention's efficacy, as advocated in prior studies (Whitehead, Julious, Cooper, & Campbell, 2016).

Prior to analyses, data were inspected for outliers, missing data, and appropriateness for statistical procedures. Listwise deletion was used for the few occasions where a variable in an analysis was missing.

We computed descriptive statistics for the demographic and disease-related measures to describe the sample and examine assumptions for planned data analyses. A series of Fisher's exact tests and Kruskal–Wallis equality-of-populations rank tests for categorical and continuous variables respectively were computed to verify randomization effectiveness.

To assess the primary outcome, whether the intervention had a positive impact on resilience relative to the wait-list control group at posttest, we performed an analysis of covariance for our primary outcome measure, controlling for the baseline value. A statistically significant group effect signified a potential intervention effect (e.g., a baseline to posttreatment change in the treatment group and no pre–post change in the control group). Adjusted means at posttest that controlled for pretest values were computed to determine the nature of the group effect. Cohen's *d* effect sizes for the group effects were computed. The primary study hypothesis was supported if our primary outcome measure achieved at least a medium effect ($d = .50$; Cohen, 1992). The impact of the intervention on secondary and exploratory outcomes, including those within the positive psychology, psychosocial, and symptom domains, were assessed using the same analytic approach as the primary outcome. Because this is a pilot study, marginal effects are reported for secondary outcomes to inform future research. As this is a feasibility study which aimed to estimate rather than confirm treatment effects, we did not adjust for multiple comparisons.

Results

Participant Enrollment and Baseline Characteristics

Figure 1 shows the participant flow through the study procedures. Table 1 describes baseline demographic and disease-related characteristics for study participants by treatment group. These characteristics were balanced between the two conditions. Overall, participants were predominantly female, non-Hispanic White, and highly educated. Most participants reported their disease was relapse-remitting; mean MS disease duration was 20 years. Outcome assessment completion rates were high at posttreatment (intervention group = 11/12 or 92%; control group = 15/15 or 100%) and follow-up (intervention = 10/12 or 83%; control = 14/15 or 93%).

Treatment Adherence and Dose

Of the 15 participants randomized to the intervention, three withdrew prior to starting the program due to scheduling conflicts. For the 12 who attended at least one session, the median number of session attended was 5.5 (range of 1–6; $M = 4.6$, $SD = 1.7$). Half of the participants attended all six sessions, and 83.3% attended four or more sessions. Participants gave a variety of reasons for nonattendance, including family member medical emergencies and vacation. One participant noted that joining by phone made it a bit easier to miss a session without feeling a social consequence.

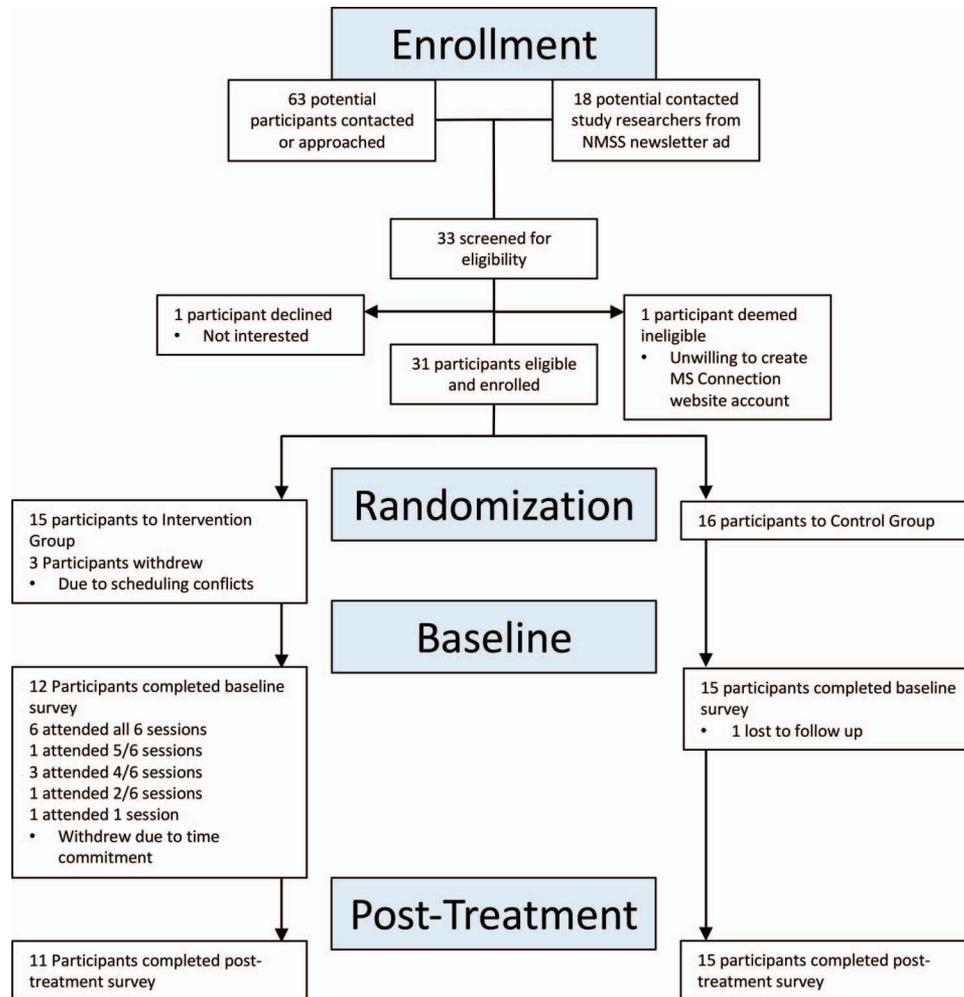


Figure 1. CONSORT diagram showing participant flow. See the online article for the color version of this figure.

Primary Outcome

Consistent with our hypothesis, we found a significant group effect for resilience, our primary outcome, $F(1, 21) = 7.02$, $p = .02$, $d = 1.16$, with the treatment group reporting higher resilience ($M_{ADJUSTED} = 31.66$) than the control group ($M_{ADJUSTED} = 28.02$) at posttest (see Table 2).

Secondary Outcomes

A significant group effect was also present for satisfaction with social roles, $F(1, 24) = 6.78$, $p = .02$, $d = 1.06$, and a marginal effect for positive affect and well-being, $F(1, 24) = 3.09$, $p = .09$, $d = 0.72$, but not self-efficacy. Specifically, the intervention group reported more satisfaction with social roles ($M_{ADJUSTED} = 47.55$) and marginally greater positive affect and well-being ($M_{ADJUSTED} = 54.82$) than the control group (satisfaction with social roles: $M_{ADJUSTED} = 42.73$; positive affect and well-being: $M_{ADJUSTED} = 50.99$).

Exploratory Outcomes

Finally, we found a marginal group effect for depressive symptom severity, $F(1, 24) = 3.13$, $p = .09$, $d = 0.72$, with the intervention group reporting marginally less depression ($M_{ADJUSTED} = 45.22$) than the control group ($M_{ADJUSTED} = 53.67$). No other exploratory outcomes produced significant findings.

Treatment Satisfaction

At posttreatment, participants allocated to the Everyday Matters condition described the treatment as very helpful ($M = 7.36$ on the 0–10 scale, $SD = 2.58$) and described the phone delivery as extremely convenient ($M = 9.00$, $SD = 2.35$). When asked to rate the overall benefit they received from participating in the Everyday Matters program, taking into account effort put into it, seven participants (64%) said the benefits far outweighed the effort, one participant said the benefits somewhat outweighed the effort, and three participants said the benefits equaled the effort; none said that the effort outweighed the benefits. All of the participants said

Table 1
Baseline Demographic Characteristics of Adults With Multiple Sclerosis (MS) Randomized to Everyday Matters Intervention or Wait-List Control

Demographic	Intervention (<i>n</i> = 12)	Control (<i>n</i> = 16)	<i>p</i> ^a
Age (years)	<i>M</i> = 59.8 ± 7.7, range 49–74	<i>M</i> = 59.8 ± 6.5, range 46–70	.68
Sex			
Female	10 (83.3)	16 (100.0)	.18
Male	2 (16.7)	0	
Race			
White	9 (75.0)	14 (87.5)	.99
Black	2 (16.7)	0	
Asian	0	16.3)	
More than 1 race	0	16.3)	
Education			
High school grad/ GED	1 (8.3)	16.3)	.99
Some college/tech	4 (33.3)	6 (37.5)	
College degree	3 (25.0)	4 (25.0)	
Graduate degree	4 (33.3)	5 (31.3)	
Marital status			
Married	2 (16.7)	0	.99
Living with partner	6 (50.0)	6 (37.5)	
Divorced	0	16.3)	
Single never married	4 (33.3)	9 (56.3)	
MS type			
Relapsing/remitting	10 (83.3)	9 (56.3)	.22
Secondary progressive	2 (16.7)	3 (18.8)	
Primary progressive	0	4 (25.0)	
Disease duration (years)	<i>M</i> = 18.6 ± 16.3, range 1–49	<i>M</i> = 21.0 ± 12.17, range 2–47	.77
PDDS			
Mild disability	2 (16.7)	4 (25.0)	.69
Moderate disability	2 (16.7)	2 (12.5)	
Gait disability	2 (16.7)	16.3)	
Early cane	0	2 (12.5)	
Late cane	2 (16.7)	2 (12.5)	
Bilateral support	1 (8.3)	3 (18.8)	
Wheelchair/scooter	3 (25.0)	2 (12.5)	

Note. GED = General Education Development degree; PDDS = patient determined disease steps. Values are *n* (%) or *M* ± *SD*, or otherwise indicated. *n* values may not add to total because of missing data.

^a Fisher's exact test for categorical variables; Kruskal–Wallis equality of populations rank test for continuous variables.

that they would recommend the Everyday Matters program to a friend with MS.

In qualitative responses about the benefits and drawbacks of the program, Everyday Matters participants indicated that the telephone delivery made it easy to participate despite mobility, fatigue, and geographic concerns. The only negative raised about the telephone delivery was the inability to make eye contact with other group members. Intervention participants indicated that the benefits of the program included being connected to and inspired by others, engaging in goal setting, and learning concrete skills (such as by breaking large tasks down into smaller goals or engaging in daily gratitude exercises). Participants suggested that a negative of the program was the lack of focus on coping with adversity, as they felt some of the positive psychology content felt unrealistic without bringing in the context of MS-related challenges.

Whereas most or all participants assigned to Everyday Matters indicated significant enthusiasm for the intervention and delivery modality, less enthusiasm was shown for the use of the MS Connection web component. Only half to two thirds of intervention participants found the web component user friendly (55%), clear (46%), and a good choice for supplementing the intervention (64%).

Discussion

The present study examined whether a teleconference version of the Everyday Matters positive psychology intervention improved resilience relative to a wait-list control condition in a sample of middle-aged or older adults with MS. Consistent with our hypothesis, and despite a small sample, intervention participants achieved statistically significantly higher levels of resilience relative to controls after controlling for baseline levels, suggesting that resilience can be enhanced through a relatively brief group intervention delivered via telehealth. Moreover, study findings revealed improved satisfaction with social roles and trends toward positive effects on positive affect and well-being and depressive symptom severity.

We were impressed with the effect of the Everyday Matters program on resilience, satisfaction with social roles, affect, and mood, particularly in the context of the small pilot sample, the relatively nondistressed baseline characteristics of the sample, and the brevity of the intervention. These findings project favorably for the intervention, as it appears to have wide applicability within the MS community and a positive impact despite a relatively limited time and effort commitment for participants. To our knowledge,

Table 2
Pretest Means, Adjusted Posttest Means, Standard Deviations, and Analysis of Covariance Results for Outcome Measures

Measures	Intervention group		Control group		<i>F</i> (1, 24 ^a)	<i>p</i>	Cohen's <i>d</i>
	<i>M</i> ± <i>SD</i>		<i>M</i> ± <i>SD</i>				
	Pretest	Posttest	Pretest	Posttest			
Resilience (CD-RISC)	25.70 ± 10.31	31.66 ± 2.26	29.67 ± 4.79	28.02 ± 1.74	7.02 ^a	.02	1.16
Satisfaction with social roles (PROMIS)	39.95 ± 9.44	47.55 ± 2.92	44.31 ± 5.43	42.73 ± 2.41	6.78	.02	1.06
Positive affect and well-being (NeuroQoL)	50.01 ± 7.62	54.82 ± 3.45	52.11 ± 4.67	50.99 ± 2.85	3.09	.09	.72
Self-efficacy (SES)	44.55 ± 9.31	45.53 ± 5.65	47.66 ± 8.03	47.14 ± 4.67	.20	.66	.18
Depression (PROMIS)	57.43 ± 9.14	45.22 ± 3.93	51.76 ± 9.15	53.67 ± 3.24	3.13	.09	.72
Anxiety (PROMIS)	55.21 ± 9.15	51.47 ± 5.35	49.81 ± 7.85	54.54 ± 4.52	.76 ^b	.39	.36
Happiness (SHS)	21.33 ± 4.72	20.48 ± 1.68	21.56 ± 4.26	22.04 ± 1.39	2.17	.15	.60
Pain intensity (NRS)	4.64 ± 2.94	3.73 ± 1.37	3.53 ± 2.03	3.67 ± 1.09	.005 ^c	.95	.03
Pain interference (PROMIS)	58.96 ± 10.98	57.29 ± 4.53	57.31 ± 9.61	56.86 ± 3.40	.03 ^d	.88	.06
Fatigue (PROMIS)	64.54 ± 12.22	58.73 ± 4.41	58.38 ± 9.57	59.76 ± 3.71	.14 ^a	.72	.16
Sleep disturbance (PROMIS)	53.23 ± 10.08	54.44 ± 4.28	56.07 ± 10.68	56.53 ± 3.55	.60	.45	.31

Note. CD-RISC = Connor Davidson Resilience Scale–Short Form; NeuroQoL = Quality of Life in Neurological Disorders; SES = University of Washington Self-Efficacy Scale for MS–Short Form; SHS = Subjective Happiness Scale; PROMIS = Patient-Reported Outcomes Measurement Information System; NRS = Numeric Rating Scale. Possible range: CD-RISC, 0–40; SHS, 4–28; NRS 0–10; NeuroQoL, SES, and all PROMIS all *T* scores (reference group *M* = 50, *SD* = 10).

^a Error *df* = 21. ^b Error *df* = 23. ^c Error *df* = 20. ^d Error *df* = 22.

* Error *df* = 24 unless otherwise indicated.

this is the first time this program has been evaluated empirically in any MS sample.

Beyond assessing for the effect of the program, we were also interested in determining whether such a program would be feasible and acceptable specifically for individuals aging with MS, so as to better understand if this program should be carried forward or further studied in a larger clinical trial. Results supported a significant interest in the program, as we were able to successfully enroll 94% of eligible participants into the study and retain 84% of the enrolled participants in the trial. However, 3 (20%) of the 15 participants randomized to participate in the group teleconference Everyday Matters program ultimately withdrew from the treatment due to scheduling conflicts. Although attendance was acceptable, it was lower than what we have found in individual telephone-delivered self-management treatment studies (Ehde et al., 2015). Of the 12 Everyday Matters participants who did not have scheduling conflicts, 50% attended all six sessions and 83% attended four or more sessions. Participants were also highly satisfied with the intervention. They reported it was helpful, found the telephone-based delivery extremely convenient, and thought the benefits equaled or outweighed the effort of participating. Subjectively, we noted significant enthusiasm for this study; individuals with MS were eager to join this study and most (65%) control group participants ultimately completed an Everyday Matters group after their study obligations as a control participant had concluded.

In line with our development work on this topic, we further sought to assess whether supplementing the program with an online group page would positively impact engagement. We developed a private group on the MS Connection website to allow for between-session discussion of content, successes, and challenges among the facilitators and participants online. Although not part of the standard Everyday Matters curriculum, we believed that increased contact may be valuable in terms of increasing group

cohesiveness and sense of community. In the end, this page was used sparingly by participants and was not reported to be a particularly meaningful component of the program. Participants noted that it was difficult to incorporate a new website into their routine and surmised that they may have participated more frequently if the group were within a common platform already in their routine, such as Facebook. Taken together, the addition of the MS Connection website group did not appear to enhance participants' experience and thus is not recommended as an adjunct to the intervention in its present form. Other social media (e.g., Facebook, Twitter) or technology (e.g., text message) platforms that are more routinely accessed by individuals living with MS may offer support and interaction outside of the sessions and thus warrant consideration in future trials.

This study's results suggest there is great potential for a program like Everyday Matters to bolster resilience and other outcomes via a time-limited, structured approach to teaching positive psychology principles that may enhance functioning and QoL. In line with our larger research program, we were particularly interested in whether this program would be of interest and impactful to individuals aging with MS; indeed, this was demonstrated in the study results. Our use of the teleconference group format allowed us to reach patients across the United States, making this a highly accessible intervention. The use of a primarily positive psychology intervention was also attractive, as those principles are universal to personal growth independent of the level of MS-related impairment. With that said, a challenge of this type of intervention is the incorporation of the concept of "bouncing back" from adversity, which is a central component of resilience. This issue is particularly critical among the target population of our study - individuals aging with MS—as they experience more risk factors for adversity, due to age-related health changes and the higher likelihood that they have lived with MS longer, which is associated with greater symptom burden and lower QoL (Kister et al., 2013). It is not surprising that we learned from our participants through qualitative

feedback that, despite our attentiveness to this issue, there remained a preference for greater emphasis on application of these principles in the context of living with adversity specific to MS. This participant feedback was especially pointed for elements of the program that had virtually no focus on adversity, such as the accompanying book, *The Happiness Advantage* (Achor, 2010), which was received as a quality text but difficult to link to the MS experience. Clinically, we adapted our style to be more inclusive of this perspective, thus informally modifying aspects of the original intervention. Taken together, these preferences reflect what we learned in our prestudy stakeholder focus groups on building resilience, such that participants in those groups emphasized both facilitators and barriers of resilience, whereas this program was structured to primarily focus on facilitators (Silverman et al., 2016).

A primary limitation of the present study was that it was a pilot and, therefore, by design, had a small sample size. Thus, while promising, the findings do not provide definitive evidence that this is an efficacious intervention. Moreover, a sample this small is unlikely to be representative of the larger population with MS. In this case, we were focused on a population aging with MS, thus resulting in a mean age older than the MS population at large. Furthermore, we observed this population to be relatively nondistressed and generally eager to participate in research and/or connect with the National MS Society. A future RCT that utilizes a larger sample size is warranted and necessary to better understand the effect of the intervention across the population of individuals living with MS. A second limitation was that the comparison group in this study was a waitlist control group. While appropriate for the pilot phase, it is unknown if other interventions would produce similar or even greater impacts on resilience than this intervention. It is also unknown whether similar effects would be found simply based on having routine interaction with clinicians. Thus, in addition to a larger scale study, a future study should also consider comparing to an active control, either through an alternative intervention or an education module that would control for attentional factors, in addition to comparing to usual care. Future studies could also examine the extent to which participants value the resilience content, the opportunity to talk with others facing similar challenges, or the combination of these factors. Finally, a motivating factor for this study was the potential to enhance resilience to place participants on a trajectory that reflected more resilient and successful aging. As this study was a pilot conducted within a brief timeframe, we do not know if the improvements in resilience were maintained beyond the immediate posttreatment period.

Through the present study we learned that a teleconference-delivered, brief positive psychology intervention can have a significant impact on resilience in individuals aging with MS after completion of the program. The success of this pilot intervention serves as motivation for further work in this space, particularly because the teleconference delivery and relatively brief commitment increases the accessibility of the intervention. Perhaps most importantly, the success of this pilot gives rise to the possibility that interventions could be delivered proactively to bolster critical factors, such as resilience, so as to increase the likelihood of successful outcomes in the future.

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