

# Acceptability and Feasibility of the English Version of Elevida, a Self-Guided Online Fatigue Intervention for People With Multiple Sclerosis

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## ABSTRACT

**BACKGROUND:** Fatigue is common in multiple sclerosis (MS); it significantly impairs quality of life, and treatment options are limited. A randomized controlled trial of Elevida, a self-guided, online German fatigue intervention, showed significant benefit. We tested an English version of Elevida with people with MS in Australia.

**METHODS:** Participants were volunteers with MS who self-reported at least mild fatigue ( $\geq 43$  on the Fatigue Scale for Motor and Cognitive Functions scale), some mobility (Expanded Disability Status Scale  $< 8$ ), and no or mild cognitive difficulties ( $\leq 32$  on the Multiple Sclerosis Neuropsychological Questionnaire). Participants completed the 9-week English Elevida program, commenting on and rating its acceptability. The Chalder Fatigue Scale was completed at baseline, end-of-program, and 2 months later. We undertook qualitative (thematic analysis) and quantitative (before/after differences, tested using paired *t* test) analyses.

**RESULTS:** Thirty-eight people with MS expressed an interest in the study; 26 were eligible; 20 began the study. Fifteen participants (75%) completed the program (mean [SD]: 58.9 [10.5] years of age, 67% women, 9 with relapsing MS, 6 with progressive MS). Over 90% of completing participants rated acceptability as good or very good, and approximately 70% found the program helpful. Three themes were identified: Positive or negative comments on program features, incorrect assumptions in program content, and personal experiences and reflections. Significant improvement ( $P < .01$ ) in fatigue scores from baseline to program completion was maintained 2 months after program completion.

**CONCLUSIONS:** Elevida was acceptable and effective for MS-related fatigue. Identified themes will guide further development of the program to satisfy users' sense of autonomy, competence, and relatedness.

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**M**ultiple sclerosis (MS) is a progressive neurological condition affecting more than 2.8 million people worldwide.<sup>1</sup> One of the most common symptoms of MS, fatigue affects up to 95% of individuals with the disease<sup>2</sup> and is associated with significantly reduced quality of life and ability to work.<sup>3</sup> Fatigue has been identified as a symptom of particular interest by the International Progressive MS Alliance because of its debilitating impact on individuals with MS.<sup>4</sup>

The pathophysiological processes that contribute to fatigue in MS are poorly understood, although there is broad agreement that it results from the interplay of biological factors (eg, neuroinflammation and degeneration, and reduced cortical volumes), psychosocial factors (including pain, sleep problems, and depression), and adverse effects of medication.<sup>4-5</sup> Fatigue in individuals with MS is subjective and invisible, and treatment options are limited.<sup>5-6</sup> However, promising recent research has focused on how MS-related fatigue can be reduced by cognitive behavioral therapy (CBT) approaches that focus on how a person with MS-related fatigue thinks, feels, and behaves, and how these experiences impact their fatigue and mood.<sup>7-8</sup>

One such CBT-based approach is the Elevida program, a self-guided online intervention that facilitates the evaluation and modification of thoughts, feelings, and behaviors associated with MS-related fatigue.<sup>9</sup> A randomized controlled trial (RCT) of Elevida in individuals with MS ( $N=275$ ) showed a statistically and clinically significant<sup>10</sup> between-group reduction in participants' fatigue scores of 2.74 points (95% CI, 1.16-4.32,  $P < .001$ ) on the Chalder Fatigue Scale (CFS) after 12 weeks, which persisted for up to 24 weeks.<sup>9</sup>

Elevida has been available only in German; this study aimed to assess the acceptability and feasibility of a UK English translation of Elevida in individuals with MS in Australia. A secondary objective was to gain preliminary

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information on the potential effectiveness of Elevida in this population.

## METHODS

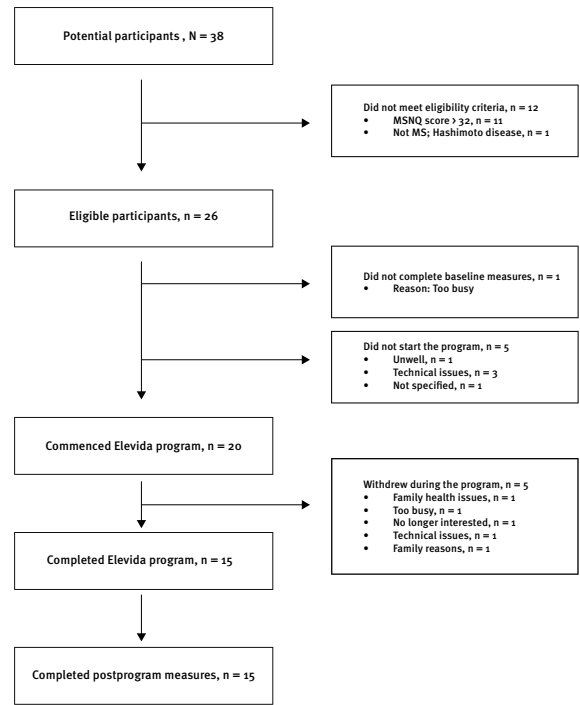
This study was approved by the Australian National University's Human Research Ethics Committee (2020/020). All participants provided written informed consent to participate in the study. This was a mixed-methods pilot study. Participants completed 9 modules or conversations of the online English Elevida program, providing feedback during and after the conversations using a think-aloud methodology. They were also asked for further reflections and to assess the effectiveness of the program on self-reported fatigue levels 2 months after completing the program. Potential participants self-referred to the study following advertisement through the local MS society, MS support groups, and a study website. They were eligible if they self-reported a confirmed diagnosis of MS, were 18 years or older, had reliable internet access, English competency, at least mild self-reported fatigue, good cognitive function, and some mobility. Participants were not eligible if they had major neurological or psychiatric conditions or had experienced a relapse in the past 4 weeks.

Potential participants who self-reported eligibility for the study then completed the Fatigue Scale for Motor and Cognitive Functions (FSMC),<sup>11</sup> and the Multiple Sclerosis Neuropsychological Questionnaire (MSNQ).<sup>12</sup> Eligibility for the study required scores of greater than or equal to 43 for fatigue on the FSMC (indicating at least mild subjective fatigue), less than or equal to 32 for cognitive function on the MSNQ (indicating self-reported mild cognitive difficulties), and self-reported score of less than 8 on the Expanded Disability Status Scale (EDSS)<sup>13</sup> (a score of 8 is "essentially restricted to bed or chair or pushed in wheelchair"). This cutoff score for the EDSS was established because the Elevida program encourages participants to engage in activities (described as behavioral activation, eg, to increase their pleasurable activities, social interactions, and exercise levels) that require a baseline level of mobility. Therefore, moderate-to-high cognitive difficulties and/or severe physical disabilities were considered limitations on the ability to fully participate in the Elevida program.

### The Elevida Program

Elevida was developed by GAIA AG in cooperation with The Institute of Neuroimmunology and Multiple Sclerosis in Hamburg, Germany, and tested using participants who speak German.<sup>9</sup> The English version of Elevida was also developed and translated by a team associated with GAIA AG (ie, native English speakers and clinical psychologists who are fluent in German and English), without changing the content of the program (FIGURE S1; supplemental materials are available at IJMSc.org). The Elevida program consists of 9 online conversations, and each takes approximately 60 minutes to complete. Participants are asked to allow 3 to 5 days between conversations to reflect on the content, practice the skills they learned, and complete the homework. Elevida is based on CBT

**FIGURE 1.** Elevida Study Design



MS, multiple sclerosis; MSNQ, Multiple Sclerosis Neuropsychological Questionnaire.

principles and asks participants to consider and identify the factors that contribute to their personal experience of fatigue, eg, thoughts, feelings, behaviors, and environmental factors. The 9 conversations (or modules) are variably composed of psychoeducation, diagrams, recordings, case studies, skills-based exercises, and worksheets. A summary of the content for each conversation of the English and German program can be found in TABLE S1.

### Data Collection

#### Think-Aloud Protocol

As the primary focus of this study was to assess the feasibility and acceptability of this first use of an English version of Elevida, we sought participant feedback to customize the program for future use in English-speaking populations. The think-aloud protocol was developed by Ericsson and Simon<sup>14</sup> to capture a person's thoughts and experiences while completing a task. It allows participants to provide immediate and spontaneous commentary during the program, which offers a timely, participant-initiated perspective rather than commentary after the program. In this study, participants were asked to "Say out loud in real time what you are thinking and feeling" and given specific examples including, "I like that example"; "That figure is nice"; "That could be explained a little clearer"; "That activity helped me to relax"; "That example was confusing"; and

“I think the tone of that section was a little harsh.” Their real-time, spontaneous reflections were audio-recorded.

### Questionnaire Data

At baseline, participants completed online questionnaires providing sociodemographic data (eg, age, sex) and indicated their current level of functioning—from 1, mild disability, to 8, bedridden—using the Patient Determined Disease Steps (PDDS).<sup>15</sup> At baseline, program completion, and 2 months after program completion, participants provided data on fatigue (using the CFS<sup>16</sup>) and mood (using the Hospital Anxiety and Depression Scale [HADS]<sup>17</sup>). These specific outcome measures were used to align with those used in the RCT of the German version of Elevida.<sup>9</sup>

At the end of the program, participants were asked to rate the Elevida program (poor, acceptable, good, or very good), and respond using a 5-point Likert scale (strongly agree, agree, neutral/not sure, disagree, strongly disagree) to 7 statements about the Elevida program (eg, “I would recommend the Elevida program to others with MS-related fatigue.”). At program completion and 2 months later, participants were asked to respond using a 5-point Likert scale (much improvement, slight improvement, no change, slightly worse, much worse) to 16 statements about the impact of different components of the Elevida program (eg, “To what extent did the Elevida program help you to improve your understanding of your fatigue?”).

### Data Analysis

We used qualitative data (from the analysis of the think-aloud recordings) and quantitative data (from participants’ responses of the Elevida program) to assess the feasibility and acceptability of Elevida. Participants’ recordings were transcribed verbatim and analyzed by 2 coders (JL and CP) to find patterns of responses, themes, and meaning in the data, with coding

discrepancies resolved via consensus.<sup>18</sup> For the quantitative analysis, we used descriptive statistics (means and SDs for continuous data and percentages for categorical data) to describe the baseline characteristics of the participants, participant responses, and the follow-up questionnaire data. We used paired *t* tests to compare participant scores for fatigue (CFS) at baseline-vs-program completion with baseline-vs-2 months after program completion and Cohen *d* (with Hedges’ *g* correction for small sample size) to indicate the effect size. Statistical significance was set at  $P < .05$ , with no adjustments made for multiple testing. Statistical analysis was performed using IBM SPSS version 28.0.1.0 and R 4.1.3.<sup>19</sup>

## RESULTS

### Participants

Participants were enrolled from January 2020 to July 2020 (ie, much of the study occurred during the COVID-19 pandemic). The Elevida study design flowchart is shown in **FIGURE 1**, and participant baseline characteristics are documented in **TABLE S2**. Of 38 respondents, 26 were eligible to participate. The 12 individuals with MS who did not meet eligibility criteria did not differ in age range ( $P = .6$ ) from those who were eligible, but had significantly higher self-reported cognitive difficulties (MSNQ,  $P < .01$ ) and levels of fatigue (FSMC,  $P < .01$ ). Of the 20 people who commenced the program, 15 completed it (see Figure 1 for reasons for noncompletion).

There were no significant differences between the eligible participants who withdrew and those who completed the study in terms of self-reported cognitive functioning (MSNQ,  $P = .1$ ), level of fatigue (FSMC,  $P = .7$ ; CFS,  $P = .6$ ), disease severity (PDDS,  $P = .7$ ), or mood (HADS,  $P = .3$ ). In view of the small sample size, and as there were no significant differences in the self-reported fatigue scores (CFS,  $P = 1.0$ ; FSMC,  $P = 0.5$ ) between relapsing-remitting and progressive MS groups, further analysis combined all participants ( $n = 15$ ).

**TABLE 1.** Themes and Subthemes From the Think-Aloud Recordings From English Elevida

Theme	Positive or negative comments on program features	Incorrect assumptions in program content	Personal experiences and reflections
Subthemes	<ul style="list-style-type: none"> <li>Content</li> <li>Language</li> <li>Program functionality</li> <li>Tone and voice</li> <li>Response options</li> <li>Conversation</li> <li>Other</li> </ul>	<ul style="list-style-type: none"> <li>Hasn’t developed strategies/not managing MS</li> <li>Has relapses/afraid of relapses/MS not stable</li> <li>Low mood/depressed</li> <li>No prior knowledge/this is new information</li> <li>Newly diagnosed</li> <li>No mobility issues/is mobile</li> <li>Working and working business hours</li> <li>Ability to focus on fatigue management/other responsibilities</li> <li>Triggers: aware of them/specific causes</li> <li>Has problems with sleep</li> <li>Negative thoughts about fatigue/MS/general</li> <li>Has high levels of stress</li> </ul>	<ul style="list-style-type: none"> <li>Coping with/managing fatigue</li> <li>New insights/reflections</li> <li>Experience and awareness of fatigue</li> <li>Fatigue and symptom attribution</li> <li>Acceptance</li> <li>Change behaviors or reestablish behaviors</li> </ul>

MS, multiple sclerosis.

On average, participants took 59 days to complete the program (range, 32-127). Modules took an average of 35 minutes to complete: Module 8 was the shortest (averaging 16 minutes) and module 1 the longest (averaging 54 minutes).

### ***Elevida Feasibility and Acceptability***

We identified 3 overarching themes from the think-aloud recordings: (1) positive or negative comments on program features, (2) incorrect assumptions in program content, and (3) personal experiences and reflections, with each theme having multiple subthemes (TABLE 1). Example quotes are presented below; **P** indicates participant number and **C** is conversation number, with more participant quotes provided in TABLES S3-S6. Not all participants commented on the same aspects of the Elevida program. Percentages within the qualitative data (Tables S3-S6) are included to indicate how many participants spontaneously commented on a specific theme or subtheme; for example, if 40% said they enjoyed the cartoons, the other 60% did not provide such feedback.

Participants provided both positive and negative feedback across the conversations but, although they may have liked or disliked a particular aspect of one conversation, this did not necessarily mean that they liked or disliked that particular aspect in another conversation. For example, P5 said the response options to the multiple-choice questions in conversation 1 “Hit the nail on the head,” but regarding conversation 6, “I don’t like any of these answers at all.” Similarly, P13 said the conversation was individualized in conversation 1: “It actually does start to feel like a bit of a conversation [because it’s tailoring the answers,” but not in conversation 8: “I am sure he [would have] taken me into the same thing regardless of what I tick[ed].”

### **Positive Comments on Program Features**

All participants liked many aspects of the Elevida program. For example, 93% liked aspects of the content (“I did find this one interesting and useful” [P7,C4]), 67% the audio recordings (“I enjoyed listening to the audio recording” [P2,C1]), 60% the program summaries (“I think that was a good summary of the objectives and that particular conversation” [P11,C2]), and 40% the cartoons (“I like the cartoons; these have been a really fun element” [P10,C9]). The language of the program was described positively by 80% of participants (“I am finding the language very easy to understand [P8,C1]), and 53% liked aspects of the program’s functionality (“I think an explanation of the orange bar is good. In terms of understanding where you are up to, I think that’s very helpful” [P15,C1]). Participants liked both the tone of the program (47%; “I like the humor that stays throughout the conversations” [P15,C8]), as well as the narrator’s voice (33%; “I do find the reader’s voice very pleasant and engaging and quite soothing” [P14,C1]). Participants related to certain response options (60%; “This section I relate to” [P14,C7]), and 40% liked particular multiple-choice options (“Clear answers for the 4 of them, good options each of them” [P15,C2]). Over 30% of participants said the conversations were responsive and personalized (“Clever programming the way it responds to your answers giving that personalized feel to it” [P15,C1]), and 27% thought the program would

be generalizable (“This could be helpful to anybody, not just with MS, but anybody at all” [P13,C7]).

### **Negative Comments on Program Features**

During the program, participants spontaneously described how they thought aspects of the program could be improved and what they disliked about it. For example, 53% of participants said they wanted the program to acknowledge that fatigue is variable and dependent on context (“Rest depends on other obligations and how I’m feeling on a given day” [P12,C2]); 47% disliked the activity plans (“I don’t find it really helpful to have plans all the time” [P10,C6]); 40% disagreed that participants should not have naps when fatigued (“Absolutely does not apply to me. I can’t get through the day without my afternoon nap” [P15,C2]); and 47% said specific language needed to be clearer (“I just find that last sentence a little bit confusing. It needs to be simplified” [P15,C1]). Regarding program functionality, 73% said the energy check scale required a moderate level (“Moderate energy levels would be fitting for me” [P15,C2]); 67% wanted a forward/back/continue button (“I think I must have missed something. There was no option to go back” [P1,C1]); 60% found particular instructions unclear or confusing (“I’m not really sure what to do here” [P7,C1]); and 40% said certain conversations were too long (“It should be about as half as long” [P2,C1]).

Regarding the tone and voice of the narrator, 40% commented negatively (“Getting an Australian to do the voiceover or putting it into less robotic language and more adult language perhaps would be better” [P13,C1]). All participants provided negative feedback on particular multiple-choice answers or response options, especially in relation to being forced to use options that were not appropriate for them (“The 4 answers are not really relevant at all in my situation” [P3,C5]); 87% said the answers were not well defined or needed a free-text option (“I am wondering if it is worth letting people to put their own responses in” [P8,C3]); and 73% found certain response options were too extreme or negative (“Those 2 choices are at the extreme ends; there’s nothing in the middle” [P12,C1]). Finally, 60% of participants did not find the conversations to be interactive or personalized (“I know that we are not having a conversation...we are having a listen and at this point it sounds a little disingenuous” [P6,C1]).

### **Incorrect Assumptions Made in Program Content**

Participants identified many incorrect assumptions that were made throughout the program.

For example, 80% said the program seemed to assume they had not already developed strategies to manage their MS (“These are strategies that I am mostly already using now” [P6,C6]). Other incorrect assumptions identified by participants included that they were having a relapse or their MS was unstable (67%; “I don’t have relapses, so these sorts of quotes just put some distance between me and the conversation” [P2,C7]); that they experienced low mood or depression (“I don’t think depression is really an issue for me” [P9,C3]), or that the information in the program was new

to them (53%; “There’s no response there that ‘I’ve already done lots of meditation and this is not new to me’” [P12,C3]). Additionally, 47% of participants disliked the assumption that they were newly diagnosed (“That is something that I have learned over the course of the last 10 years” [P11,C3]); mobile (“I would like to take short but brisk walks, but I can’t” [P10,C2]); working (“There’s no relevant answer to this question as I don’t work” [P14,C5]), have sleep difficulties (“The sleep questions are not important to me [as] I am sleeping quite well” [P3,C6]); and/or were aware of their MS triggers (“My fatigue doesn’t seem to be tied into anything in particular; it can just happen day-to-day and I can’t pin it down to any particular events which exacerbate it” [P2,C9]). Participants also reported that the program seemed to assume they had negative thoughts about their fatigue and MS (40%; “I am not getting a lot out of this chapter where it talks about how to respond to negative thoughts because I don’t have a lot of negative thoughts” [P5,C7]) and high levels of stress (40%; “The options are presuming that I often suffer from stress, but, in fact, I don’t” [P4,C5]). Participants also wanted the program to acknowledge their variable ability to focus on their fatigue management depending on their competing responsibilities (47%; “I don’t think I am really actively fighting against fatigue by pushing myself; I push myself where it is important to do so” [P1,C1]).

### Personal Experiences and Reflections

During the Elevida program, participants reflected on their experiences with MS and fatigue. For example, 80% of participants commented on how they manage their fatigue (“I have a very positive outlook and try to stay pretty positive all the time. Positivity plays a big, big part in managing this disease in my case” [P5,C7]), and 80% of participants shared new insights about their fatigue (“I probably do tend to swing between doing everything at once, and then completely withdraw; this is a good insight to have” [P11,C2]). Participants discussed their personal experiences and how they shared these experiences with others (73%; “The way I explain it to people I talk to is it’s like operating with a flat battery: you just don’t have the energy to do stuff” [P4,C1]), with difficulties in attributing their symptoms of fatigue to MS or other causes (60%; “When you’ve had MS for a while it’s hard to know what would be your normal fatigue and what’s actually related to MS” [P15,C1]), with their acceptance of living with MS-related fatigue (60%; “I certainly don’t have to fight the fatigue. I think it’s more important to accept it and manage it, work around it” [P9,C1]), and with how parts of the program encouraged them to change their behavior or reestablish behaviors that may have helped them to manage their fatigue previously (53%; “It is certainly something I will follow through with and give it a go this week and see if it makes a difference to my level of tiredness in the evening” [P13,C2]).

### Participant Ratings of Elevida

At the end of program, participants rated Elevida as poor (7%), acceptable (13%), good (47%), or very good (33%). Overall,

participant ratings to the 7 statements about the English version of the program were very positive (TABLE S7). For the 16 statements about the impact of the different components of the Elevida program (completed at the end of the program and again 2 months later), participants reported an improvement at 2 months follow-up compared with program completion for 9 statements, no change for 3 statements, and a worsening over time for 4 statements (TABLE S8).

### Effectiveness for Fatigue

There was a statistically and clinically significant reduction in CFS mean fatigue scores<sup>10</sup> from baseline to program completion (mean difference=3.8, Cohen  $d=0.84$ ,  $P<.01$ ; baseline score 16.2 [SD =4.7], program completion score 12.4 [SD=4.0]), which persisted 2 months after program completion (mean difference=4.8, Cohen  $d=0.83$ ,  $P<.01$ ; 2-month postcompletion score 11.4, [SD =4.0]; FIGURE S2).

## DISCUSSION

In this pilot study, we examined the acceptability, feasibility, and preliminary findings of the effectiveness of an English version of Elevida in a small group of individuals with MS in Australia. When comparing the effectiveness of the English version of the Elevida program with the German version, both showed a statistically and clinically significant reduction in CFS mean fatigue scores from baseline to program completion, and this improvement persisted up to 2 months after program completion. Overall, participants rated the program very positively, and 80% said they would recommend the program to others with MS-related fatigue.

Using the think-aloud protocol, participants gave comprehensive feedback in real time while completing Elevida that highlighted the program’s strengths, areas for improvement, assumptions, and how engagement with the program enabled participants to reflect on their experience of MS-related fatigue. Even in this small study, mean fatigue scores reduced significantly—both statistically and at a clinically meaningful level.<sup>10</sup>

Overall, the Elevida program appeared to be feasible and acceptable. Of those who started the program, 75% completed it, despite the additional requirements of the think-aloud protocol. This is very similar to the attrition in the original German trial of Elevida (74% of those randomly assigned to the intervention completed the 12 week program).<sup>9</sup> The COVID-19 pandemic may have contributed to the dropout rate, with 2 of 5 noncompleting participants citing family issues or family health issues as the reason for withdrawal. Technical issues accounted for 3 eligible participants failing to start the program, and 1 later withdrawal. Also, the additional requirements associated with conducting the think-aloud protocol, eg, continuously talking about the program while completing it, and the practical requirements, eg, using the recorders and uploading the recordings, made Elevida program completion for this study more complicated than the standard protocol. A recent meta-analysis of attrition rates in digital psychological interventions that

mimic human conversation found an overall attrition rate in the intervention group of 22% (95% CI, 17%-27%), with key drivers including lack of human support (which may have been more of a challenge for participants during the COVID-19 pandemic) and not having a symptom tracker feature.<sup>20</sup> All things considered, our findings indicated that this English version of the Elevida program was acceptable, but would benefit from a number of improvements.

Although the benefits of CBT-based approaches to MS-related fatigue have been shown,<sup>7-9</sup> this study has indicated the importance of considering various factors relating to how people with MS-related fatigue engage with and respond to the content of CBT-based programs. For example, the lived experience of MS-related fatigue could relate to many factors, including time since diagnosis, type of MS, access to resources and support, and/or the impact of the symptoms of MS-related fatigue on motivation and behavior.<sup>2,21,22</sup>

The Elevida program is based on the principles of CBT, however the development of Elevida was also inspired by the principles of Deci and Ryan's self-determination theory (SDT).<sup>23,24</sup> SDT considers how human motivation and behaviors are associated with the psychological needs for autonomy, competence, and relatedness (ie, having a sense of choice and control, behaviors that are effective, and satisfaction when engaging with others).<sup>25</sup>

An SDT-based approach has previously been examined in individuals with MS in relation to physical activity<sup>26</sup> and dietary change.<sup>27</sup> Mulligan et al<sup>28,29</sup> applied SDT principles to a fatigue program that showed a significant improvement in perceived impact of fatigue and self-efficacy in participants with MS. Therefore, although principles of SDT inspired the development of the Elevida program, findings from this study suggest that additional SDT-based changes might further improve the acceptability of the English version.

First, it is important for participants to be offered adequate choices, as they did not like being forced to respond with or endorse particular options they could not relate to. Therefore, including more neutral options such as "I haven't experienced that" or "Let's continue" would be useful. Second, participants also expressed their desire to have more detailed control within Elevida, including the ability to go forward and backward and/or use a continue button to skip sections that were not relevant. Finally, some participants found the use of activity plans useful, whereas others found them burdensome and restrictive. Allowing participants to have even more flexibility to choose and implement activity plans, depending on their unique contexts, might promote independence and generate a greater sense of autonomy.

People with MS are often highly motivated to understand and manage their symptoms of fatigue.<sup>21</sup> Throughout the program, participants described their experiences with problem-solving, planning, and implementing strategies to help them understand, manage, adapt to, and accept their symptoms. Although the perception of competence in managing symptoms of fatigue varied among participants, they perceived that some of the implicit assumptions conveyed by the Elevida program reflected negatively on their sense of competence. Therefore, including

more responses such as "I already do that" or "I tried that, but it didn't work for me" would acknowledge participants' strategies to manage their symptoms of fatigue.

Some participants also wanted Elevida to acknowledge that symptoms of MS-related fatigue fluctuate, as does one's ability to accommodate them. For example, a person with symptoms of MS-related fatigue can rest on some occasions while having to push through at other times, depending on their commitments and responsibilities. Finally, to reduce the perception that the program makes incorrect assumptions, the use of more sensitive and inclusive language is recommended to better acknowledge the range, severity, and fluctuation of symptoms, as well as the varying abilities of people with MS-related fatigue and the contextual factors that might influence them. For example, using more hedging language, eg, stating that people with MS-related fatigue *may* experience low mood, stress, sleep issues, etc, without assuming they *are* experiencing or *have* experienced them, would help.

Participants provided mixed feedback on how they related to the Elevida program based on their symptoms and experience of MS, including MS subtype, mobility, and level of functioning. Some people with progressive MS regularly commented that the program was too focused on the experiences of people with relapsing-remitting MS. These comments could be perceived as patronizing and insensitive, as they may have suggested that the program is better suited to participants who are more mobile (eg, capable of walking to improve their mood). Therefore, including case studies, additional response options, and recommendations that reflect the diverse experiences of people with different subtypes of MS would improve participants' sense of belonging and their ability to relate to Elevida and other people with MS-related fatigue.<sup>25,30</sup>

Participants often reflected on their unique experiences of MS-related fatigue, which, at times, provided greater understanding, perspective, meaning, new insights, and/or acceptance. Response options that acknowledge the difficulty of the program being able to cover all possible experiences (eg, "My experience is different to that" or "You may experience X while others may experience Y") and enabling participants to contribute their experiences, either through a free-response option or a *My Insights and Reflections* section, could enhance how participants relate to the program.

Finally, some participants found the Elevida program to be too negative and wanted the positive outcomes of their experiences of MS-related fatigue to be acknowledged more explicitly. One way to do this would be to incorporate elements relating to how participants had adapted to living with MS (eg, "I have learned to live with my symptoms of fatigue"), reprioritized their life, increased their resilience, and/or expanded their identities beyond their symptoms (eg, "I have MS but it doesn't have me").

## CONCLUSIONS

Overall, this study's results demonstrated that the English version of Elevida is highly acceptable and worthy of further study. The rich participant feedback provided clear and specific ways to optimize the program. There was a relatively high

dropout rate, possibly due to the COVID-19 pandemic and/or the additional requirements associated with this study design, so further research on the feasibility of the English version of Elevida needs to be conducted. The participants in this study were highly motivated, which may be related to specific factors (eg, MS type, age, employment status), so Elevida also needs to be tested on a broader range of individuals with MS. Similarly, the number of participants in this study was too small to determine whether or not the program might benefit specific participant subgroups.

Interestingly, participants commented on the generalizability and usefulness of the Elevida program for people without MS, generating another area of future research. Bearing in mind that the fatigue associated with post-COVID-19 condition has been likened to MS-related fatigue,<sup>31,32</sup> the Elevida program could be adjusted for use in those people experiencing this condition, as well as other conditions associated with fatigue.

The English version of Elevida is a promising tool for use by people with MS-related fatigue. Integrating further SDT-based principles is recommended and might further improve the program's acceptability, but regardless of whether these recommendations can be implemented, program trials ought to be conducted in a larger and more diverse MS population in Australia, as well as in other regions globally. ■

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## REFERENCES

- King R. Part 1, mapping multiple sclerosis around the world, key epidemiology findings. *Atlas of MS 3rd edition*. Multiple Sclerosis International Federation. September 2020. Accessed November 17, 2024. <https://www.msif.org/wp-content/uploads/2020/12/Atlas-3rd-Edition-Epidemiology-report-EN-updated-30-9-20.pdf>
- Induruwa I, Constantinescu CS, Gran B. Fatigue in multiple sclerosis - a brief review. *J Neurol Sci*. 2012;323(1-2):9-15. doi:10.1016/j.jns.2012.08.007
- Oliva Ramirez A, Keenan A, Kalau O, Worthington E, Cohen L, Singh S. Prevalence and burden of multiple sclerosis-related fatigue: a systematic literature review. *BMC Neurol*. 2021;21(1):468. doi:10.1186/s12883-021-02396-1
- Zackowski KM, Freeman J, Brichetto G, et al. Prioritizing progressive MS rehabilitation research: a call from the International Progressive MS Alliance. *Mult Scler*. 2021;27(7):989-1001. doi:10.1177/1352458521999970
- Ayache SS, Chalah MA. Fatigue in multiple sclerosis—insights into evaluation and management. *Neurophysiol Clin*. 2017;47(2):139-171. doi:10.1016/j.neucli.2017.02.004
- Khan F, Amatya B, Galea M. Management of fatigue in persons with multiple sclerosis. *Front Neurol*. 2014;5:177. doi:10.3389/fneur.2014.00177
- van den Akker LE, Beckerman H, Collette EH, et al. Cognitive behavioral therapy positively affects fatigue in patients with multiple sclerosis: results of a randomized controlled trial. *Mult Scler*. 2017;23(11):1542-1553. doi:10.1177/1352458517709361
- Wendebourg MJ, Heesen C, Finlayson M, Meyer B, Pöttgen J, Köpke S. Patient education for people with multiple sclerosis-associated fatigue: a systematic review. *PLoS One*. 2017;12(3):e0173025. doi:10.1371/journal.pone.0173025
- Pöttgen J, Moss-Morris R, Wendebourg JM, et al. Randomised controlled trial of a self-guided online fatigue intervention in multiple sclerosis. *J Neurol Neurosurg Psychiatry*. 2018;89(9):970-976. doi:10.1136/jnnp-2017-317463
- Nordin Å, Taft C, Lundgren-Nilsson Å, Dencker A. Minimal important differences for fatigue patient reported outcome measures—a systematic review. *BMC Med Res Methodol*. 2016;16:62. doi:10.1186/s12874-016-0167-6
- Penner IK, Raselli C, Stöcklin M, Opwis K, Kappos L, Calabrese P. The Fatigue Scale for Motor and Cognitive Functions (FSMC): validation of a new instrument to assess multiple sclerosis-related fatigue. *Mult Scler*. 2009;15(12):1509-1517. doi:10.1177/1352458509348519
- Benedict RH, Munschauer F, Linn R, et al. Screening for multiple sclerosis cognitive impairment using a self-administered 15-item questionnaire. *Mult Scler*. 2003;9(1):95-101. doi:10.1191/1352458503ms8610a
- Kurtzke JF. Rating neurologic impairment in multiple sclerosis: an expanded disability status scale (EDSS). *Neurology*. 1983;33(11):1444-1452. doi:10.1212/wnl.33.11.1444
- Ericsson KA, Simon HA. *Protocol Analysis: Verbal Reports as Data*. 2nd ed. MIT Press; 1993.
- Hohol MJ, Orav EJ, Weiner HL. Disease steps in multiple sclerosis: a simple approach to evaluate disease progression. *Neurology*. 1995;45(2):251-255. doi:10.1212/wnl.45.2.251
- Cella M, Chalder T. Measuring fatigue in clinical and community settings. *J Psychosom Res*. 2010;69(1):17-22. doi:10.1016/j.jpsychores.2009.10.007
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361-370. doi:10.1111/j.1600-0447.1983.tb09716.x
- Miles MR, Huberman AM, Saldana J. *Qualitative Data Analysis: A Methods Sourcebook*. Sage; 2014.
- The R Project for Statistical Computing. R Foundation. Accessed October 14, 2021. <https://www.R-project.org>
- Jabir AI, Lin X, Martinengo L, Sharp G, Theng YL, Tudor Car L. Attrition in conversational agent-delivered mental health interventions: systematic review and meta-analysis. *J Med Internet Res*. 2024;26:e48168. doi:10.2196/4816
- Desborough J, Brunoro C, Parkinson A, et al. 'It struck at the heart of who I thought I was': a meta-synthesis of the qualitative literature examining the experiences of people with multiple sclerosis. *Health Expect*. 2020;23(5):1007-1027. doi:10.1111/hex.13093
- Newton G, Griffith A, Soundy A. The experience of fatigue in neurological patients with multiple sclerosis: a thematic synthesis. *Physiotherapy*. 2020;107:306-316. doi:10.1016/j.physio.2016.11.004
- Deci EL, Ryan RM. *Intrinsic Motivation and Self-Determination in Human Behaviour*. Plenum; 1985.

24. Deci EL, Ryan RM. Self-determination theory: a macrotheory of human motivation, development, and health. *Can Psychol*. 2008;49(3):182-185. doi:10.1037/a0012801
25. Kilpatrick M, Hebert E, Jacobsen D. Physical activity motivation: a practitioner's guide to self-determination theory. *J Phys Educ Recreat Danc*. 2002;73:36-41. doi:10.1080/07303084.2002.10607789
26. McCarty N, Sayer S, Kasser SL. Motivation for physical activity in adults with multiple sclerosis: a self-determination theory-based approach. *Int J MS Care* 2022;24(3):117-123. doi:10.7224/1537-2073.2020-091
27. Russell RD, Black LJ, Begley A. Navigating dietary advice for multiple sclerosis. *Health Expect*. 2021;24(3):853-862. doi:10.1111/hex.13226
28. Mulligan H, Wilkinson A, Barclay A, Whiting H, Heynike C, Snowdon J. Evaluation of a fatigue self-management program for people with multiple sclerosis. *Int J MS Care* 2016;18(3):116-121. doi:10.7224/1537-2073.2015-019
29. Mulligan H, Wilkinson A, Snowdon J. A fatigue management programme for persons with multiple sclerosis: development, theory and practical considerations. *Phys Ther Rev* 2017;22(1):1-4. doi:10.1080/10833196.2017.1287393
30. Wood V, Kasser SL. Spousal support and self-determined physical activity in individuals with multiple sclerosis: a theory-informed qualitative exploration. *Disabil Health J*. 2020;13(1):100835. doi:10.1016/j.dhjo.2019.100835
31. O'Brien KK, Brown DA, McDuff K, et al. Conceptualising the episodic nature of disability among adults living with long COVID: a qualitative study. *BMJ Glob Health*. 2023;8(3):e011276. doi:10.1136/bmjgh-2022-011276
32. Jennings G, Monaghan A, Xue F, Duggan E, Romero-Ortuño R. Comprehensive clinical characterisation of brain fog in adults reporting long COVID symptoms. *J Clin Med*. 2022;11(12):3440. doi:10.3390/jcm11123440