

Figure S1. Participant Recruitment and Enrollment

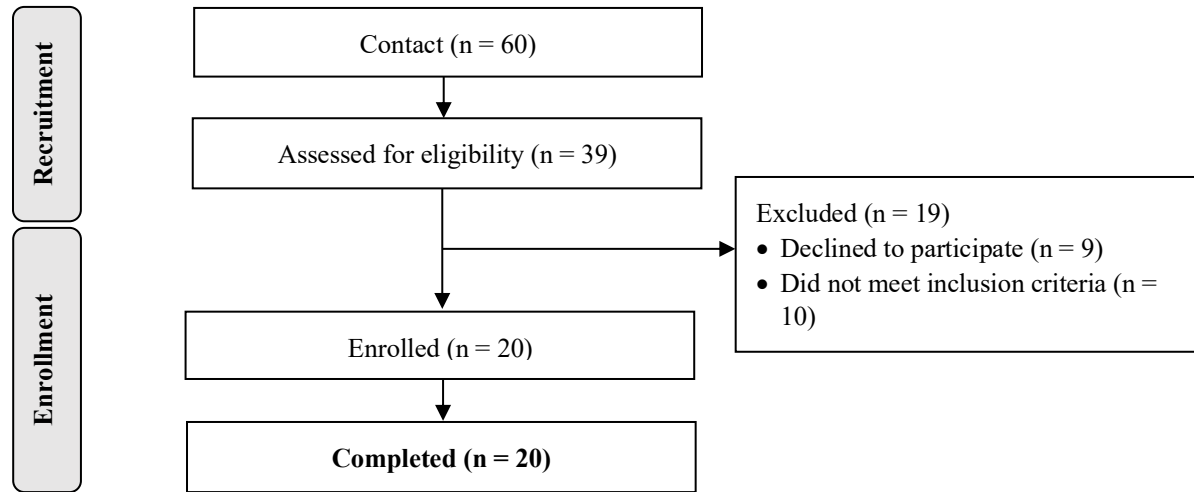


Table S1. Semistructured Interview Questions

COM-B component	TDF domain	Questions
Behavior		What does PA mean to you? (Images, words, activities, anyone ever talks to you about it). What was your PA like before being diagnosed with MS? - What were you doing for PA? Can you tell me about your current experiences with PA? - Are you currently physically active? - What types of PA?

Capability, psychological	Knowledge	<p>- Intensity? How often? How long?</p> <p>Can you tell me how much PA is recommended (or appropriate) for an individual with MS?</p> <p>How do you think your current PA levels compared to these PA recommendations for MS?</p>
	Behavior regulation	<p>How do you know if you are getting sufficient PA for MS?</p> <p>- Do you monitor your PA behavior? How?</p>
	Memory, attention, and decision processes	<p>To what extent is PA something you normally do for managing MS?</p> <p>- Do you regularly do PA for your health?</p>
Capability, physical	Skills	To what extent are you confident in doing physical activities safely (intensity, frequency, duration, type of activities, health status, environments, etc) to promote your health?
Opportunity, physical	Environmental context and resources	<p>What is in your life/work/home environment that might help/hinder your PA behavior?</p> <p>- What are the barriers/facilitators for being physically active?</p>
Opportunity, social	Social influences	<p>Do/would your family/friends help or hinder you in doing physical activities? Why/why not?</p> <p>- How do/would their opinions influence your PA?</p>
Motivation, reflective	Goals and intentions	To what extent would you like to be physically active following the guidelines for PA in MS?
	Social/professional role and identity	Do/would your family/friends accept you for doing physical activities? Why/why not?
	Beliefs about capabilities	How easy or difficult would it be for you to engage in an appropriate amount of PA?

	Optimism	To what extent are you confident that you can overcome these barriers to be physically active?
	Beliefs about consequences	What do you think will happen when you continue to do physical activities/are more physically active? - How has/would PA impacted/impact you and your MS?
Motivation, automatic	Emotion	How does/would doing physical activities make you feel?
	Reinforcement	What has helped you be physically active? What do you think could be rewards for being physically active?

COM-B, capability, opportunity, and motivation behavior model; MS, multiple sclerosis; PA, physical activity; TDF, Theoretical Domains Framework

Table S2. PA Behavior Themes and Representative Quotes

Theme	Representative quotes
Difficulty engaging in PA since MS diagnosis	“When I tried to go for walks, I just felt really weak, and, after about ... I could do less than a mile. My, my workplace that I previously worked at is, uh, about three quarters of ... or a half a mile away ... and I could barely walk to work, and I would be winded and tired.”
Engaging in light to moderate levels of PA after a break	“Um, I took a break from like doing theater ... and from just anything like dancing and anything like that, so it definitely did impact it. Now I'm like more so like back into dancing. And like I said, I play, I do play tennis now and stuff like that, but it's, it's not as much I would say as, as before.”
Regularly engaging in PA after MS diagnosis	“Yeah, right now I do yoga 5 days a week. It's hot yoga. It's like 60 minutes and I do that every morning. And I, I subscribe to a video service.”

MS, multiple sclerosis; PA, physical activity

Table S3. Types of PA Individuals Newly Diagnosed as Having MS Did After Their Diagnosis

Type of activity	Activities
Exercise with equipment	Biking Peloton Rowing machine Weightlifting
Stretching and strengthening	Yoga Exercise for strength and flexibility
Lifestyle PA	Walking Activities for enjoyment (eg, sports, dancing, gold mining, gardening) Household activities (eg, cooking, playing with kids, making knives)

MS, multiple sclerosis; PA, physical activity.

Table S4. Subthemes of PA Influencing Factors Mapped Onto the COM-B Model and TDF

COM-B component	TDF domain	Subtheme	Illustrative quote
Psychological capability	Knowledge	Knowledge and perception of PA	Barrier: “Um, so I don't really know what's recommended for people with MS.” Facilitator: “You know, it keeps your brain healthy, so I mean, that's basically just to slow down the progression, so later on, there is no increase in disability, I should say.”

			<p>Barrier: “Um, I guess I try to test my limits on, you know, how much I can do. In terms of walking for exercise, I feel like sometimes I over push my boundaries, and don't realize until after so I try to see, but that one's a little more difficult.”</p>
	Memory, attention, and decision processes	Awareness of new physical limitations	<p>Facilitator: “Um, before that, I was super active and then coming out of the hospital and not doing anything, even for just 5 days ... I got back on the Peloton, and I think my whole mindset just changed to kind of being less aggressive and more consistent and for shorter times on the Peloton ... kind of just lowered and, and started, from a more of a beginner mindset and work my way back up.”</p>
	Behavior regulation	Challenges in PA self-monitoring	<p>Barrier: “It's not that I don't want to, it's just I don't think I'm at any kind of level to really track anything. Like, I don't feel I'm doing anything that's trackable.”</p> <p>Facilitator: “Some of the ways that I do that is through keeping a record of my body and how I look. I'll take pictures of my torso and I've started to measure different parts of my body to have data to compare to, and I suppose I've been weighing myself as well.”</p>
Physical capability	Physical skills, strength, and stamina	Impact of fluctuating symptoms and mobility limitations	<p>Barrier: “And I let it get pretty bad before I got my diagnosis. By the time I did, I was barely able to walk because of the pain and the severity of what was going on and so I ended up off of work and in rehabilitation to gain any use back. And through the treatments and stuff, the numbness didn't get better, but I learned how to deal with it and how to work with it. And I was doing my best to be physically active, and it was hard.”</p>

			<p>Facilitator: “I don't feel like it's having an effect on my PA. The only things that I felt were like in my eye and those like almost a 100 percent recovered, like I don't notice a difference in my vision.”</p>
			<p>Barrier: “Uh, but some of my activities outdoors, you know, I either stopped doing or did less because gait become a problem, particularly on like, uneven surfaces, uneven ground.”</p>
Physical opportunity	Environmental context and Resources	Environmental resources	<p>Facilitator: “Huh, I think mostly having a dedicated space that is free of pets who can get under your feet and trip because I think a lot of people have busy lives, busy households. We turned our, our shed into a studio and my studio has an open floor and no pets to help prevent trips and falls. I think that definitely can be helpful. I also think having supportive devices, so things like pillows and stretching straps that help you do the stretching without overdoing it, so different tools around can be helpful as well.”</p>
Social opportunity	Social influences	Interpersonal support in PA engagement	<p>Barrier: “And I, I kinda get annoyed with the doctor for continuing to speak about that subject because I feel like it's a sensitive subject because if you knew me before I was diagnosed, these doctors were meeting me 40 pounds heavier. And I just felt like I know where I was and I know what I was doing, and I just can't do it, if you're giving me medication that's gonna, make me gain weight. So, I was just kind of frustrated with 'Why are you telling me to lose weight when you're giving me medicines that make me gain weight?’”</p>

		<p>Facilitator: “Um, I mean my husband's great. He definitely helps. He's more motivated and more of a morning person than I am. So for waking up in the morning and going on that first walk of the day... but he's also, like, he likes riding his bike so like I probably wouldn't have gotten a bike if it wasn't for him.”</p>
<p>Reflective motivation</p>	<p>Beliefs about capabilities</p> <p>Perceived physical limitations impact confidence in PA engagement</p>	<p>Barrier: “Because there are many things that affect my feeling to do things. Because with vision issues and balance issues, and just like dizziness and things like that. I feel things can become unsafe and so it's always something that I'm always thinking about, to not push. Like before my diagnosis, I would push myself really hard.”</p> <p>Facilitator: “Fairly confident. I mean, because if I need to, even if I close the gym down, I'll buy my own bar, dumbbells or ... just use body weight instead. I mean there are other ways to do it so I'm pretty confident that I would be able to work around it.”</p>
	<p>Goals and intentions</p> <p>Setting realistic PA goals in early MS</p>	<p>Barrier: “Nobody's ever recommended a time limit, but my goal has, when I do cardio, has been at least a half hour, if not an hour. Um, though I don't think I've ever hit an hour.”</p> <p>Facilitator: “Let me put it this way. I'm working on the problems. I have many goals. I have very specific goals, actually. At a mechanical level, I'm looking at 7 to 10 more degrees of flexion in my hip, 10 to 15 more degrees of flexion in my knee, and 3 to 5 more degrees of flexion in my dorsiflexion in my ankle. These are all on the right side.”</p>

Social/professional role and identity	Self-identity in PA engagement after diagnosis	<p>Barrier: “I think that I've always been kind of a low-activity person, like I don't run. I'm, I'm a very easygoing, slow person. I used to dance; I will say I used to dance more regularly, and then in the last couple of years, what I know now were relapses. I didn't know. I had a couple of relapses in the last 2 years that caused numbness, tingling in my leg, and fatigue so there were times where I'd be really active, and I'd be dancing more regularly and then there were times I'd go through these periods of numbness that I didn't know was a relapse. Then after that, it was like the fatigue hit me really hard, and so a lot of my day was spent just sitting on the couch, watching shows or movies or something, or reading.”</p> <p>Facilitator: “And again, my physical ability, the fact that I was, and I am a physically active person in general, and it feels like it's a part of who I am as a person, I think my personality facilitates as well.”</p>
Belief of consequences and Optimism	Positive outlook	<p>Barrier: “Uh, so it was definitely jarring, but I kept my hopes up. I knew that eventually I would be able to get back into it and I did.”</p> <p>Facilitator: “I think that there are some lifelong barriers that I have in place that will always be there, and I feel confident that I will get to a place where physical activity will just be a normal thing ... I now see that having a disability doesn't mean that you don't do anything, that just because I have a disability, it just means I have to find my ability elsewhere. It won't be perfect, but it'll be something.”</p>

	Reinforcement	Outcomes of PA engagement	<p>Barrier: “Uh, it's kind of weird, but I mean, it's like if I'm working out and doing all these things, my muscles get sore and I've got to go through all that discomfort.”</p> <p>Facilitator: “If I'm moving more and I just keep moving around the house and doing things and going out into the garden, I feel less fatigued than if I just sit all day.”</p>
Automatic motivation	Emotion	Role of emotions in PA engagement	<p>Barrier: “Uh, depression and anxiety, I think. Well, those are the big 2. I think those 2 are the two main things that I want to focus on. So on the depression side, you believe you're not capable, you can't do it, right? And so why even bother?”</p> <p>Facilitator: “There was a time that I was very, um, scared at the prospect of not being able to be physically active.”</p>

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