

“The positive feel”: Unpacking the role of positive thinking in people with multiple sclerosis’s thinking aloud about staying physically active

Sam Hall-McMaster¹, Gareth J. Treharne¹ and Catherine M. Smith²

¹Department of Psychology, University of Otago, Aotearoa/New Zealand

²Centre for Health, Activity and Rehabilitation Research, School of Physiotherapy,
University of Otago, Aotearoa/New Zealand

Corresponding author:

Gareth J. Treharne,

Department of Psychology, University of Otago, PO Box 56, Dunedin 9054,
Aotearoa/New Zealand

Email: gareth.treharne@otago.ac.nz

“The positive feel”: Unpacking the role of positive thinking in people with multiple sclerosis’s thinking aloud about staying physically active

Abstract (100 words)

People with multiple sclerosis (MS) experience barriers to physical activity (PA). Thought processes are interwoven with garnering motivation to overcome these barriers. The present study investigated in-depth the role of positive thinking in PA motivation of two women and two men with MS. Participants thought aloud while completing standardised measures of PA, stages of change and self-efficacy, and in response to planned and spontaneous questions. Four themes were formulated using inductive thematic analysis: thoughts about purpose, self-efficacy, the past, and reinforcement through positive thinking. These findings have implications for PA theories and delivering appropriate PA interventions to the MS community.

Keywords: multiple sclerosis; physical activity; positive thinking; thematic analysis; think-aloud

Introduction

Regular physical activity (PA) is connected with improved physical health, emotional well-being, social connection and improved quality of life in the general population (Bize et al., 2007). The benefits of PA are particularly important for people with chronic illnesses, but further research is required into how psychological processes around motivation and 'positive thinking' feature in the PA of people with chronic illnesses (see Beckerman et al., 2010; Hale et al., 2012).

Multiple sclerosis (MS) is a chronic illness that has a particularly complicated relationship between fatigue and perceived ability to exercise (Smith et al., 2009, 2011, 2014; Stroud and Minahan, 2009). People with MS typically experience symptoms such as co-ordination and balance loss, sensory numbing and fatigue (Bear et al., 2007), all of which can make PA more challenging. Despite these challenges, engaging in regular PA has been shown to reduce the physical impact of MS in just three months (Hale et al., 2013; Learmonth et al., 2013). In the longer term, Stroud and Minahan (2009) found people with MS who engaged in regular PA reported less fatigue, fewer symptoms of depression and a greater quality of life.

Although regular PA has many benefits, people with MS tend to be less active than the general population (Motl et al., 2005). It is therefore critical to understand what motivates people with MS to engage in regular PA and to keep doing so over the long-term. Dlugonski et al. (2012) found that women with MS were motivated to do PA for

enjoyment, to feel good, gain a sense of accomplishment and to maintain physical capabilities. Women and men with MS may also be motivated to exercise as a means of cultivating optimism and hope (Kasser, 2009).

It is also essential to understand factors affecting PA motivation. Using a qualitative research approach, Smith et al. (2011) explored how exercise motivation was impacted by perceived control over MS fatigue. The core contributors to this perceived control are believing: 1) exercise can improve health; 2) exercise can help achieve goals; and 3) fatigue is controllable. An important avenue for further exploration is how positive thinking features in those beliefs, or in an absence of those beliefs, to impact PA motivation. Based on a review of qualitative research, Hale et al. (2012) concluded that long-term engagement in PA is more likely when individuals with MS have choice over their PA, control over the type and amount of PA, and support in their decisions. A corollary of this theory is that an individual's stage of change is an important reflection of their readiness to exercise when they have MS, as per the transtheoretical model (Prochaska, 1979). Chiu et al. (2012) found that people with MS in the action stage of change for PA have higher self-efficacy and outcome expectancy than those in a contemplative or pre-contemplative stage, but the role of positive thinking was not examined in their study. Hence, there is a need to explore whether positive thinking also distinguishes people in the stages of change and whether positive thinking could promote a more active stage of change for PA.

Thought processes, such as positive thinking, may benefit PA motivation for people with MS. Kosma et al. (2012) argued PA interventions should first emphasise cognitive processes of change such as positive thoughts about PA, followed by behavioural strategies like goal setting. Self-efficacy and stages of change were two of best predictors of initial PA levels over a year in a sample of people with chronic illnesses of whom 53.8% had MS. However, perceived benefits, as well as cognitive and behavioural processes of change (e.g. self-reevaluation and reinforcement) were among the best predictors of PA change over the long-term. These findings point to thoughts as effective tools in garnering the motivation necessary to commit to behavioural change and highlight the need to explore kinds of thoughts that might motivate people in MS community to be more physically active. In addition, Morrison and Stuifbergen (2014) found social and physical outcome expectations explained 11.5% of the variance in PA participation among individuals with long-standing MS (>15 years). However, neither physical, social, nor self-evaluative outcome expectations explained differences in physical capability. Morrison and Stuifbergen (2014) concluded that social and physical outcome expectations that are positive in nature may serve to enhance PA motivation in people with long-standing MS. Alongside these quantitative studies, more in-depth research exploring the perspectives of people with MS is needed, particularly whether they believe such positive thinking strategies could increase PA motivation.

Overall, thought-based practices may provide a positive addition to current strategies that aim to help people with MS increase their PA motivation. To explore this possibility, there is an unaddressed need to investigate thoughts that affect PA motivation among people with MS. One way to achieve this is by using cognitive interviewing techniques, some of which include completion of standardised questionnaires in the context of a qualitative interview (Adamson et al., 2004; Anderson-Lister and Treharne, 2014). This multi-method approach has been regarded as extremely valuable for gathering qualitative data in health research because it can provide triggers to explore complex issues (Adamson et al., 2004). One form of cognitive interviewing is called the concurrent think-aloud method. In this procedure, participants are asked to verbalise their thought processes as they read questionnaire items or respond to interview questions. In doing so, substantial insight can be gained regarding participants' perspectives (Lundgrén-Laine and Salanterä, 2010). The think-aloud method has previously been applied to explore perceptions of people undergoing physiotherapy for various reasons (Van Oort et al., 2011), as well as people's perceptions about health behaviours (Al-Janabi et al., 2013; Anderson-Lister and Treharne, 2014; Kaklamanou et al., 2013), walking (Darker and French, 2009) and attempting to increase physical activity levels (French et al., 2007). The think-aloud method has previously been used in studies with people with MS but only to assess the

content validity of new questionnaires (Wicks et al., 2012) and not to provide in-depth exploration of their experiences and beliefs.

The aim of the present study was to explore thoughts around motivation to be physically active among individuals with MS. A think-aloud method was used to gain an understanding of participants' perspectives by providing a range of prompts, and we took an in-depth qualitative approach to the think-aloud data (Koro-Ljungberg et al., 2013; McGavock and Treharne, 2011). The main research question in this study was: How do people with MS describe their thought processes related to physical activity and their motivations to be physically active?

Methods

Participants

The sample consisted of four participants diagnosed with MS who had been experiencing symptoms for 8–19 years and diagnosed for 2–11 years. Participants ranged in age from 46–70 years. Three participants were physically mobile, and one was reliant on an electric wheelchair. A sample size of four is ideal for an in-depth exploratory qualitative analysis in which the emphasis is on interpretation rather than prevalence of particular views (Braun and Clarke, 2013; Koro-Ljungberg et al., 2013; McGavock and Treharne, 2011). All participants spoke English as a first language and signed informed consent before taking part. Recruitment took place through the

University of Otago School of Physiotherapy ‘Umove’ classes and participants were given a \$20 grocery voucher as reimbursement for expenses. The study was approved by the University of Otago Human Ethics Committee.

Measures

Six questionnaire measures were used in the think-aloud procedure in the following order:

Demographics. This section included questions about age, gender identity, sexual orientation, relationship status, living situation, ethnicity, qualifications and job status. The date MS symptoms first appeared and the date of MS diagnosis by a health professional were also requested.

Physical activity diary (Hale et al., 2013). This open-ended diary was used to ascertain self-reported physical activity from the previous day. The participant’s most active type of physical activity formed the basis for a series of verbal questions that explored participants’ feelings, thoughts and motivations for that specific activity. These verbal questions are detailed in Appendix 1.

Barriers and strategies for physical activity (Hale et al., 2013). This questionnaire contains 24 items, 12 of which related to barriers to performing physical activity and 12 of which relate to strategies for overcoming such barriers. Participants indicated the relevance of the barrier or strategy to them by ticking ‘No’, ‘Maybe’ or ‘Definitely’.

Verbal questions were asked following questionnaire items 1, 6, and 11 in the barrier section, and 3 and 11 in the strategies section (see Appendix 1). Verbal questions were tailored to the participant's response to the preceding questionnaire item.

Stages of change for physical activity (Plotnikoff et al., 2007). This question consists of five answer options that correspond to the five stages of change. Participants indicated which stage of change they were currently in for physical activity, ranging from not getting regular physical activity and having no intention of doing so through to having performed regular physical activity for longer than six months. The instructions for this question included a definition of 'physical activity' (from Plotnikoff et al., 2007) as doing activities at a moderate intensity, such as brisk walking and 'regular physical activity' was defined doing a total of 30 minutes of physical activity (or more) on a given day, three or more days every week.

Stages of change for positive thinking. This question was created specifically for the present study and is adapted from the stages of change for physical activity (Plotnikoff, et al., 2007). The five answer options match the five stages of change and range from not choosing to think positively and having no intention of doing so through to having chosen to think positively for longer than six months. Definitions of 'positive thinking' and 'choosing to think positively' were developed from Bekhet and Zauszniewski (2013) and were included in the instructions for this question. 'Positive thinking' was defined as focusing on the positive aspects of a situation, including the use of uplifting

thoughts, images or sounds. ‘Choosing to think positively’ was defined as deliberately bringing these to mind for five minutes or more, without interruption, three or more days each week.

The MS Self-efficacy Scale (MSSS) (Rigby et al., 2003). This questionnaire provides a measure of control over quality of life that is specific to MS. Participants were asked to indicate on a six-point scale how strongly they agree or disagree with 14 statements. In the present study, the MSSS was expanded to include two additional written statements: “I deliberately choose to think positively in order to help me cope with my illness” and “I choose to take control of how I interpret my MS symptoms”. Additional verbal questions were asked after items 3, 10, 11 and 13 (see Appendix 1).

Procedure

Think-aloud interviews were conducted with individual participants and involved participants completing the series of questionnaire measures while verbalising instructions, written questions and voicing their thought processes as they reached their answers. After 11 specific questions, the researcher asked additional verbal questions to further explore participants’ thoughts and motivation for physical activity (Appendix 1). The questioning style was flexible with further questions being asked as needed to reach the desired depth. Clarification was given to one participant for two written questions, where the intended meanings were not clear to them. At the end of the think-aloud

interview, participants were asked if they had any further comments or queries.

Interviews lasted 73–95 minutes. Interviews were audio recorded and then transcribed by an independent company who work to a confidentiality agreement.

Analysis

Data were analysed using inductive thematic analysis based on the steps outlined by Braun and Clarke (2006). Due to the exploratory nature of the study, the themes identified were data driven, rather than attempting to test a specific overarching theory. In addition, analysis was conducted using the epistemology of critical realism (Braun and Clarke, 2013). The analysis was led by the first author and six main steps were undertaken. Firstly, the transcripts were repeatedly read and initial impressions were noted. Secondly, the transcripts were systematically coded for content relating to patterns of physical activity, thought patterns, motivation and positive thinking. Thirdly, codes were collated into several candidate themes. Ideas were considered candidate themes when expressed by the two or more participants, both participants of a gender, or when recurrently expressed by an individual. At this stage, the relationships between candidate themes as well as sub-themes were contemplated. Fourthly, themes were critically reviewed by re-reading extracts coded under each theme and evaluating whether they collectively formed a clear pattern. The entire data set was re-read to evaluate whether candidate themes reflected the narrative across the data corpus. Fifthly, the essence of each theme was defined. Data relating to each theme was

analysed in-depth and discussed between the researchers to identify the story told by a theme and its relation to the research questions. This analysis was semantic because findings are based on surface word meanings, treating what participants said as a reflection of their reality (Braun and Clarke, 2006, 2013). Sub-themes were also identified and systematically checked during this phase. Four themes were formulated from the data and are presented along with supporting quotes. Pseudonyms are used to maintain confidentiality whilst showing how the quotes arose from all four participants. Within these quotes any clarifications are contained in square brackets. Short pauses are indicated by ellipsis and short edits are indicated by ellipsis within square brackets. Italicised sections of quote indicate where participants were directly reading items from the questionnaire measures.

Results

Theme 1: Thoughts about purpose

All four participants discussed the purpose of engaging in PA. Thinking about these reasons, particularly about *why* they were doing PA, tended to motivate PA behaviour. Participants' reasons could be grouped into the three sub-themes: managing MS; being independent; and commitment to others.

Managing MS

Participants were motivated by thoughts about using PA to regain former capabilities or prevent further decline due to MS. Julian is confined to a wheelchair due to his MS but is driven by a goal of regaining his ability to walk. His key motivations are that PA will help him manage his MS and get him closer to his goal:

[...] I don't stop [going] to the [physiotherapy] class... because I know they're a necessity... for my recuperation or for me getting up to walk... that's you know the positive feel I've still got... these physical activities are there to help me get better, not for me to sit back and say 'Bugger it.'

Richard, like all of the participants, felt frustrated by the loss of his physical capabilities. He indicated being in the contemplative stage of change for PA, unlike the other participants who were all in the maintenance stage, Richard's contemplation of more regular PA centred around thoughts of maintaining his current capabilities:

[...] if you don't use it you'll lose it... if I don't use my legs they might... seize up on me. That's the motivation. You just think... it's better for your health... it's going to be good for me.

Being independent

Thinking about PA as a way of showing independence enhanced PA motivation. All participants had become more dependent due to their MS. However, many thought about PA as a way of showing they could still do many things for themselves. Cleo talked about not enjoying PA but described being highly motivated to maintain her independence:

[...] it makes you feel good that you can still do these things... I don't want to be totally dependent on people running after me... I hate the fact that some days my mother takes my dogs out or if we go out together to watch my 74 year old mother toddle off into the distance with my dogs while I sit and wait for her to come back.

In addition, Julian, Sophie and Richard were motivated by thoughts of how PA would help them take control over their lives. While many aspects of their MS were uncontrollable, these participants were motivated to take control where possible. One way they did this to think about and use PA to focus on their present and desired physical capabilities, and to manage their symptoms, rather than feel controlled by their illness:

I often feel that MS controls my life... no... well it is controlling... not being able to walk but um there's a positive feel that I'm gonna walk so... I'm not gonna let it... control my life. (Julian)

Commitment to others

For two participants, Cleo and Sophie, motivation to be physically active was particularly enhanced by thinking about commitment to two groups of others. Both are proud dog owners, committed to caring responsibly for their pets. Bringing to mind this commitment bolstered PA motivation, even when they did not feel like being active themselves:

[...] the dogs have to go out whether it's wet, windy, snowy, whatever and no matter how I feel... so even if I'm not feeling good... it's like 'Oh God it's windy, it's going to be hell,' but I've still got to take them out. (Cleo)

Participants' commitment to physiotherapists was also noted to help maintain PA motivation when faced with discouragement from friends or family:

Being tempted not to be physical, physically active because my friends or family don't think I should, to be so...no... even if they did, I say no, this is what my physio says so this is what I'm doing... this is up to me and my physios. (Sophie)

Theme 2: Thoughts about self-efficacy

Participants with strong PA motivation believed they were capable of achieving their PA goals. This self-efficacy over their ability to engage in PA seemed to enhance their PA motivation regardless of their actual physical abilities. Within this theme, two sub-themes were evident: developing self-efficacy and being realistic.

Developing self-efficacy

Three participants identified self-efficacy as being important for PA motivation; however, self-efficacy could be created in multiple ways. Julian's self-efficacy for PA seemed to have developed quite effortlessly, created by a "positive feel" that PA would enable him to walk again. For two of the participants, however, self-efficacy required more deliberate cognitive action. Sophie used positive self-talk, repeating thoughts like "I can make it, I can make it, I can make it," to push herself during PA. Richard hypothesised that self-talk might help him create PA self-efficacy and motivate him to achieve his goal of doing PA more regularly:

[...] motivation's the big thing. I think you've got to motivate yourself. Tell yourself you can do things and you might be able to do them. You've got to believe in yourself. I probably don't believe in myself enough.

Being realistic

Thoughts relating to PA self-efficacy were only motivating for participants when they felt they were realistic. This meant that participants' motivation for PA was enhanced by self-efficacy for achievable physical activities, rather than activities prevented by their MS. Even Julian, who was wheelchair-bound yet optimistic about walking, recognised there were a number of physical activities he could not do:

[...] I'll attempt anything I can. Now you see the likes of changing a light bulb... I know I can't do... I've gotta turn around and say no, someone else can do it when they arrive.

While self-efficacy was important in PA motivation, participants stressed it was insufficient to change the reality of their MS symptoms, particularly fatigue:

[...] when you're fatigued... or having a relapse, I don't think if someone said... there's a pot of gold at the end of the rainbow, go get it... that you would even bother... you wouldn't care. (Cleo)

Theme 3: Thoughts about the past

Thoughts about past levels of PA could be encouraging or unhelpful. Thoughts about the past did not enhance PA motivation when compared to present capabilities. For

example, Cleo highlighted how imagining the past made her aware of the activities she could no longer do, leaving her feeling discouraged and frustrated:

[...] I used to work full-time [...] have 3 dogs, play outdoor bowls, play indoor bowls... and that's what I think is worse... because I used to go, go, go, go, go and now I can't go, go, go, it's extremely frustrating.

Thoughts about past success in sport were used by Sophie to enhance PA motivation by focusing on the feelings of achievement and empowerment in these memories. Sophie was involved in cross-country running in childhood and remembers winning a gold medal for her high school relay team. Despite feeling like pulling out of the race, Sophie persisted, telling herself that she “didn't come all this way for nothing”. Her efforts were strongly rewarded and she often brings this memory to mind to bolster her PA motivation and push herself “to the limits”:

I used to do a lot of running... cross-country running which means you have to push yourself... even when you're feeling exhausted... so with my daily things, I'd start thinking... 'Get into a rhythm and get on with it... I've got to do it, I've got to get there,'

Theme 4: Reinforcement through positive thinking

Participants expressed that PA generated positive thoughts and feelings, which had a reinforcing effect; they enhanced motivation for future PA. Positive thinking was therefore an important component in positive spirals, which helped increase positive behaviours, especially PA.

For Julian and Sophie, positive spirals involving PA were important to avoid negative ones. Sophie had experienced these in the past, during which her motivation for PA was diminished. For her, positive spirals were helpful because they amplified achievements and increased motivation for behaviours like PA:

[...] once I see the effort being more positive... I'm thinking... 'Oh this is good,'... and then I feel so much more positive about myself which even gives you more positivity to go on and do even more stuff. (Sophie)

Julian, Richard and Sophie expressed how PA generated positive feelings from having acted in the interests of their well-being. These feelings, particularly confidence and contentment, reinforced their PA behaviour and enhanced their motivation to do it again:

I would tell myself that I would feel more confident in myself if I were more physically active... I do feel confident in myself... it's through the fact that

physical activity is keeping me feeling like that... that things are gonna get better... (Julian)

Richard predicted that a positive spiral would help him move into more of an action stage of change for regular PA. Specifically he believed that by adopting a more positive attitude, he would be more motivated to do regular PA and feel good about himself as a result:

Well, all I've got to do is think positively and I'll start doing things... coz I feel better if I've done it. You feel... good about yourself you've done a bit of exercise.

Discussion

The present study explored thoughts related to PA motivation in people with MS, using a think-aloud method. Four major themes were identified using inductive thematic analysis: thoughts about purpose, self-efficacy, and the past, as well as reinforcement through positive thinking.

Thoughts about purpose (theme 1), or reasons for doing PA, were connected with increased PA motivation in the participants. When thinking about PA as a way to manage MS, be independent or meet commitments to others, participants were highly motivated to engage in PA. These findings fit with previous research by Smith et al.

(2011), who found perceived control over MS fatigue involved beliefs that exercise could improve health and help achieve goals. Similarly, participants in the present study expressed high PA motivation when they thought PA would allow them to maintain or improve their physical capabilities and help them achieve physical goals. This suggests similar cognitive processes may govern both perceived control of fatigue and enhanced PA motivation. Additionally, such processes seem to apply to both exercise and to PA more broadly. Theme 1 is also consistent with the findings of Dlugonski et al. (2012), who found one reason women with MS were motivated to do PA was to maintain physical capabilities. The present study indicates this reason for doing PA also applies to men with MS, furthering previous findings that men with MS use goal readjustment to overcome the impact of fatigue on physical activity levels (Smith et al., 2014). Based on theme 1, we conclude that having a clear reason to engage in PA, and thinking about that reason, may be important for enhancing PA motivation in the MS community. The purpose should be relevant and meaningful to each individual; however, key targets for intervention may centre around maintaining physical capabilities, being independent and meeting commitments to others.

Thoughts about self-efficacy (theme 2) were also important for PA motivation. Participants who believed they were capable of PA expressed strong motivation to pursue their PA goals, regardless of their actual physical abilities. This is consistent with the findings of Chiu et al. (2012), who found MS individuals in the action stage of

change for PA had higher action self-efficacy than those in the contemplative stage. Moreover, one participant in the contemplative stage predicted that developing self-efficacy would help him move to a more active stage, suggesting that thoughts around self-efficacy may enhance PA motivation for people with MS. Two participants in the present study referred to using self-talk, a positive thinking strategy, as a way to develop self-efficacy and help achieve their PA goals. This is consistent with research showing motivational self-talk can improve confidence during athletic activities (Goudas et al., 2006) and the proposal that positively interpreted self-talk may benefit motivation for athletes and exercisers (Hardy and Oliver, 2014). Theme 2 is also consistent with the findings of Kosma et al. (2012), who showed self-efficacy and stages of change best predicted initial PA levels; however, cognitive processes of change were among the best predictors of long term PA engagement. Taken together with theme 2, this suggests that use of positive thinking strategies, such as self-talk, may be effective in enhancing and sustaining PA motivation for people with MS over the long-term. Although self-efficacy was important in PA motivation, participants stressed it was insufficient to change the reality of their MS symptoms. This suggests PA self-efficacy needs to be realistic and sensitive to current MS symptoms in order to be effective.

Thoughts about the past (theme 3) could enhance or diminish PA motivation, depending on the individual and the focus of the memory. One participant in the present

study recalls past success in PA to bolster her motivation and push herself in the moment. For another, this was not an effective strategy because it emphasised things she could no longer do. One possible reason for this is that, in the first case, the memory may help to bolster self-efficacy for present activity. In the second case, awareness on lost capabilities may diminish self-efficacy and thereby PA motivation. Based on theme 3, we conclude that thoughts about the past may enhance PA motivation for certain individuals who have a history of past success in PA. Emphasis must be given to re-experiencing those past successes rather than making comparisons with the present and drawing awareness to loss of physical capabilities. From an intervention standpoint, fostering thoughts about the past may not be appropriate for all individuals with MS.

Reinforcement through positive thinking (theme 4) demonstrated that positive thinking enhanced future PA motivation. Participants expressed that PA fuelled positive thoughts and feelings, which reinforced PA behaviour, creating a positive spiral that enhanced PA motivation. This finding is particularly interesting because it suggests PA behaviour precedes positive thinking. However, this may reflect that participants were not consciously aware of positive thoughts that preceded activity or that they were unable to recall them. The one participant who was not regularly physically active (Richard) predicted that choosing to think positively would help him move into the preparation stage of change for PA. These findings suggest positive thinking may be particularly effective in promoting PA motivation for those not yet in the action or

maintenance stages of change. Once in the action stage, positive thinking may take on a reinforcing role, to help sustain PA motivation over the long-term. This fits with research by Kosma et al. (2012) who found that cognitive processes of change were among the best predictors of long-term PA change. Theme 4 also provides an extension to the findings of Chiu et al. (2012), suggesting that positive thinking may be another factor distinguishing MS individuals in the action versus contemplation stages of change for PA. Furthermore, theme 4 supports the conclusion by Morrison and Stufbergen (2014) that positive social or physical outcome explanations may enhance PA motivation in people with long-standing MS. Based on theme 4, we conclude that positive thinking may be a useful addition to current interventions aiming to increase PA motivation and behaviour in people with MS and to help sustain this motivation over the long-term.

The present study provided an in-depth exploration of participant's experiences, revealing themes relevant to enhancing *their* PA motivation. One limitation of this approach was that, in focusing on depth, we used a relatively small sample size, placing constraints on the external generalisability of our findings. The central focus on the questionnaire items in the think-aloud method offers less flexibility than unstructured interviews or focus groups but is suitable for generating qualitative data (Anderson-Lister and Treharne, 2014; Koro-Ljungberg et al., 2013; McGavock and Treharne, 2011) and we applied a semi-structured version of thinking aloud that involved

additional planned and spontaneous probes (Adamson et al., 2004). Some of these probes may not have been asked as openly as would have been desirable but they served to allow participants to elaborate on unexpected issues around physical activity and thought processes.

Future research should include quantitative measures to test whether the themes formulated apply to the wider MS community. The present findings map directly onto items 18 and 33 in a previously established taxonomy of behaviour change interventions (Michie et al., 2011). Thus future research could also design and test the feasibility of a pilot PA intervention that incorporates positive thinking practices. Specifically, such an intervention could focus on developing purpose for PA behaviour and building self-efficacy through positive thinking strategies like self-talk. In addition, it could involve strategic use of positive thinking to motivate inactive members of the MS community to move into a more active stage of change or to reinforce PA behaviour for people who are already physically active.

Many strategies exist to help increase PA for people with MS. The present findings support the potential of thought-based strategies to increase PA motivation. Thus we conclude that positive thinking and related thought-based strategies may serve as useful tools to enhance motivation for PA in the MS community.

Declaration of Conflicting Interests

None Declared.

Supplementary Materials

Accessible from the Sage Journal of Health Psychology Website.

References

- Adamson J, Gooberman-Hill R, Woolhead G and Donovan J (2004) 'Questerviews': Using questionnaires in qualitative interviews as a method of integrating qualitative and quantitative health service research. *Journal of Health Services Research and Policy* 9(3): 139-145.
- Al-Janabi H, Keeley T, Mitchell P and Coast J (2013) Can capabilities be self-reported? A think aloud study. *Social Science and Medicine* 87: 116-122.
- Anderson-Lister G and Treharne GJ (2014) 'Healthy individuals' perceptions of type 1 and type 2 diabetes cause and management: A 'think-aloud,' mixed-methods study using video-based vignettes. *Journal of Health Psychology* 19(11): 1371-1381.
- Bear MF, Connors BW and Paradiso MA (2007) Chapter 4: the action potential. In: Bear MF, Connors BW and Paradiso MA (Eds) *Neuroscience* (3rd ed.). Baltimore: Lippincott Williams and Wilkins, 75-98.

- Beckerman H, de Groot V, Scholten MA, Kempen JC and Lankhorst GJ (2010)
Physical activity behaviour of people with multiple sclerosis: understanding how they can become more physically active. *Physical Therapy* 90(7): 1001-1013.
- Bekhet AK and Zauszniewski JA (2013) Measuring use of positive thinking skills psychometric testing of a new scale. *Western Journal of Nursing Research*. Epub ahead of print March 18 2013. doi:10.1177/0193945913482191
- Bize J, Johnson JA and Plotnikoff C (2007) Physical activity level and health-related quality of life in the general adult population: a systematic review. *Preventative Medicine* 45(6): 401-415.
- Braun V and Clarke V (2006) Using thematic analysis in psychology. *Qualitative Research in Psychology* 3(2): 77-101.
- Braun V and Clarke V (2013) *Successful qualitative research: A practical guide for beginners*. London: Sage.
- Chiu CY, Fitzgerald SD, Strand DM, Muller V, Brooks J and Chan F (2012)
Motivational and volitional variables associated with stages of change for exercise in multiple sclerosis a multiple discriminant analysis. *Rehabilitation Counselling Bulletin* 56(1): 23-33.
- Darker CD and French DP (2009) What sense do people make of a theory of planned behaviour questionnaire? A think-aloud study. *Journal of Health Psychology* 14(7): 861-871.

- Dlugonski D, Joyce RJ and Motl RW (2012) Meanings, motivations and strategies for engaging in physical activity among women with multiple sclerosis. *Disability and Rehabilitation* 34(25): 2148-2157.
- French DP, Cooke R, Mclean N, Williams M and Sutton S (2007) What do people think about when they answer theory of planned behaviour questionnaires? A think aloud study. *Journal of Health Psychology* 12(4): 672-687.
- Goudas M, Hatzidimitriou V and Kikidi M (2006) The effects of self-talk on throwing- and jumping-events performance. *Hellenic Journal of Psychology* 3: 105-116.
- Hale LA, Mulligan HF, Treharne GJ and Smith CM (2013) The feasibility and short-term benefits of Blue Prescription: a novel intervention to enable physical activity for people with multiple sclerosis. *Disability and Rehabilitation* 35(14): 1213-1220.
- Hale LA, Smith C, Mulligan H and Treharne GJ (2012) “Tell me what you want, what you really really want...”: asking people with multiple sclerosis about enhancing their participation in physical activity. *Disability and Rehabilitation* 34(22): 1887-1893.
- Hardy J and Oliver EJ (2014) Self-talk, positive thinking, and thought stopping. In *Encyclopedia of Sport and Exercise Psychology*. Thousand Oaks, California: Sage.

- Kaklamanou D, Amitage CJ and Jones CR (2013) A further look into compensatory health beliefs: A think aloud study. *British journal of health psychology* 18(1): 139-154.
- Kasser S (2009) Exercising with multiple sclerosis: insights into meaning and motivation. *Adapted Physical Activity Quarterly* 26(3): 274-289.
- Koro-Ljungberg M, Douglas EP, McNeill N and Therriault D (2013) Re-conceptualizing and de-centering think-aloud methodology in qualitative research. *Qualitative Research* 13(6): 735-753.
- Kosma M, Ellis R and Bauer JJ (2012) Longitudinal changes in psychosocial constructs and physical activity among adults with physical disabilities. *Disability and Health Journal* 5(1): 1-8.
- Learmonth YC, Marshall-McKenna R, Paul L, Mattison P and Miller L (2013) A qualitative exploration of the impact of a 12-week group exercise class for those moderately affected with multiple sclerosis. *Disability and Rehabilitation* 35(1): 81-88.
- Lundgrén-Laine H and Salanterä S (2010) Think-aloud technique and protocol analysis in clinical decision-making research. *Qualitative Health Research* 20(4): 565-575.

Michie S, Ashford S, Snehotta FF, Dombrowski SU, Bishop A and French DP (2010)

A refined taxonomy of behaviour change techniques to help people change their physical activity and healthy eating behaviours: The calo-re taxonomy.

Psychology and Health 26(11): 1479-1498.

McGavock ZC and Treharne GJ (2011) Young adults' beliefs about people living with

HIV/AIDS and rheumatoid arthritis: thematic analysis of a think-aloud

questionnaire investigation. *New Zealand Journal of Psychology* 40(3): 71-78.

Morrison, JD and Stuifbergen AK (2014) Outcome expectations and physical activity in

persons with longstanding multiple sclerosis. *Journal of Neuroscience Nursing*

46(3): 171-179.

Motl RW, McAuley E and Snook EM (2005) Physical activity and multiple sclerosis: a

meta-analysis. *Multiple Sclerosis* 11(14): 459-463.

Plotnikoff RC, Lippke S, Reinbold-Matthews M, Courneya KS, Karunamuni N, Sigal

RJ and Birkett N (2007) Assessing the validity of a stage measure on physical

activity in a population-based sample of individuals with Type 1 or Type 2

diabetes. *Measurement in Physical Education and Exercise Science*, 11(2): 73-91.

Prochaska JO (1979) *Systems of psychotherapy: A transtheoretical analysis*. Pacific,

CA: Brooks-Cole.

- Rigby SA, Domenech C, Thornton EW, Tedman S and Young CA (2003) Development and validation of a self-efficacy measure for people with multiple sclerosis: the Multiple Sclerosis Self-efficacy Scale. *Multiple Sclerosis* 9(1): 73-81.
- Schreurs KMG, Veehof MM, Passade L and Vollenbroek-Hutten MMR (2011) Cognitive behavioural treatment for chronic fatigue syndrome in a rehabilitation setting: Effectiveness and predictors of outcome. *Behaviour Research and Therapy* 49(12): 908-913.
- Smith CM, Fitzgerald HJM and Whitehead L (2014) How fatigue influences exercise participation in men with multiple sclerosis. *Qualitative Health Research*. Epub ahead of print October 1 2014. doi:10.1177/1049732314551989
- Smith C, Hale L, Olson K and Schneiders AG (2009) How does exercise influence fatigue in people with multiple sclerosis? *Disability and Rehabilitation* 31(9): 685-692.
- Smith C, Olson K, Hale LA, Baxter D and Schneiders AG (2011) How does fatigue influence community-based exercise participation in people with multiple sclerosis? *Disability and Rehabilitation* 33(22-23): 2362-2371.
- Stroud NM and Minahan CL (2009) The impact of regular physical activity on fatigue, depression and quality of life in persons with multiple sclerosis. *Health and Quality Life Outcomes* 7(1): 68-69.

Van Oort LC, Schröder C and French, DP (2011) What do people think about when they answer the Brief Illness Perception Questionnaire? A ‘think-aloud’ study. *British Journal of Health Psychology* 16(2): 231-245.

Wicks P, Vaughan TE and Massagli MP (2012) The multiple sclerosis rating scale, revised (MSRS-R): Development, refinement, and psychometric validation using an online community. *Health and Quality of Life Outcomes* 10(70).
doi:10.1186/1477-7525-10-70