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2 “A forward movement into life”: A qualitative study of how, why and when physical activity
3 may benefit depression

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Abstract

Physical activity can help manage depression, but little is known about how, why and when it ‘works’. Few studies have used qualitative methods to explore the change process, which could identify new hypothesised mechanisms and moderators. This qualitative, grounded theory study aimed to elucidate the change process by exploring physical activity experiences among individuals with self-reported and diagnosed depression or low mood who felt it had or had not helped their mood. Twenty-six individuals recruited from one general practice and elsewhere were interviewed about their physical activity experiences. The participants felt physical activity helped their depression through providing a sense of engagement in life and the present, but, as the participants with negative or mixed positive and negative physical activity experiences particularly highlighted, the activity needs to be pleasant and enjoyable to be beneficial. For some, these positive physical activity experiences led them to knowing being active would make them feel good, making it self-reinforcing. This represented a shift from extrinsic to intrinsic motivations, which helped them overcome barriers to being active, and some began to use physical activity to self-manage symptoms. We conclude that physical activity may help depression through people feeling more pleasantly engaged in life and that pleasant activities are important in treating depression. Practitioners could encourage individuals to take part in enjoyable physical activities to enhance the depression response and to increase adherence through the development of intrinsic motivations. New hypothesised mediators include enjoyment (also a moderator), reduced anhedonia, and increased flow and mindfulness.

Keywords: mental health; exercise; mechanisms; moderators; change process; grounded theory.

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Introduction

Physical activity is a recommended treatment option for managing mild to moderate depression in primary and secondary care in the United Kingdom (UK) (National Institute for Health and Care Excellence [NICE], 2009). Physical activity is defined as any muscular movement that increases energy expenditure, while exercise is a more structured activity that is performed for a purpose, such as to get healthy (Shephard, 2003). Physical activity is therefore an all-encompassing term for leisure and non-leisure-time activities such as structured exercise, housework, gardening, and activity performed at work or for transportation. This paper focuses on physical activity generally and its relationship with depression and low mood, and so we use the term ‘physical activity’ throughout the paper. Evidence suggests physical activity (which has often been studied in the form of structured exercise), reduces depression symptoms and may be as effective as antidepressants (Cooney et al., 2013). Little is known, however, about how or why it might work (the mediating mechanisms of change) or in whom and when it may work (the factors that might moderate response to it). It is important to understand these aspects of the change process so that interventions or physical activity recommendations to patients can target or take into account these factors, which may then enhance the likelihood that patients will experience benefit (Judd & Kenny, 1981).

Examining potential mediators, studies have found that increased state positive affect and decreased state negative affect may mediate the depression response to physical activity (Pickett, Yardley, & Kendrick, 2012; White, Kendrick, & Yardley, 2009). Improved positive affect (i.e. increased feelings of pleasurable activation and engagement) may be particularly important (Kratz, Ehde, & Bombardier, 2014; Mata et al., 2012; White et al., 2009). Evidence also supports improvement in self-esteem, physical self-perceptions and self-efficacy as potential mediators (Bodin & Martinsen, 2004; Craft, 2005; Legrand, 2014; McPhie &

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Rawana, 2012; Petty, Davis, Tkacz, Young-Hyman, & Waller, 2009; Pickett et al., 2012; Ryan, 2008; White et al., 2009). There is less support for distraction from negative thoughts (Craft, 2005) and mixed support for increased social support or social engagement (Armstrong & Edwards, 2004; Harvey, Hotopf, Overland, & Mykletun, 2010).

Regarding moderators, depression responses are similar across participant characteristics such as age and gender (Craft & Perna, 2004), and aerobic and anaerobic physical activity (Lawlor & Hopker, 2001). No optimal physical activity dose has yet been identified (Teychenne, Ball, & Salmon, 2008). Some studies suggest that people's psychosocial experiences of physical activity might moderate mood outcomes. For example, Callaghan, Khalil, Morres, and Carter (2011) found participants' depression improved more when they were active at a preferred rather than prescribed intensity. Berman et al. (2012) found people with major depressive disorder experienced more positive affect after walking in a natural compared with an urban environment. These findings suggest that people's subjective physical activity experiences may be more important outcome moderators than their characteristics or the activity type.

Overall, a better understanding about the psychosocial aspects of people's physical activity experiences that may moderate or mediate depression and mood outcomes is needed. It has been suggested that qualitative studies of patients' experiences of an intervention, such as physical activity, could help identify change mechanisms and processes, in addition to quantitative studies (Doss, 2004; Cerin, 2010). Qualitative research may complement quantitative findings by providing a richer, contextualised understanding of the change process and may generate new hypothesised mechanisms or change processes for examination in future quantitative work (Foss & Ellefsen, 2002).

There have been some qualitative studies of experiences of physical activity among people with depression (Faulkner & Biddle, 2004; Kahlil et al., 2012; Mental Health

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Foundation, 2005, Mental Health Foundation, 2009; Searle et al., 2011; Wright, Armstrong, Taylor, & Dean, 2012). These have described perceived benefits and experiences among particular populations, such as people with bipolar disorder (Wright et al., 2012) or people who self-initiated physical activity to manage their depression (Mental Health Foundation, 2005), or relating to specific physical activity interventions, including exercise referral schemes (Faulkner & Biddle, 2004; Mental Health Foundation, 2009) and those being evaluated in randomised controlled trials (Kahlil et al., 2012; Searle et al., 2011). None has, however, fully explored the change process to produce a more theorised account of how physical activity may improve depression. To do this, it is important to include people with a variety of experiences of both depression and physical activity, to explore variations in the data. In the present qualitative study, we addressed this gap. We aimed to provide a theoretical account of the change process and to do this we recruited people with a range of experiences of depression or low mood and physical activity (e.g. people with a diagnosis of depression, people who self-classified as having experienced depression, people with self-reported low mood, people currently and previously depressed, people active to varying degrees, and people recruited from within and outside primary care). In particular, we recruited both people who felt that physical activity had and had not improved their depression or mood. We used grounded theory for data collection and analysis, which is ideally suited to studying process. The study aims were: a) to explore experiences of physical activity and the change process among a variety of individuals who had used it to manage their depression or mood, and b) to elucidate the process of change by focusing on both individuals who have and have not found physical activity beneficial for their depression or mood.

Method

Ethical and research governance approval

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We obtained ethical approval to conduct the study from our institution's ethics committee. We also obtained ethical and research governance approval from the Isle of Wight, Portsmouth and South East Hampshire Local Research Ethics Committee and Southampton City Primary Care NHS Trust to recruit patients from a general practice.

Methodological approach and epistemological perspective

This grounded theory study was conducted from an interpretivist, constructionist epistemological perspective, primarily following the methods outlined by Henwood and Pidgeon (1995, 2003) and Charmaz (1995, 2006). We approached the analysis from the perspective of seeking to understand the participants' subjective experience, and acknowledged, in line with the constructionist approach, that it is not possible to access underlying realities; that is, reality is constructed through language and social interactions (including those between the interviewer and interviewee) (Charmaz, 1995; Madill, Jordan, & Shirley, 2000). In line with this approach, we also acknowledged that our preconceptions and existing knowledge of the literature and theories of change might influence the analysis. Therefore, the analysis presented here is an interpretation of the participants' experiences.

In grounded theory, data collection and analysis are iterative and proceed in parallel (Charmaz, 1995; Charmaz, 2006; Henwood & Pidgeon, 2003; Pidgeon & Henwood, 1995). Data analysis begins with the first interview and the ongoing analysis determines further sampling and data collection needs.

Sampling and participant recruitment

We recruited and interviewed 26 individuals, in the South of England, who had experienced depression or low mood about their experiences of physical activity. We recruited participants both via and outside the National Health Service (NHS) to obtain a sample with diverse depression and mood experiences and socio-economic statuses, and to aid transferability of the findings. We recruited fifteen participants through advertisements at

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1 a university and one local exercise group. We interviewed and analysed data from most of
2 these at the beginning of the study, as ethical approval was pending to recruit participants
3 from the general practice. We recruited 11 participants from the general practice mid-way
4 during the analysis. This meant we could verify and develop categories identified from the
5 analysis of the initial interviews with participants recruited from outside the NHS in a
6 different group. The practice staff selected potential participants who had consulted with their
7 general practitioner (GP) within the last two years about depression and who were aged 18-
8 65. The practice sent the selected individuals a recruitment pack and individuals interested in
9 taking part contacted the first author to discuss the research and to arrange an interview. For
10 both groups, the recruitment literature stated we were interested in the experiences of
11 individuals who had had depression or low mood and who had tried using physical activity to
12 manage these feelings. We emphasised we were equally interested in positive and negative
13 experiences of physical activity.

14 We did not define depression or low mood in the participant recruitment materials, so
15 participants from outside the NHS self-selected to take part based on their assessment of
16 whether or not they had had these experiences. However, when asked at interview, seven of
17 these participants self-reported they had been diagnosed with depression, including two
18 individuals who reported they had been diagnosed with bipolar disorder; this is discussed
19 further below. We recruited people with low mood and those who classified themselves as
20 having experienced depression but who had not had a diagnosis to take part in the study in
21 addition to those recruited through the general practice for three reasons: 1) to recruit people
22 with a range of mood experiences, so that variations in the data could be explored, 2) to
23 explore the experiences of both those who had and had not consulted with a general
24 practitioner about their mood (again, to obtain a varied sample), and 3) because some
25 individuals may have felt more comfortable volunteering to take part in the study if they

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could refer to themselves as having experienced low mood rather than depression. For brevity throughout this paper, we refer to all the participants as having experienced ‘depression’ – but this term will include the minority of participants who felt that had only experienced low mood.

We began the study with a convenience sample of the participants recruited from outside the NHS who had any experience of physical activity and depression and low mood. Then, as the initial analysis progressed, as recommended by Chamberlain, Camic and Yardley (2004), we purposively sampled participants based on characteristics considered relevant to the study. For example, initially we interviewed many people who had been physically active all their lives, so we selected further participants to interview who had more recently started being active. This was also part of the theoretical sampling, to develop a data analysis category about physical activity motivations. During the analysis, we found we had recruited participants with mainly positive experiences of physical activity, so we distributed further recruitment literature emphasising our wish to interview people with negative experiences. This resulted in three participants contacting the researcher. Data collection ceased when category saturation was reached.

Procedure and interviews

The first author carried out face-to-face, semi-structured interviews with each participant, in a private room at either the general practice or her university, and obtained written informed consent before each interview began. A topic guide, containing open-ended questions, was used to guide the discussion about the participants’ experiences. Participants were asked about their current and previous involvement in physical activity, how they came to use physical activity to manage their depression or mood, their experiences of beginning to be active and their physical, emotional and mental reactions to it. They were also asked about their experiences of keeping up physical activity over time and their thoughts about its role in

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managing their depression or mood. As data analysis proceeded, we altered the topic guide to focus on the developing analysis categories. At the end of the interview, demographic and further information about the participant's physical activity and depression or mood status [e.g. whether or not they were currently receiving treatment for depression and a definitive answer (yes/no) about whether or not they felt that being physically active had helped their depression] was collected. All interviews were tape recorded and transcribed verbatim.

Data analysis

The first author analysed the data and periodically met with the other authors to discuss the analysis. To start the analysis, interview recordings were listened to and transcripts read, for full immersion in the data. Open coding was then conducted, with action-oriented and *in vivo* codes assigned to meaning units within the transcripts to reflect meanings or concepts (Camberlain et al., 2004; Charmaz, 2006). The method of constant comparison was used to compare instances within and between participants, and codes to other codes. As the analysis progressed, focused coding of the central and most frequently occurring codes took place to identify categories and sub-categories (Charmaz, 2006; Henwood & Pidgeon, 2003). Finally, theoretical coding was used to explore relationships between the categories and sub-categories to move the analysis to a theoretical level (Charmaz, 2006). Categories were re-sorted and graphical techniques (e.g. diagramming) were used to create conceptual models of the analysis (Charmaz, 2006; Henwood & Pidgeon, 1995). Throughout the analysis, the first author wrote theoretical memoranda to record and explore thoughts and emerging conceptualisations about the analysis (Henwood & Pidgeon, 2003). In the memoranda, an ongoing reflexive diary was kept as the analysis progressed.

Trustworthiness

To help ensure the trustworthiness of the results, we used reflexivity, checking for internal coherence (deviant case analysis; seeking cases that appear to contradict the

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developing theory and trying to account for them) (Mays & Pope, 1995) and reader evaluation (providing a transparent outline of the methods used and enough participant quotes so that the reader may evaluate how well the analysis fits the data) (Mays & Pope, 1995; Yardley, 2000). These measures are suited to the constructionist approach (Madill et al., 2000). To demonstrate the role of reflexivity in our analysis, we provide here some of the main reflections the first author noted in her diary during the analysis. She noted that she believed that positive mental health partly comes from being active and involved in life, and noted she was aware that this could affect her analysis of the interviews. When the issue of the importance of being active and engaged in life for helping to ease feelings of depression came out in the analysis, she was wary to shift between her existing views and the data to try to minimise potential bias from this in the analysis (Henwood & Pidgeon, 1995). In fact, the participants' accounts taught her more about this; being active in itself may not be the important element, but that the activity or involvement may need to be engaging, pleasant or enjoyable to be beneficial (as we elaborate below). In line with the constructivist approach to reflexivity and reader evaluation, we have provided the reader with the first author's beliefs and the participants' own words, so that they may make their own interpretation.

Results

Participant characteristics

Table 1 summarises the 26 participants' characteristics. Over two thirds had been diagnosed with depression, including two individuals recruited from outside the NHS who, as mentioned above, self-reported at the interview they had been diagnosed with bipolar depression. Four individuals described themselves as experiencing low mood, stress, or negative feelings due to being under pressure, rather than depression. Of those who had either a diagnosis of depression or self-reported depression, the majority (70%) stated that they were not currently depressed. We found that the categories we identified in the analysis and

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the theoretical model we produced of the process of change were cross-cutting across all the participants, regardless of whether they were diagnosed with depression, diagnosed with bipolar disorder or self-classified as having experienced depression or low mood.

The majority had self-initiated physical activity during periods of depression or low mood. Fewer had attended exercise referral schemes or had had a health care professional recommend physical activity for their depression. Most reported that being physically active had helped their depression or mood, while three felt it had not. Some participants, however, had mixed experiences, which we did not anticipate and which provided unexpectedly rich data. Further information about each participant's depression or mood and physical activity experiences is provided in accompanying supplementary material to this paper. We have anonymised all the participants and used pseudonyms in this paper.

Figure 1 summarises the categories developed from the data analysis and shows the theoretical relationships between them. We conceptualised the change process into the following phases: '(Re)starting physical activity: "having to", "wanting to" and "making change"', 'embodied experiences of physical activity' ('a forward movement into life: experiencing change'; and, 'enjoyment'), and 'embodied knowledge: knowing from experience' ('moving from "having to" to "wanting to"'); and, 'taking control'). To inform the theoretical conceptualisation of the change process in this analysis, we drew on literature relating to a phenomenological view of the body, which takes the stance that all experience is embodied (Ignatow, 2007; Turner, 1996). That is, people experience and come to understand their world and health conditions through their bodily involvement with and sensory and emotional responses to them.

(Re)starting physical activity: "having to", "wanting to" and "making change"

Most of the participants reported that their activity during depression or low mood episodes was either part of their usual habits or a coincidental new activity period. Most were

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not initially using it to manage their depression or mood and had been unaware that physical activity had mood or mental health benefits. They reported being active for a variety of reasons. At the theoretical stage of the analysis, drawing on self-determination theory (Ryan & Deci, 2000), we labelled these different motivations as ‘intrinsic’ and ‘extrinsic’. Extrinsic motivations included being prompted to be active by external factors, such as having to walk the dog or being encouraged by friends. One participant, who had been recruited through the general practice and who had had severe depression, said, when asked why she started being active:

Just friends really, just they wanted to go to the gym. Um, I think basically what they were trying to do was just to keep getting me out, you know, to introduce me to different things, just to give me motivation otherwise I would have just sat in bed all day. (Mandy)

Others stated they had started being active (again) to make positive changes in their lives, such as to get healthier or lose weight, often to feel better about themselves. Intrinsic motivations included enjoying the activity or wanting to improve abilities. These participants tended to be active because they *wanted to* rather than because they *had to*. As Mark, who had bipolar disorder, said, “mostly I do it because I enjoy it”. We identified that the participants’ motivations and initial unawareness of the mood benefits of physical activity were an important contextual background to and a part of the change process.

Embodied experiences of physical activity

A forward movement into life: experiencing change. Although the participants reported their depression or low mood affecting their daily lives to varying degrees, they often described experiencing feelings of disengagement from life and the immediate situation. The severity of this appeared to depend, though, on the severity of their depression or mood problems. They described this disengagement as a physical, bodily experience as

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1 well as a mental one. Mark said: “You sort of feel almost disabled when you’re depressed,
2 sort of it’s difficult to, to move”. The participants experienced physical activity as a
3 transformative process that gave them, mentally and physically, a greater sense of
4 engagement in life and the immediate situation, either temporarily or more enduringly.
5 Margaret, for example, who had been previously diagnosed with depression and had
6 experienced depression for around 30 years, and who attended yoga and other exercise
7 classes, as well as cycled and swam, said:

8 if you are feeling quite isolated and not very good at talking with people, exercise is
9 something that you can participate in, and that, you’re just using your body [...] so for
10 me where I’m so stuck inside myself and, physically I, you know, I have terrible
11 inertia [...] it’s like a forward movement into life. (Margaret)

12 Similarly, Geoff, who self-reported depression but had not been diagnosed with it and tended
13 to be active by performing stretching exercises at home, said:

14 If you just sit still and you’re tired and watch some rubbish on television, you kind of
15 forget your existence, whereas, when you are trying to move and overcome
16 resistances, you actually become directly conscious of all your limbs and the space
17 around you (Interviewer: Right) and [it] sort of gets you back to these real things.
18 (Geoff)

19 Elements of this additionally included gaining a sense of achievement from having done
20 something rather than “doing nothing”, being outside, around nature or other people and
21 having pleasant experiences, focusing on the moment and experiencing a shift to a more
22 outward focus on life. Some also stated that being active gave them a sense of getting back to
23 who they were before they had depression or helped maintain a sense of a normal life.
24 Tracey, who was recruited through the general practice, had experienced and been treated for

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1 depression over the past five or six years and who had been active all her life except when her
2 daughter was born and she became depressed, said:

3 in a period of two-and-a-half years, I went from being happy, active, in a
4 job, to being the complete opposite of everything that I had known for ... hence,
5 where, to get myself back, I started the sport again [...] like I say, I've ... just in a
6 small part I've found myself, um ... that, you know, that side of me (Interviewer: Uh
7 huh), and as I say, it's like this little arm is sticking up and saying Tracey is still here.
8 (Tracey)

9 Tracey, however, did not find being active again directly beneficial for her
10 depression, as she did not enjoy the activity in which she took part (see below). During the
11 deviant case analysis, Tracey's account offered insight that physical activity could provide a
12 sense of engagement in life, but that being active and involved in life in itself may not be the
13 important element, but for the activity or involvement to be engaging, pleasant or enjoyable
14 (this is discussed further below under the category 'Enjoyment').

15 For others, being active increased their confidence. Kathryn, recruited through the
16 general practice, who stated her depression partly centred around finding it difficult to be
17 around other people, attended an exercise referral scheme and said, "it gave me confidence I
18 didn't have before in myself".

19 The participants reported experiencing more energy and motivation both when being
20 regularly active and immediately after a session. They also reported being increasingly active
21 in other areas of their lives. Harriet, who had experienced depression for over 30 years, had a
22 diagnosis and was currently taking antidepressants, but had only recently begun to be active
23 again at the age of 45, having not been active since her 20s, stated:

24 Before I started cycling to work, you know, when I used to drive, I would get home
25 and just slump in a chair [...] so when I get home in the evenings now, I'm far more

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1 inclined to go and do something like ... go out in the garden for an hour and do some
2 gardening or go and visit somebody after work. (Harriet)

3 People also reported generally feeling better in themselves, about their lives and
4 happier. They said their sleep improved. Many reported experiencing a 'good', 'pleasant'
5 feeling after being active. They felt physically and mentally 'clearer', 'freshened up',
6 invigorated, relaxed and calmer ("blowing the cobwebs away", Harriet).

7 The participants with a diagnosis of depression, self-reported depression and self-
8 reported low mood experienced physical activity as providing them with a greater sense of
9 engagement with life. However, the experiences of people who had low mood differed
10 slightly to those with diagnosed or self-reported depression. They tended to talk about
11 physical activity helping them to focus more on the moment rather than internal thoughts and
12 other benefits, such as feeling calmer and having more energy, while those with diagnosed or
13 self-reported depression also talked about physical activity taking them away from feelings of
14 dissociation or getting them back to their normal lives.

15 **Enjoyment.** Although most of the participants reported experiencing some positive
16 changes in their lives from physical activity, their perceptions of mood or depression benefits
17 appeared to depend on whether or not they had found it enjoyable, pleasant or engaging.
18 Their embodied experiences of physical activity – their bodily, emotional and sensory
19 reactions to it and the physical activity environment – were crucial aspects this. The accounts
20 of the participants with negative and mixed experiences of physical activity were particularly
21 useful for highlighting the importance of this. Sarah, for example, went swimming during one
22 episode of depression, but found it a disengaging experience and perceived little benefit for
23 her depression. She said: "I can't say that it had a dramatic effect on lessening the depression,
24 nothing that I noticed, (Interviewer: Uh huh) as I said, it was just a diversion but it was a bit
25 of a boring diversion". Although Elizabeth had been physically active all her life, during

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1 periods of depression she did not feel that it provided any benefit (she personally found that a
2 different form of engagement with the present – mindful meditation – helped her to control
3 her depression) – she said:

4 Sometimes the depression would actually ... deepen while I was out walking
5 because I would be so lost in my thoughts; instead of being mindful about what was
6 around me, enjoying the surroundings, I'd, I'd go out and sort of be walking and
7 almost be unaware of what was around me because, um, the walking would be
8 automatic and I wouldn't really feel it. (Elizabeth)

9 The importance of enjoying the activity for mood benefits was highlighted by the
10 accounts of all participants, regardless of whether they had diagnosed or self-reported
11 depression or low mood.

12 Key elements of an enjoyable or engaging experience were: finding it felt good (i.e.
13 enjoying the physical sensations and how the body felt); having a purpose and goals; finding
14 it rewarding or gaining a sense of achievement; focusing on the moment; discovering
15 personal abilities; and, finding it, including the environment it was performed in, a pleasant
16 and comfortable experience.

17 Perceptions of the physical activity environment played a role in whether physical
18 activity was found to be enjoyable. An environment which contributed to an enjoyable
19 experience was one that was pleasant and one in which people felt mentally and physically
20 comfortable. A number of the participants experienced initial feelings of discomfort,
21 awkwardness or intimidation when (re)beginning physical activity and entering a new,
22 unfamiliar environment, such as the gym or an exercise class. This was more pronounced for
23 people who did not see themselves as 'sporty types' or people who were not used to being
24 physically active. However, even for someone who had been 'sporty' all her life, entering a

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1 new physical activity environment having lost confidence during her experiences of
2 depression, also presented a similar trial:

3 I was then entering into a group, um, it's a very large [netball] squad that I play for,
4 they have, like, six or seven teams and to suddenly be going into that environment,
5 you turn up at training and there were probably, I'm not exaggerating when I say
6 there were probably fifty people there training [...] That I found nerve wracking
7 and I've genuinely never, ever been that nerve wracked, you know, [by that] sort of
8 stuff. (Tracey)

9 These feelings were an initial difficulty for some, but faded over time with developing and
10 repeated physical activity experiences. For others, these feelings of discomfort did not
11 diminish. These individuals experienced little benefit from the physical activity for their
12 depression or mood. For example, Tracey found herself among a netball training group of
13 much younger women and had experiences that made her feel uncomfortable. With her loss
14 of confidence, she found attending netball training a demoralising experience:

15 But, like I say, the actual ... confidence thing, yeah, I find it actually can be quite
16 demoralising to me. So, as I say, the sport helps physically but I don't believe that
17 sport, at this moment in time, is helping me mentally [...] As I say, physically I
18 don't have a problem with it (Interviewer: Mm-hm), er, emotionally I feel ... um ...
19 the underdog. (Tracey)

20 Notably, many individuals' had had a mixture of positive and negative experiences of
21 physical activity over their lives. Even when people had previously been put off physical
22 activity by negative experiences, some later perceived mood benefits when they had better
23 experiences. Felicity, for example, attended an exercise referral scheme twice, and first time
24 round did not experience any depression benefit and ceased to go. She had health problems
25 which she felt the instructors did not understand and that made her uncomfortable when she

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1 was active. A couple of years later, Felicity attended again and found an activity she liked.
 2 She said “I’ve been to their swimming ... um ... class, the aerobics in water (Interviewer:
 3 Yeah) which is really quite pleasant”. This made a difference, and she found being active
 4 beneficial for her mood.

5 Similarly, Harriet, who had attended an exercise referral scheme on the instruction of
 6 her doctor, felt uncomfortable in the gym and did not perceive any mood benefit from it.
 7 After a short period she ceased to attend the scheme:

8 Just going made me even more depressed, (Interviewer: Okay) because I didn’t like
 9 the gym, I didn’t like the people there, I was the only woman there and they were all,
 10 all male body builders (Interviewer: Right), there was nobody else there on the sort of
 11 programme and I felt ... I felt as if I stood out like a sore thumb, and I didn’t enjoy
 12 the exercise at all, and it, really, it just made me feel worse and I stopped after
 13 about six weeks. (Harriet)

14 After she ceased the scheme, she started a new job and, out of necessity (i.e. having to),
 15 started cycling and walking to work. This time around she found being active to be a much
 16 more positive and enjoyable experience, and, consequently, found that it had improved her
 17 mood:

18 I really have found that it’s improved my mood, and that is when I started cycling that
 19 I cut down on my medication [...] I feel, I really do genuinely feel better, for the
 20 exercise, but it’s a kind of natural exercise rather than being forced into a gym.
 21 (Harriet)

Embodied knowledge: Knowing from experience

23 **Moving from ‘having to’ to ‘wanting to’ be active.** Although extrinsic motivations
 24 often initially brought people to (re)beginning physical activity, through positive experiences,
 25 some reported starting to ‘get into it’. This represented a shift from extrinsic to more intrinsic

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1 motivations. They were now active because they enjoyed it and liked the feelings they gained
2 from it, including the mood benefits. They began to 'know' the benefits and enjoyment of
3 being active from their own experience and it became a self-reinforcing activity. Margaret
4 said, "and now I know that I'll feel good (Interviewer: Yeah), so I am more likely to do it".
5 For some, who were very intrinsically motivated, this eventually led to a personal
6 commitment to it, a developed habit and a sense that it was part of the self. These differing
7 motivations for physical activity and the shift from extrinsic to more intrinsic motivations
8 among some participants were apparent in the participants' accounts regardless of whether
9 they had diagnosed or self-reported depression or low mood. Additionally, the participants'
10 depression or low mood status did not seem to affect how extrinsically or intrinsically
11 motivated they were.

12 The move towards intrinsic motivations was an important part of the change process,
13 as physical activity became more self-regulated and it was a key factor in people keeping up
14 physical activity and overcoming barriers. Harriet's experience shows the importance of
15 embodied experience and knowledge in this:

16 Although I still get down days, I still do feel very lethargic and depressed and, well
17 'I really don't want to do this', and I'll just sit indoors, but I know that if I do go out, I
18 will feel better and it's, having had that experience of feeling better for getting out and
19 doing something, rather than somebody telling me, 'oh, you'll, it'll make you feel
20 better, it'll do you good' (Interviewer: Mmm), it's actually knowing myself from
21 experience (Interviewer: Mmm) that's more, gives me more of an impetus to do it.
22 (Harriet)

23 The deviant case analysis of individuals who had continued being physically active despite
24 stating no perceived benefit for depression, highlighted that a personal commitment to it and

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sense that it was part of the self meant that physical activity would be maintained even if it was not found to be an enjoyable or beneficial experience.

Taking control. The participants' embodied experiences and knowledge of their condition or mood also appeared to be an important part of some people taking control of their depression or moods over time. The participants reported that as they lived with depression, they came to 'know' it. They described beginning to know from experience the early warning signs of symptoms returning and how they could actively manage them. They reported having a greater acceptance of negative moods when they arose. Against this background, some of the participants reported, based on their positive embodied experiences of physical activity, gradually making the connection that being active helped them feel better and then purposely using it to self-manage symptoms, as Olivia, who was recruited through the general practice, stated:

[...] doing exercise while I was depressed just didn't seem, didn't seem possible, but, um, when I started working, waitressing at one restaurant, well, it's like moving about all the time, after I'd finished the shift ... I did feel better, I didn't feel tired, I felt like I could carry on like a normal life and then when I stopped working and found that I wasn't getting ... er, activity, then I felt my mood slipping down again so that's when I decided to get on the treadmill (Interviewer: Mm-hm) and get going. (Olivia)

This finding was cross-cutting across participants, regardless of whether they had diagnosed or self-reported depression or low mood. Simon, who stated he had never been depressed but had experienced work-related stress, said:

I didn't pick up a book and read and say, 'ah, exercise is good for stress, therefore, I'll do it' (Interviewer: Yes). It was quite the reverse (Interviewer: Right) and I've noticed the effects of physical activity as I've gone through stressful periods. (Simon)

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The participants viewed physical activity as a way of managing their depression or moods, and felt it provided temporary relief rather than a cure. They saw it as a way of “balancing the mood”, stopping it from getting worse and maintaining an “equilibrium”. They felt that to move away from depression in the long-term, the cause needed to be identified and resolved.

The participants felt that engaging in any activity, not just physical activity, was beneficial, including going outside, having a nice meal at a restaurant, or doing paperwork or housework. Some of the participants who felt they had taken control of their depression or moods stated that they had learnt from experience the importance of “just doing something”, as Margo, who was recruited through the general practice, said:

I mean, I found it wasn't only just the exercise, it was just doing something, you know, it doesn't have to be exercise, it's just, I found that the more I, um ... made myself do things rather than just sit, which is what I felt like doing, um ... that I could improve how I felt. (Margo)

Similarly, Geoff, who self-reported depression but had not been diagnosed and who felt isolated living in the countryside, felt that socialising helped his feelings of depression, in addition to being active. He said, “I think meeting people that you like and spending time with them seems to make it [the depression] go away for a while.”

Some people had learnt from experience that involvement or participation in life, particularly activities that they experienced to be pleasant or engaging, could help them feel better. Physical activity was seen to be a part of this.

Discussion

Our analysis suggests that physical activity may in part benefit depression and low mood through giving people a greater sense of engagement in life and the immediate situation. It may help people move away from a disengaged, inward-focused state to a more

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1 activated, outward-focused state. The findings suggest that engaging in any activity, not just
2 physical activity, may be an important strategy for moving away from the depressed or low
3 mood state, even if only temporarily, but that the activity needs to be enjoyable, pleasant or
4 engaging to be beneficial.

5 Other qualitative studies of the mental health effects of physical activity corroborate
6 our suggestion that a sense of engagement in life may be a mechanism through which
7 physical activity promotes mental health. Participants in these studies reported that physical
8 activity is beneficial partly because it provides them with structure, purpose, energy and
9 motivation in other areas of life, and feelings of social inclusion or connectedness to nature
10 and other people (Crone, Smith, & Gough, 2005; Faulkner & Biddle, 2004; Hardcastle &
11 Taylor, 2001; McArdle, McGale & Gaffney, 2012; Mental Health Foundation, 2009; Priest
12 2007; Stathi, McKenna, & Fox, 2003).

13 The participants' experiences in our study suggest that an activity needs to be
14 pleasurable and enjoyable to have depression or mood benefits. This supports a continued
15 focus on increased positive affect as a potential mediator of the physical activity and
16 depression relationship in quantitative studies (Kratz et al., 2014; Mata et al., 2012; Pickett et
17 al., 2012; White et al., 2009). It also suggests that physical activity may be a form of
18 behavioural activation (which has been shown to treat depression effectively; Ekers et al.,
19 2014) and we therefore suggest, as have Stathopoulou, Powers, Berry, Smits and Otto (2006),
20 that physical activity may work through behavioural activation processes. The findings
21 additionally suggest that physical activity may alleviate depression through reducing
22 anhedonia, and future research could also test this as a potential mechanism. Our analysis
23 particularly suggests that people's enjoyment of physical activity may mediate or moderate
24 depression outcomes. This has not previously received attention and could be examined in

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1 future quantitative research. Thus our analysis suggests new possible mechanisms and a
2 moderator that could be examined in the future (i.e. enjoyment and reduced anhedonia).

3 The participants' accounts suggested that a mental focus on the present may alleviate
4 depression or low mood. Researchers have speculated that physical activity alleviates
5 depression through distraction from negative thoughts (e.g. Cooney et al., 2013). Our
6 participants' accounts suggest, however, that concepts such as flow (a state in which people
7 are fully engrossed in and enjoying what they are doing when involved in a challenging task
8 that their skills meet; Csikszentmihalyi, 1999) and mindfulness (an awareness of and
9 attention to the present moment; Brown & Ryan, 2003), which emphasise present
10 engagement, may be more appropriate hypothesised change mechanisms than distraction.
11 Indeed, research suggests that physical activity increases dispositional mindfulness and that
12 this is associated with improvements in mental health (Mothes, Klaperski, Seelig, Schmidt, &
13 Fuchs, 2014). Again, these are newly hypothesised mechanisms from this study, which, as far
14 as we are aware, have not received attention in the literature.

15 The insights from present analysis also suggest that people's embodied experiences of
16 physical activity, in terms of their affective and sensory reactions to it (particularly feelings
17 of enjoyment), and resulting embodied knowledge, were a significant part of the change
18 process. As far as we are aware, this has not been highlighted by previous research and is a
19 novel contribution from our analysis to the wider literature. These embodied experiences
20 appeared to influence perceptions of benefit, changing motivations (i.e. moving from
21 extrinsic to intrinsic motivations) and a movement over time for some towards using physical
22 activity as a way of self-controlling moods. This suggests that one approach practitioners can
23 take to promoting physical activity among people with depression or low mood is to support
24 them in finding positive physical activity experiences, which might support development of
25 embodied knowledge of the benefits, and associated intrinsic motivations, over time.

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1 In terms of using physical activity to self-regulate mood, as stated, people's embodied
2 experience and knowledge of the benefits of physical and other activities for their depression
3 or mood may lead them to use these to self-regulate their moods. Self-determination theory
4 (Ryan & Deci, 2000), social cognitive theory (Bandura, 1997) and research findings
5 (Fehlinger, Stumpenhorst, Stenzel, & Rief, 2013) emphasise the importance of skills for self-
6 regulating moods for good mental health. We suggest (as have others, e.g. Craft, 2005) that
7 physical activity may partly help depression through increasing self-efficacy for coping with
8 or self-regulating negative moods. Our findings suggest that state mood changes may be
9 responsible for initial depression reductions and that increased coping self-efficacy or mood
10 self-regulation may mediate longer-term effects.

11 The participants' accounts suggest that motivations for physical activity are an
12 important part of the change process. If physical activity needs to be maintained for
13 continued mood benefits, then people's motivations are an important consideration for
14 practitioners promoting physical activity. In our analysis, developing intrinsic motivations
15 (through positive physical activity experiences) led to physical activity becoming self-
16 reinforcing. In contrast, those with more extrinsic motivations were reliant on external
17 prompts and reasons for being active, which meant physical activity was less likely to be
18 maintained. Indeed, in the wider literature, intrinsic motivation (Papaioannou, Bebetos,
19 Theodorakis, Christodoulidis, & Kouli, 2006; Ryan, Frederick, Lipes, Rubio, & Sheldon,
20 1997; Thogersen-Ntoumani & Ntoumanis, 2006), physical activity enjoyment (Lewis,
21 Williams, Frayeh, & Marcus, 2016) and having positive experiences of an activity (Kahlil,
22 Callaghan, Carter, & Morres, 2012) have been found to be related to better physical activity
23 adherence. We suggest that interventions could be designed or tailored to individuals to
24 promote positive, enjoyable physical activity experiences to support a gradual shift to more
25 intrinsic motivations, if individuals are not already intrinsically motivated. A novel aspect of

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our analysis and the new theoretical framework of the process of change we present is that it shows that people's motivations for physical activity are an integral part of, and important consideration, in the process of change.

Clinical implications

In line with the principles of cognitive behavioural therapy and behavioural activation, our and other qualitative studies' findings suggest that encouraging behaviours that involve an active engagement in life and pleasant activities (such as physical activity) may be important in treating depression. When practitioners are promoting physical activity with patients with depression, our analysis suggests that they could encourage patients to find enjoyable, engaging or pleasant activities and activity environments to increase the likelihood of benefit. Our analysis also suggests that practitioners could focus on developing patients' intrinsic motivations for regular physical activity, through facilitating positive physical activity experiences, to help it become a self-reinforcing activity. Maximising patients' enjoyment of physical activity may be more important for reducing depression than maximising the amount of activity they undertake (although more research is needed to confirm this).

Limitations

Despite efforts to recruit participants with more negative physical activity experiences, only a few of the participants had mixed or negative experiences and this may have biased the results. However, the mixed and negative experiences obtained were rich and were particularly useful for gaining an understanding of the central importance of embodied experiences of enjoyment.

Although we attempted to sample according to the needs of the analysis, we did not fully employ theoretical sampling. A fruitful approach, which may have moved the grounded theory beyond the substantive area of physical activity, may have been to interview people

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engaged in other activities which they feel have helped their depression. The importance of ‘a forward movement into life’ may go beyond the experience of physical activity (as suggested by the participants accounts), and may be an overall concept of importance in the management of and movement away from depression or low mood.

Our sample included two individuals with bipolar disorder and we did not find, from the interview questions we asked them, that their experiences of physical activity differed qualitatively to the other participants’ experience. However, we did not ask these participants any questions specifically about their bipolar disorder, which may have highlighted some differences in the perceived effects of physical activity between these individuals and others. Indeed, Wright et al. (2012) provides an in-depth qualitative analysis of physical activity experiences among people with bipolar disorder and found that they perceived it to be a ‘double edged sword’ that was both beneficial and harmful. For example, it could be harmful through increasing manic mood. We provide a theoretical account of the process of change that is transferable to individuals with a range of depression and low mood experiences, but we acknowledge that this may not represent some of the nuances of the physical activity experience among particular groups, such as those with bipolar disorder.

Conclusions

We have provided a more theorised account of the change process than previous similar studies (e.g. Faulkner & Biddle, 2004; Mental Health Foundation, 2005). Our analysis suggests that embodied experience and knowledge of the benefits of physical activity and living with depression or low mood over time are important parts of the change process – this has not been raised by previous studies. Our analysis also emphasises the importance of pleasant experiences and feeling engaged in life for managing depression and low mood. The findings of this study suggest that a continued focus on increased positive affect and coping self-efficacy or self-efficacy for mood regulation as potential mechanisms of change is

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1 warranted. The results additionally suggest new hypothesised mechanisms, including
2 enjoyment, reduced anhedonia, increased flow and mindfulness, which could be examined in
3 future quantitative studies. The findings suggest that researchers could focus on examining
4 how psychosocial aspects of physical activity, such as enjoyment, moderate depression
5 outcomes.

6

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Table 1

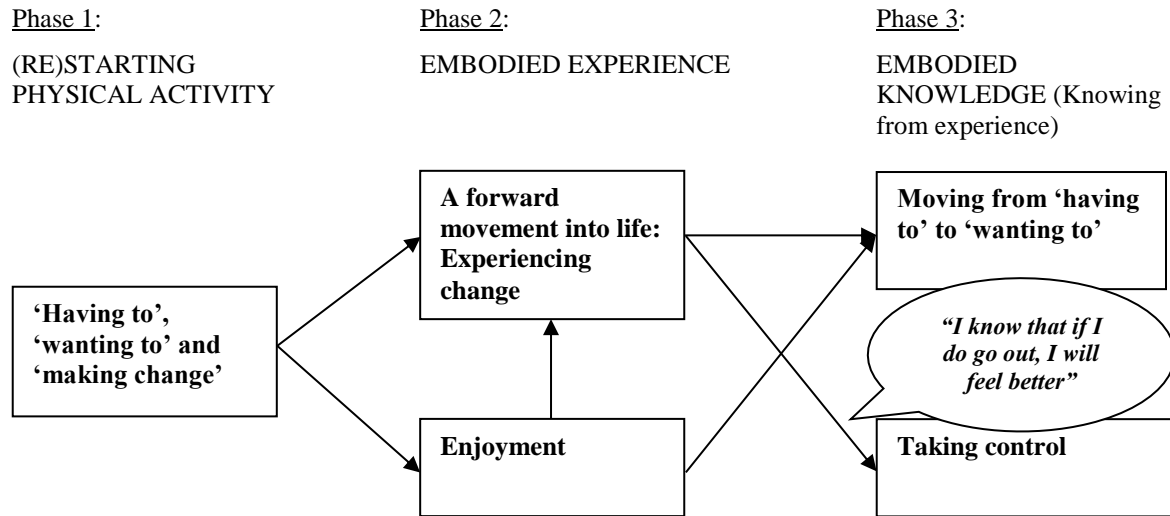
Summary of participants' characteristics (N = 26)

Participant characteristic	n (%), unless stated
Age (years), mean (range)	40 (21 to 65)
Gender	
Male	6 (23.1)
Female	20 (76.9)
Occupational status	
Employed	15 (57.7)
Homemaker	2 (7.7)
Home schooler	1 (3.8)
Student	4 (15.3)
Part-time student and part-time employed	2 (7.7)
Clinical diagnosis and depression experience	
Diagnosed with depression	16 (61.5)
Diagnosed with bipolar depression	2 (7.7)
Self-reported depression (but had not received a formal diagnosis)	2 (7.7)
Self-reported low mood	4 (15.5)
Unclear whether or not had been diagnosed with depression	2 (7.7)
Self-report of whether currently or previously depressed ^a	
Currently experiencing depression	6 (30.0)
Previously depressed	14 (70.0)
Reasons for being physically active during a depression period	
Attended an exercise referral scheme	3 (11.5)
Recommended to do it by a health care professional	3 (11.5)
Recommended to do it by occupational health at work	1 (3.8)
Self-initiated	19 (73.1)
Self-evaluation of whether or not physical activity had helped their depression or mood	
It has helped ^b	23 (88.5)
It has not helped	3 (11.5)

^aParticipants with a diagnosis of or who self-reported depression only (n = 20). ^bIncludes

some individuals with mixed experiences (i.e. whom previously had negative experiences and then more positive experiences).

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The process of change

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- 1 *Figure 1.* The process of change in physical activity for depression: overview of analysis,
- 2 categories and their inter-relationships.
- 3

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Supplementary material

Table S1 below provides information about each participant's depression history, physical activity involvement and whether or not they felt physical activity had helped their mood or depression.

Table S1

Participants' details (N = 26)

Pseudonym (age)	Depression history and physical activity involvement	Helped? ^a
Participants recruited from outside the NHS		
<i>Had been diagnosed with depression</i>		
Margaret (48)	Was diagnosed with depression and previously took antidepressants. Last episode five years ago. Physically active since her 20s and is currently active once a day. Currently uses her bike as transport and goes swimming regularly. Has previously done yoga and attended physical activity classes on stretching. Occasionally runs.	Yes
Harriet (45)	Has experienced depression for 30 years. Diagnosed with depression and taking antidepressants. Was sporty in her teens (did swimming, canoeing, gymnastics, rounders and hockey), but stopped in her 20s. Started being physically active recently after GP referral to an exercise referral scheme. Did not find scheme beneficial. Recently started to walk and cycle to work and found it helped her mood. Now cycles twice a day and walks.	Yes
William (47)	Experienced depression for all of his life. "Possibly" currently experiencing depression. Was previously diagnosed with depression and has taken antidepressants. Was involved in sports as a child, but stopped for a period later in life. Recently took up various sports and activities again, including going to the gym, tennis and cricket. Is very active.	Yes
Celia (38)	Treated for depression several times; taking antidepressants. Been physically active for five years regularly. Is active three days per week. She goes to the gym and does yoga.	Yes
Elizabeth (50)	Was previously depressed – experienced depression for most of childhood and on and off as an adult. Has had two major bouts. Found meditation eventually helped. Likes being physically active –has always been a part of her lifestyle. She gardens, walks and swims.	No
<i>Had been diagnosed with bipolar disorder</i>		
Lucinda (38)	Was diagnosed with bipolar depression six years ago. Currently taking antidepressants. Very active. Has been involved in sport and physical activity since childhood. She sails, plays badminton twice a week, swims once or twice a week and walks to work.	Yes
Mark (25)	Has been diagnosed with manic depression. Has been involved in physical activity for the past five years. Usually takes part in physical activity for two hours a week.	Yes

QUALITATIVE STUDY: PHYSICAL ACTIVITY & DEPRESSION

	Regularly plays basketball, but when he is not doing this he plays badminton and tennis. Occasionally plays squash.	
<i>Self-reported experiencing depression</i>		
Geoff (52)	Feels that his feelings of depression are 'always there below the surface'. Has never been diagnosed with depression. Got into being active about 15 years ago and is active every third day. Says that before this he was not very active. Got into physical activity through attending yoga classes and now tends to do stretching exercises at home every third day.	Yes
Mary (29)	Experienced depression between the ages of 16 and 20. Been physically active since age 16, when she joined a gym and started doing aerobics, and this happened to coincide with her mood deteriorating. She then stopped being active due to studying. Started again recently and currently is active two to three times per week – she goes roller skating or running around the park.	Yes
<i>Self-reported low mood</i>		
Simon (44)	Has never been depressed, but suffers from the 'stresses and strains' of life. Experienced a period of increased stress due to difficulties at work. Has been involved in sports since childhood. Is active every day; he goes to the gym.	Yes
Tim (31)	Has felt negative mood due to being under pressure for past six years. Began taking part in physical activity at age 13. Is physically active for one hour every day. Primarily plays tennis competitively, but also plays badminton for fun.	Yes
Sally (28)	Has suffered from low moods for over 10 years. Been physically active for under a year. She recently took up jogging. Jogs twice a week for 40 mins per session.	Yes
Liz (48)	Has experienced low moods on and off for 20 years. Been physically active for the past 30 years. She started by walking with her grandfather as a child and then, when she got older and had less time, she began to jog instead of walk. Is physically active daily – she either walks or runs, for at least an hour.	No
<i>Unclear whether or not had been diagnosed with depression</i>		
Amy (21)	Stated she experienced depression on and off for a period of eight to seven years. She started being active when she ran track in school and discovered she was more capable than she thought. Has been physically active for five years. Currently active five times a week – she goes to the gym for fun now. Mother took her to a child psychologist when she was younger; unclear if she was diagnosed with depression.	Yes
Norman (53)	Self-reported experiencing depression previously for a period of two to three months and at recurrent intervals since then. GP diagnosed 'anxiety'. Has been active since a child. Is active every day. He mainly walks and cycles, but he also sometimes plays tennis and swims.	Yes
<i>Participants recruited through a general practice^b</i>		
Sharon (27)	Had depression for eight years on and off. Currently experiencing depression, but not severely. Only started to be	Yes

QUALITATIVE STUDY: PHYSICAL ACTIVITY & DEPRESSION

	physically active recently, for a period of three to five months, when she went to the gym. Not currently taking part in any physical activity.	
Olivia (27)	Has experienced depression on and off since 19-years-old. Has been physically active for under a year. Runs on a treadmill at home every day and walks a lot. Uses physical activity to 'control' depression.	Yes
Kathryn (37)	Had depression for about 25 years – since childhood. Currently taking antidepressants. Been involved in physical activity since starting an exercise referral scheme two years ago. Stopped a year ago for health reasons, but currently walks a lot.	Yes
Mandy (43)	Has experienced depression for nine years. Started going to the gym with friends during one episode of depression. Eventually used physical activity as a way of fighting her depression without antidepressants. Is not currently taking part in any physical activity.	Yes
Heather (54)	Has experienced depression for seven years, currently depressed and taking antidepressants. Has been physically active for the past five years. Physical activity suggested by occupational health at work to help depression. Used to swim, but stopped doing that and now just walks dogs every day.	Yes
Rose (65)	Experienced depression for three years on and off. Currently receiving treatment for depression. Started to be physically active a couple of years ago to lose weight. Walks on a treadmill at home every day.	Yes
Felicity (44)	Has experienced depression for 11 years, and is currently taking antidepressants. Was active until 20s and then not so much after that. Was referred to an exercise referral scheme a couple of years ago for depression - had a negative experience of going to the gym during the scheme. Has just been referred again recently because of her weight concerns and now does aerobics in water as part of the scheme.	Yes
Tracey (36)	Experienced depression for past five or six years periodically, currently depressed and receiving counselling and taking antidepressants. Has been physically active all of life, except for two-and-a-half years after daughter was born. Recently started again. Plays netball twice a week.	No – but influenced decisions to get over depression
Sarah (39)	Currently depressed. Has had depression on and off for years. Receiving counselling and taking antidepressants. Went swimming for a six week period two years ago during one episode of depression. Is not currently physically active.	Yes
Margo (49)	Currently depressed and taking antidepressants. Has been physically active for the past 18 months, following the recommendation of her GP and counsellor. Is physically active every day – goes to the gym, does aerobics classes and walks.	Yes
Sophie (29)	Has had depression for approximately two years. Currently taking antidepressants. GP recommended physical activity	Yes

QUALITATIVE STUDY: PHYSICAL ACTIVITY & DEPRESSION

for her depression, but she did not do it. Started going to the gym to lose weight. Has been active for about a year. Goes to the gym once a week and walks to and from work for about an hour a day.

^a“Helped?” = participant’s overall evaluation of whether physical activity has helped their depression or mood. ^bAll these participants had consulted with their general practitioner within the last two years about depression. GP, general practitioner.

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QUALITATIVE STUDY: PHYSICAL ACTIVITY & DEPRESSION

1 **Highlights**

- 2 • We interviewed people with depression or low mood about their physical activity.
- 3 • We used grounded theory methods to explore how, why and when it helped their
- 4 mood.
- 5 • Being active helped the participants feel engaged in life and the present.
- 6 • To be beneficial for their mood, the activity needed to be pleasant and enjoyable.
- 7 • New hypothesised mechanisms are enjoyment, flow, mindfulness and reduced
- 8 anhedonia.
- 9

QUALITATIVE STUDY: PHYSICAL ACTIVITY & DEPRESSION

“A forward movement into life”: A qualitative study of how, why and when physical activity may benefit depression

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