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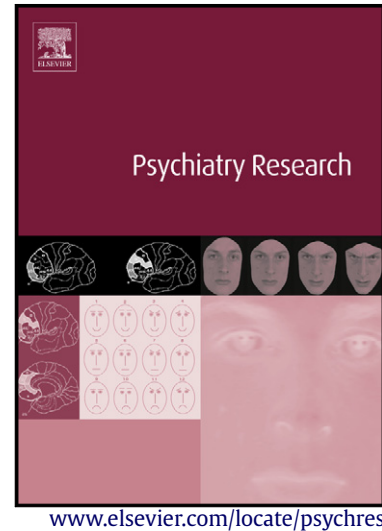
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# Author's Accepted Manuscript

The transcending benefits of physical activity for individuals with schizophrenia: A systematic review and meta-ethnography

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## Title:

The transcending benefits of physical activity for individuals with schizophrenia: a systematic review and meta-ethnography

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## ABSTRACT

A systematic review and meta-ethnographic synthesis exploring the experiences of people with schizophrenia and healthcare professionals (HCPs) towards physical activity was undertaken. Major electronic databases were searched from inception until January 2014. Studies were eligible if they considered the experiences and perceptions of people with schizophrenia or the perceptions of HCPs towards physical activity. All included studies were synthesised within a meta-ethnographic approach, including completing a methodological quality assessment. The search strategy identified 106 articles, 11 of which were included in the final analysis. Eight articles considered patients' experiences and perceptions, and three articles considered the experiences and perceptions of HCPs. A total of 108 patients and 65 HCPs were included. Three main themes were identified: (1) the influence of identity, culture and the environment on physical activity engagement, (2) access and barriers to participation in physical activity, and (3) the benefits of engaging in physical activity. Aspects within the built, social and political environment as well as aspects of social cognition and perceptual biases influence participation in physical activity for individuals with schizophrenia. Specific recommendations for HCPs are given to help promote physical activity in this population group.

Keywords; physical activity, review, qualitative

## 1. INTRODUCTION

Schizophrenia has a profound effect on the health and well-being of individuals (De Hert et al., 2009) and severely impairs social and role functioning (Piskulic et al., 2012). Furthermore, there is a drastic physical health disparity seen in people with schizophrenia compared to the general population, leading to higher mortality rates, largely due to preventable physical illnesses (De Hert et al., 2009). Recently interest has grown in the use of physical activity to reduce this health disparity in people with schizophrenia. Notably, review evidence has suggested physical activity has a diverse range of benefits on all bio-psychosocial domains of health and well-being (Soundy et al., 2012; Vancampfort et al., 2012a; Vancampfort et al., 2012b). However, most people with schizophrenia spend long periods being sedentary and are not able to reach the recommended physical activity levels to attain these health benefits (Soundy et al., 2013). Research is required to provide an in-depth understanding of the experiences of, and perceptions towards, physical activity of people with schizophrenia to help enhance physical activity levels in this vulnerable population. Most research to date attempting to investigate physical activity participation has utilised a quantitative approach (e.g. Vancampfort et al., 2012; Soundy et al., 2013). Whilst this approach is useful, it often fails to elaborate on the personal experiences and perspective of the individual and does not consider how the social, environmental or political context can influence the experience. Such information would be highly valuable to inform clinical practice and develop future interventions.

In recent years, interest has developed in understanding the experiences of people with schizophrenia of engaging in physical activity (Gorczyński et al., 2013; Leutwyler et al., 2013; Roberts and Bailey, 2013). Whilst ascertaining the view of the patient experience is clearly valuable, interest has also grown in ascertaining the views and experiences of health care professionals (HCPs) that implement physical activity in clinical practice (Leutwyler et al., 2012; Soundy et al., 2014; Stanton, 2013). Ultimately, HCPs have a key role facilitating physical activity in people with schizophrenia and much can be learnt from their experiences. Qualitative research by several authors (Gorczyński et al., 2013; Leutwyler et al., 2013; Roberts and Bailey, 2013) has highlighted important findings which

provided a deeper understanding of the experiences and challenges faced by people with schizophrenia trying to engage in physical activity. Further, previous reviews (Roberts and Bailey, 2011; Soundy et al., 2012) have identified the value of including rich qualitative data in order to further understanding within this domain of research. However, these reviews did not attempt to combine the views of HCPs with patients' experiences of physical activity. An overview of the experiences of people with schizophrenia and HCPs is required and a meta-ethnographic approach is well suited for this purpose, as it enables a complete in-depth overview of the experiences and challenges of physical activity participation in people with schizophrenia and is able to generate new findings (Atkins et al., 2008; Soundy et al., 2012).

### **Aim of the Study**

The aim of the current systematic review was to use a meta-ethnographic approach to synthesise research that has documented the experiences of physical activity of patients with schizophrenia and HCPs who work with these individuals.

## **2. METHODS**

This meta-ethnography followed the seven stages of the traditional meta-ethnographic model (Noblit and Hare, 1988). We report these stages in 3 phases (Malpass et al., 2009): (1) a systematic search of the literature, (2) a critical appraisal of identified studies, and (3) a synthesis of research to reveal over-arching and emerging themes.

### **2.1. Phase 1: Systematic Search**

The search was undertaken following the procedures identified by Campbell et al. (2011). A systematic search of major electronic databases was conducted from inception until January 2014 including: AMED, CINAHL Plus, Medline (revised), EMBASE, ASSIA, IBSS, Biological Nursing Index, Social Sciences Abstracts, ProQuest Nursing and Allied Health Source, Science Citation Index. The search terms used included: schizophrenia, health care professionals, exercise, physical activity,

severe mental illness, qualitative, experiences, and care. In addition, we conducted hand-searching of the included articles' reference lists.

#### 2.1.1 Eligibility criteria

Articles were eligible if: (a) they included individuals with a diagnosis of schizophrenia or if >80% of the sample had schizophrenia according to recognised criteria (DSM-V, ICD-10); (b) the research utilised qualitative methods; (c) the study reported the views, perceptions, or experiences of physical activity or exercise of individuals with schizophrenia or the staff within the multi-disciplinary team working directly with them; and (d) were published in English. Articles were excluded if: (a) two or more used the same the data set; if this happened, the primary author selected the article with the most valuable content; (b) studies were only available as conference proceedings, as a thesis or summarised in a book; (c) studies did not primarily focus on physical activity; (d) studies were a review or commentary; (e) studies were mixed methods or quantitative research. There was no restriction on publication date but we only considered articles published in English.

#### 2.1.2. Study selection process and data extraction

The primary author conducted a search of major databases and identified articles. Where an article was ambiguous (in terms of meeting all inclusion criteria) the abstract was read; if there was any uncertainty about its eligibility the full text was obtained and it was retained for further screening. Two authors (AS/BS) then screened the selected articles by title and abstract. The full text of an article was retrieved when the two authors agreed that it could not be unequivocally excluded based on its title and abstract (Centre for Reviews and Dissemination, 2009). An article was included when the reviewers agreed that it satisfied all eligibility criteria. The primary author extracted all the information from each article using a pre-determined form (see Table 1).

#### 2.2. Phase 2: Critical appraisal of the included studies

We used the Consolidated Criteria for Reporting Qualitative Studies (COREQ; Tong et al., 2007) to assess the quality of the included studies. The COREQ provides clear guidelines to enable a gold

standard approach in reporting qualitative studies. A standardised assessment of methodological quality is important as part of a meta-ethnography as it enables the researchers to consider any aspects of research practice that could identify a potentially flawed study (Dixon-Woods et al., 2007). We report a summary score from each of the three COREQ domains, as well as a total score. The score is based on each question either being reported correctly (scoring a point) or not (scoring no point), with a maximum possible score of 32.

### 2.3 Phase 3: The synthesis

Three orders of interpretations were made in accordance with previous syntheses (Britten, 2002; Malpass et al., 2009; Soundy et al., 2012). Thematic line-by-line coding was undertaken using participants' quotes (first order interpretations) and author's comments (second order interpretations). Themes were then rearranged and streamlined (third order interpretations). Finally, a model was generated to link the findings together. An audit trail of the thematic development is available from the primary author.

## 3. RESULTS

### 3.1 The systematic search

Out of a possible 106 articles identified by title, eleven articles met the inclusion criteria: Eight studies (Faulkner and Sparkes, 1999; Fogarty et al., 2005; Gorczynski et al., 2013; Johnstone et al., 2009; Leutwyler et al., 2013; Roberts and Bailey, 2013; Sandel, 1982; Weissman, 2006) considered the experiences of individuals with schizophrenia and three studies (Happell, 2012; Hedlund, 2013; Leutwyler et al., 2012) considered the experiences of HCPs. Figure 1 provides the results of the search within a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram (Moher et al., 2009).

The articles included 108 individuals with schizophrenia, 42 nursing staff, 10 physiotherapists, five counsellors, two psychiatric technicians, two managers, two social workers and two exercise



physiologists. Further descriptive statistics are not available due to poor reporting methods. Table 1 provides the summary characteristics of the included studies.

### 3.2 Critical appraisal of the studies

No studies were considered as fatally flawed (Dixon-Woods et al., 2007) so all eleven studies were included in the synthesis. The weakest of the three domains assessed included the details regarding the research team and reflexivity (this domain requires studies to consider how the data collection could have been influenced by previous research and/or the researcher, e.g., the identity of the researcher, the researcher's assumptions or theoretical orientation). Other specific weakness across the studies included insufficient information regarding minor themes, data saturation, a coding tree or audit trail, how many individuals coded the data within the analysis stage, and details on non-participation and dropout rates. The two lowest scoring papers were Sandel (1982) who presented an observational study but provided very little methodological detail, and Weissman (2006) who reported his results within an editorial and did not give (likely due to a specified word limit) details of key methodological procedures and analysis. Despite these concerns, both were considered to contain important findings that warranted inclusion. Table 2 provides a summary of COREQ scores.

INSERT TABLE 1,2 and FIGURE 1 AROUND HERE

### 3.3 The synthesis

Three themes, eight sub-themes, and 52 codes were generated. The themes were: (1) The influence of individuals and their environment upon physical activity, (2) access and barriers to participation in physical activity, and (3) the benefits of engaging in physical activity. Indicative quotes from first order and second order interpretations are available in the supplementary online tables.

### 3.3.1 Theme 1: The influence of individuals and their environment upon physical activity

Within this theme, two subthemes were identified.

#### 3.3.1.1 Sub-theme 1: The influence of culture and identity on physical activity engagement

There was a culture of being sedentary at the out/in-patient centre they attended (Fogarty, 2005; Gorczynski et al., 2013; Johnstone, 2009), and patients were generally perceived by HCPs as lacking motivation towards physical activity, despite staff efforts. This may be due to the side effects of medication (Weissman, 2006) or because patients had actual or perceived physical health limitations (Happell et al., 2012; Johnstone et al., 2009; Weissman, 2006; Leutwyler et al., 2013). In general, patients felt vulnerable, isolated, and often expressed a low sense of self-worth (Faulkner and Sparkes, 1999; Hedlund et al., 2013; Johnstone et al., 2009; Weissman, 2006). However, the participants and HCPs identified varied levels of physical activity engagement; although some individuals had a specific routine in place others did less and defined physical activity in a different way. For example, one patient in the research by Johnstone et al. (2009) stated that *“making it to the bus stop is physical activity for me”*. Importantly, individuals highlighted the need for tailored programs, such as consideration for those who are elderly, in pain, or who had previous injuries.

#### 3.3.1.2. Sub-theme 2: Challenges presented by the environmental setting on physical activity participation

Patients identified that it could be difficult to undertake physical activity in new or unknown environments. Further, it proved a barrier to participation if the activity was not supported in a constructive way. However, this barrier could be overcome as Leutwyler et al. (2012) noted *“staff also discussed how some clients were reticent to join groups and participate. For those clients, a one-on-one format was more effective”*.

The built environment and the cultural or political environment were identified as playing a role in restricting physical activity. For instance, Gorczynski et al. (2013) noted the limited space available within a fitness studio that participants had access to, and that staircases restricted access for patients. The building structure was also identified by Leutwyler et al. (2012) as being a factor that limited physical activity. One further aspect of the built environment included the local environment, such as the physical location of the group, its surroundings and accessibility. Beyond the physical environment, there were policy restrictions within environments, such as physical activity being a lower priority than other aspects of treatment (Leutwyler et al., 2012), inpatient units having locked doors and restricted access (Johnstone et al., 2009; Leutwyler et al., 2012), specific restrictions on programme availability (Gorczynski et al., 2013; Happell et al., 2012; Leutwyler et al., 2012; Roberts and Bailey, 2013), and staff shortages (Happell et al., 2012).

The most common consideration by HCPs was concerning crime and safety in their local environments (Gorczynski et al., 2013; Leutwyler et al., 2013; Leutwyler et al., 2012; Weissman, 2006). Patients also reported the need for a safe local environment that has limited stress, violence or intimidation.

### 3.3.2. Theme 2: Access and barriers to participation in physical activity

Within this theme, three sub-themes were identified.

#### 3.3.2.1. Subtheme 1: Psychosocial factors which influenced interactions within the community

Social physique anxiety was identified within a number of studies as being a problem (Faulkner and Sparkes, 1999; Gorczynski et al., 2013; Johnstone et al., 2009; Leutwyler et al., 2013; Roberts and Bailey, 2013; Weissman, 2006), in that individuals were concerned about how they looked and how they were seen by others. This was also noted in several studies by HCPs, who recognised the impact of weight gain on a patient's body image and self-esteem.

A considerable number of studies identified the problem of meta-perceptions (patients' thoughts of what other people were thinking about them) and biases with patients' interpretation of situations,

actions, or interactions (Fogarty et al., 2005; Gorczynski et al., 2013; Hedlund et al., 2013; Johnstone et al., 2009; Leutwyler et al., 2012;2013; Roberts and Bailey, 2013). In some cases, authors considered this to be stigma or stereotypes held by others. However, it is important to acknowledge that individuals may be hyper-sensitive to ambiguous behaviours in physical activity settings which are not directed at them, but are perceived to be.

#### 3.3.2.2. Sub-theme 2: The influence of the illness and medication on physical activity behaviour

Different illness symptoms severely impaired individuals' ability to undertake physical activity. It was clear that the symptoms of schizophrenia could act as a barrier as they prevented individuals from going outside (Faulkner and Sparkes, 1999; Gorczynski et al., 2013; Johnstone et al., 2009; Leutwyler et al., 2012), but two studies noted that symptoms could act as a facilitator in helping individuals undertake more physical activity (Leutwyler et al., 2012;2013). The stability of individual symptoms also acted as a gatekeeper to physical activity participation. However, medication was seen as a central barrier to physical activity across several studies (Johnstone et al., 2009; Leutwyler et al., 2012; Roberts and Bailey, 2013; Weissman, 2006). The sedative effects of medication acted to prevent and limit physical activity, as a result of this, individuals redefined what type physical activity was possible. Importantly, medication was seen as a key factor which prevented weight loss (Weissman, 2006).

#### 3.3.2.3. Sub-theme 3: Lifestyle factors that influenced physical activity

Smoking (Happell et al., 2012; Johnstone et al., 2009; Leutwyler et al., 2012), poor diet (Happell et al., 2012) and irregular sleeping patterns (Faulkner and Sparkes, 1999) were all noted within the literature as factors that may influence physical activity. Further, individuals identified that whilst they may be receptive to improving physical function through physical activity (Leutwyler et al., 2013; Roberts and Bailey, 2013), they required physical activity that could account for their current fitness level, as well as their perceived confidence to undertake exercise (Johnstone et al., 2009).

### 3.3.3. Theme 3: Benefits of engaging in physical activity

Within this theme, three sub-themes were identified.

#### 3.3.3.1. Sub-theme 1: The bio-psychosocial benefits of physical activity sessions

Patients and HCPs noted that if weight loss was achieved, it motivated the individuals' attendance of the physical activity programmes (Roberts and Bailey, 2013). Weight loss also was identified as having a clear physical health benefits, which was valued by patients (Weissman, 2006), regarded as a 'yardstick' for recovery by one patient (Faulkner and Sparkes, 1999), and valued for the improvement in body image by other individuals (Leutwyler et al., 2013). However, some patients reported that being weighed was a difficult and uncomfortable part of the exercise programmes. Patients also experienced several psychological benefits during and immediately after physical activity sessions including a reduction in voices and hallucinations (Faulkner and Sparkes, 1999; Johnstone et al., 2009; Leutwyler et al., 2012), symptom relief or management (Leutwyler et al., 2012; Roberts and Bailey, 2013), and improved sleep (Faulkner and Sparkes, 1999). Finally, patients benefitted from positive interactions while undertaking physical activity (Faulkner and Sparkes, 1999). This included individuals feeling valued by others for having specific roles and responsibility within the sessions (Sandel, 1982), which improved their attitudes towards exercise (Fogarty, 2005).

#### 3.3.3.2. Sub-theme 2: The broader psychosocial value of physical activity

A key finding from the synthesis was the value of positive exercise experiences in providing benefits that went beyond the direct psychological changes in and around physical activity sessions. This was considered in several domains of their life. An important change was individuals' ability to self-initiate further changes and create a more autonomous future. This included continuing physical activity through promoting autonomy (Fogarty et al., 2005; Hedlund et al., 2013; Johnstone et al., 2009; Leutwyler et al., 2013; Sandel, 1982). This enabled patients to have a focus towards potential future gains (Johnstone et al., 2009). Further, HCPs in the study by Faulkner and Sparkes (1999) were

astonished by the changes in patients' behaviour, which translated to a more structured routine around sleeping, engagement with the health services, and an interest in personal hygiene.

Importantly, patients engaging in physical activity reported having confidence and self-esteem to engage more in the community (Faulkner and Sparkes, 1999; Hedlund et al., 2013), having enough fitness to get through the day, and in promoting the benefits to their peers (Fogarty et al., 2005). Indeed, individuals could experience a great sense of pride, accomplishment, and confidence from performing physical activity (Faulkner and Sparkes, 1999; Hedlund et al., 2013; Roberts and Bailey, 2013; Sandel, 1982). Further, exercise provided a sense of purpose for individuals with schizophrenia (Faulkner and Sparkes, 1999; Johnstone et al., 2009; Leutwyler et al., 2013), providing a daily structure and preventing the boredom of a 'standard' day (Leutwyler et al., 2012; Roberts and Bailey, 2013)

Studies identified the importance of social support between peers and from staff in increasing physical activity. Using four previously established dimensions of social support (Cutrona and Russell, 1990), it was possible to identify different forms of supportive behaviours and how each benefitted the patients. Esteem support was the most frequently identified dimension of support for patients, represented by the provision of encouragement (Fogarty et al., 2005), courage (Johnstone et al., 2009) and motivation (Happell et al., 2012; Johnstone et al., 2009; Leutwyler et al., 2012; Roberts and Bailey, 2013). Emotional support provided patients with empathy (Fogarty et al., 2005; Hedlund et al., 2013; Roberts and Bailey, 2013; Sandel, 1982), a sense of warmth (Roberts and Bailey, 2013), and companionship (Leutwyler et al., 2013). The role and value of tangible support and informational support were identified by two studies (Leutwyler et al., 2012; Roberts and Bailey, 2013). Tangible support included tickets to the movies, passes for outings or other activities such as having a coffee; such behaviours played an important motivating role, and aided adherence. Informational support was identified as being important by staff and patients and included informing individuals about the benefits of physical activity, identifying how small changes to an individual's

routine was possible (Leutwyler et al., 2012) and giving more general lifestyle advice (Roberts and Bailey, 2013).

#### 3.3.3.3. Sub-theme 3: Group factors that influenced physical activity

Being part of a physical activity group had several benefits for patients including providing positive relationships and connection to others (Faulkner and Sparkes, 1999; Roberts and Bailey, 2013; Sandel, 1982), giving a reason to be active (Fogarty et al., 2005; Leutwyler et al., 2013), helping to motivate individuals and providing a forum for modelling behaviour (Roberts, and Bailey, 2013), and helping patients to initiate other activities (Johnstone et al., 2009). Physical activity generated cohesion and relatedness between individuals, which was an important facilitator of positive behaviour change and engagement (Faulkner and Sparkes, 1999; Leutwyler et al., 2012; Roberts and Bailey, 2013). Further, a sense of cohesion and belonging with other patients was considered to make participation easier and patients less anxious (Johnstone et al., 2009). Staff cohesion with patients could provide an incentive for physical activity engagement (Leutwyler et al., 2012; Roberts and Bailey, 2013).

#### 3.3.4. A model to identify the translational benefits of physical activity

We identified a model which identifies the influences and outcomes of a positive physical activity experience (see Figure 2). The model was generated from the current thematic synthesis. The centre of the model focuses on achieving a positive physical activity experience. We identified factors that influenced physical activity participation. These factors primarily represented the vulnerabilities of individuals with schizophrenia and focused on the environment in which physical activity occurs and the interactions within this environment. The current data also demonstrated the importance of fulfilling the psychological needs of patients. These issues link with two existing psychosocial theories (social support and self-determination theory). Finally, we identified two outcomes from

physical activity: (1) the transcending benefits of physical activity engagement and (2) the bio- psychosocial health benefits of physical activity participation. Within the literature, the most studied aspect of this model is the bio-psychosocial health benefits of physical activity participation and the information generated from this review did not further the current understanding of this. Thus, within the following sections we consider the other elements of the model in detail.

INSERT FIGURE 2 AROUND HERE

*The vulnerability of individuals with schizophrenia towards the environment and interactions*

This factor illustrates the importance of considering and managing interactions, the environment and the importance of promoting an individual's sense of self. HCPs must be aware of interactions which may be viewed in a negative way by individuals and use strategies to prevent this. HCPs must consider that patients may have a poor sense of self, a limited routine, a low self-confidence, engage in isolated activities, limited autonomy and be amotivated towards physical activity engagement. Further, HCPs must consider what political, social or physical challenges may exist in the environment and if they can change or adapt the environment to help the patients.

*The psychological needs of patients*

Social support (Cutrona and Russell, 1990) and self-determination theory (Deci and Ryan, 2000) are important when considering how to best interact with individuals with schizophrenia and promote physical activity. Importantly, these theories address the majority of barriers identified in the current review and fit in well with the most important facilitators of physical activity. HCPs may be well situated to provide and focus on giving esteem support and emotional support, and these dimensions of support may be particularly important in facilitating social confidence (Critte et al., 2013). However, it is worth noting that tangible support and informational support are still valuable. For instance, review evidence suggests that tangible support is associated with increased rates of recovery (Chou and Chronister, 2012). The current review has highlighted the value of group physical activity sessions for improving confidence and developing positive relationships, illustrating the



value of peer and other stakeholder support within group physical activity settings (Cutrona and Russell, 1990). Consistent with recent research, our review suggests an important role for self-determination theory in understanding the adoption and maintenance of physical activity in individuals with schizophrenia (Vancampfort et al., 2013). Humans are suggested to have three fundamental needs including relatedness, autonomy and competence, which in turn increase motivation and well-being. Clinicians could focus on these three needs when developing physical activity programmes for individuals with schizophrenia.

#### *The transcending benefits of physical activity*

This suggests that issues beyond the immediate bio-psychosocial benefits should be considered when promoting physical activity. This includes self-initiated changes and improved autonomy, confidence, and future planning. Having a real sense of purpose in one's life, having somewhere to go other than the outpatient centre, being connected to others, establishing a positive role in a group, and being valued and being part of something you value were also key benefits patients experienced from engaging in physical activity. Finally, a sense of achievement and mastery of skills led to the realisation that other goals were achievable.

## 4. DISCUSSION

The current findings highlighted the factors which influence the physical activity of individuals with schizophrenia as well as the extended value of engaging in physical activity. Psychosocial and environmental factors were found to play a central role in influencing the physical activity experience of individuals with schizophrenia. In this discussion we have focused on the three themes identified in the line of argument synthesis.

### 4.1 The vulnerability of individuals with schizophrenia to the environment and interactions

Social anxiety, paranoid thoughts, and meta-perceptual bias have been reported previously in a similar sample of individuals with severe mental illness (Soundy et al., 2007). The attribution style of

patients may play an important role in how this bias occurs and develops. For instance, it has been suggested that individuals with paranoid thoughts and/or persecutory delusions can demonstrate a personalising bias (tendency to infer blame of negative outcomes to individuals rather than situations) (Couture, 2006). Alternatively negative interpretations of ambiguous events and catastrophic interpretations of negative events have been reported previously in individuals with schizophrenia (Schutters et al., 2012). These tendencies require consideration for how interactions and environments are managed in physical activity contexts.

The current results suggest that it is important that the physical activity environment and interactions within that environment are more patient centred, as this will help protect and reassure individuals and aid adherence. Social physique anxiety may require attention within interventions as it may be those who will benefit most from exercise that have the greatest level of social physique anxiety (Hart et al., 1989). HCPs that identify motivation as a central problem (Soundy et al., 2014) may also need to consider how important a positive, welcoming and warm environment is for patients, and consider interactional cues that may act as a barrier to physical activity participation. Patients with schizophrenia may need to feel valued and accepted before they take part in physical activity.

#### 4.2 The consideration and application of social support and self-determination theories

Two theories that are strongly supported by the current results are social support (Cutrona and Russell, 1990) and self-determination theory (Deci and Ryan, 2000). A possible reason which may explain the importance of these two theories is the social isolation that exists in individuals with serious mental illness (Critten et al., 2013). The provision of social support by rehabilitation staff who promote physical activity has been highlighted as very important in recent research (Soundy et al., 2014). However, the need for tangible assistance such as financial support or transport was identified by the current findings. Further, tangible support in other forms such rewards for

participation may represent a strategy used to 'kick start' behaviour change. Further, patients highlighted the need for informational support, and having knowledgeable HCPs who can provide guidance on appropriate physical activity. The value of groups, group processes, and the benefit of self-initiated physical activity was congruent with the principles of autonomy, belonging and competence identified by self-determination theory (Deci and Ryan, 2000; Sheldon et al., 1996); the relevance of this theory for understanding the experiences and motives of individuals with schizophrenia has been previously acknowledged (McCann and Clark, 2004). HCPs could use these principles to facilitate physical activity participation.

#### 4.3 The bio-psychosocial health benefits and the transcending benefits of physical activity

The importance of physical activity and the bio-psychosocial benefits are illustrated in numerous reviews that consider individuals with schizophrenia (Faulkner et al., 2003; Vancampfort et al., 2012a;2012b;2012c). Importantly these reviews have established the beneficial effects of interventions on specific outcomes. The current findings support these but also suggest other meaningful outcomes should be recognised. It was clear from the current review that the benefits of physical activity went beyond simple direct measurable effects (considered within the bio-psychosocial theme). Indeed, the current results suggest that physical activity may contribute to essential recovery processes including finding hope, (re)establishing identity, and taking responsibility for recovery (Andresen et al., 2003). Thus, physical activity may be used as a vehicle by which individuals can become more socially competent, self-reliant, and undertake important behaviour changes that promote well-being.

#### 4.4 Limitations

The current systematic review was based on a small number of studies undertaken in specific contexts, thus the generalisability of the results may be limited. The process and methods of the meta-ethnography are also limited by the focus and expertise of the primary author, thus important concepts or theories may not have been considered. Finally, the inclusion of articles written only in

English mean that valuable articles written in other languages have not contributed to the current results.

#### 4.5 Clinical Implications

Several important implications are generated by this review. First, beyond the traditionally acknowledged benefits of physical activity for individuals with schizophrenia there are likely to be more general benefits which relate to social functioning. Second, it is important to consider how patients with schizophrenia are introduced to the physical activity environment, including recognising patients' vulnerability to social and emotional perceptual biases. Finally, there is a need for HCPs to consider the value of individual preferences towards physical activity, and to promote autonomy and belonging when encouraging physical activity.

### 5. CONCLUSIONS

The current review highlighted the particular vulnerabilities that patients with schizophrenia have towards interactions and environments. At the same time, it highlighted the range of benefits that physical activity can have for patients above and beyond the bio-psychosocial benefits traditionally associated with physical activity.

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Table 1 Characteristics of the synthesised papers

Source Paper	Sample Population (Age & Gender)	Data Collection & Schedule	Location of Data Collection	Specific Topic Covered in Study	Method of Analysis
Faulkner (1999)	3 individuals with schizophrenia 2 ♂ Age not provided.	Field Diary and interviews pre and post exercise intervention.	Psychiatric residential unit	Consideration to the role of exercise in the lives of a small number of individuals with schizophrenia an ethnographic study	Thematic analysis with triangulation of methods
Sandel (1982)	Individuals with schizophrenia no details given.	Observational methods	Psychiatric inpatient unit	Consider the role and value of dance-movement therapy for individuals with schizophrenia	None detailed
Fogarty (2005)	6 ♂ individuals with schizophrenia Aged between 20-42 ----- 2 exercise physiologist 4 nursing staff	Focus group interview post intervention program	Community mental health care unit	Determine the physical and psychological impact of physical activity following a tailored intervention	Thematic analysis
Johnstone (2009)	27 individuals with schizophrenia 16 ♂ Age 43 (27-64)	Individual interview undertaken in the participant on community mental health unit	Community mental health care unit	Focus on considering and exploring the barriers to physical activity	Interpretive Phenomenological analysis
Weissman (2006)	23 individuals with schizophrenia 50±7.9 years	Three focus groups in medical centre for veterans	Veteran medical affairs centre	Focus on what individuals with schizophrenia think about weight management	None detailed
Leutwyler (2013)	16 individuals with schizophrenia no other details provided	One in-depth focus group or a one to one interview	5 locations convenient to the participant.	Exploring the perceptions of barriers and facilitators to physical activity	Atlas.ti software was utilised
Gorczyński (2013)	25 individuals with Schizophrenia	Individual interviews combined with photos of environment taken by individuals	Centre for addiction and mental health	Focus on factors experiences and views from the local environment which impact physical activity	Thematic Analysis
Roberts	8 individuals	Participant	Group lifestyle	Better understand	Thematic Analysis



(2013)	with schizophrenia 6 ♂ Age 24-66	observation and individual interview	intervention within a private setting (not clear exactly where)	the beliefs, attitudes and behaviours of individuals regarding physical activity.	
Leutwyler (2012)	23 staff members no other details 11 from locked facility: 4 nurses 2 social workers 2 rehabilitation workers 1 program director and 2 psychiatric technicians 6 from transitional facility 5 counsellors 1 program director	Semi-structured interview	Three psychiatric sites	Perception of mental health staff towards the barriers and facilitators of physical activity for individuals with schizophrenia	Grounded theory
Happell (2012)	38 nurses 11 worked in community mental health 17 in acute inpatient setting Worked in mental health setting between <1 year – 22 years	Focus group interviews	Focus groups on psychiatric site or via live video link	Views of nurses towards physical activity for individuals with serious mental illness	Thematic analysis
Hedlund et a (2013)	8 ♀ outpatient physiotherapist 41 years old (30-67 years) Mean work experience 13 years	Semi structured interview	Physiotherapists' outpatient unit	Consider physiotherapist use, experience and attitudes of basic body awareness training.	Content analysis

Table 2: The summary of results of the COREQ (Tong et al., 2007) appraisal for the 11 included studies.

Group	Author/ Year of Publication	Domain 1 (8) Research Team & Reflexivity	Domain 2 (15) Study Design	Domain 3 (9) Analysis & Findings	Total (32)
Patients	Faulkner (1999)	8	12	7	27
	Sandel (1982)	4	6	2	12
	Fogarty (2005)	1	8	7	16
	Johnstone (2009)	7	11	8	26
	Weissman (2006)	0	10	5	15
	Leutwyler (2013)	4	11	8	23
	Gorczyński (2013)	4	12	8	24
	Roberts (2013)	5	14	9	28
Staff	Leutwyler (2012)	5	11	8	24
	Happell (2012)	7	10	7	24
	Hedlund (2013)	5	8	6	19
	<b>Mean</b>	<b>4.5</b>	<b>10.3</b>	<b>6.7</b>	<b>21.6</b>
	<b>Median</b>	<b>5</b>	<b>11</b>	<b>7</b>	<b>24</b>
	<b>Mode</b>	<b>4</b>	<b>11</b>	<b>8</b>	<b>24</b>

**Highlights**

- Physical activity can significantly impact the recovery of individuals with schizophrenia.
- Physical activity can promote a positive identity, social competence, self-reliance and hope.
- Psychosocial vulnerabilities' of represent a significant barrier to physical activity.
- The concepts of social support and self-determination theory facilitate physical activity.

Accepted manuscript

Figure 1. A PRISMA diagram for the study

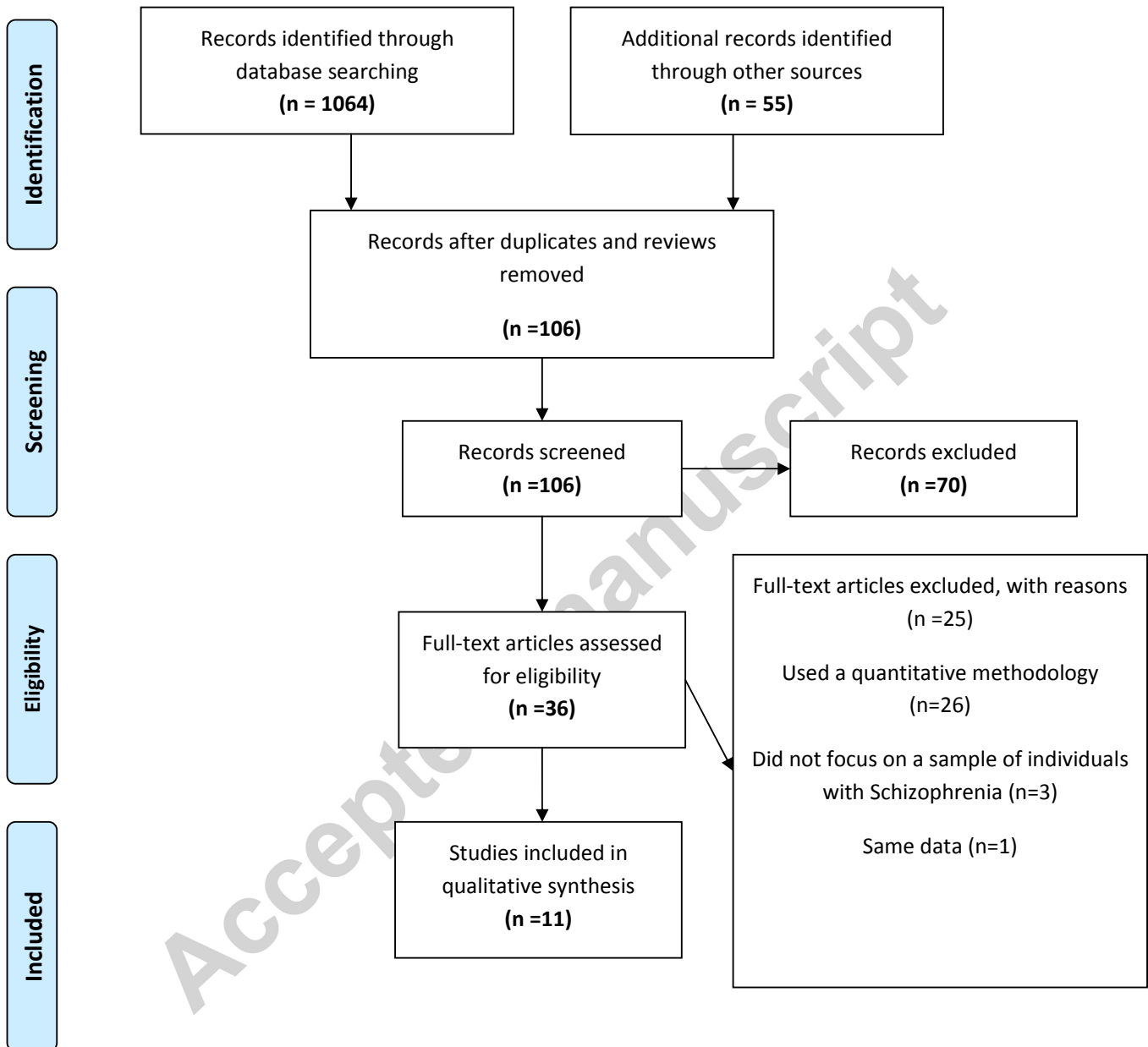


Figure 2. Illustrating the psychosocial factors that influence physical activity and the transcending benefits of physical activity

