

Is sport an untapped resource for recovery from first episode psychosis? A narrative review
and call to action

Lauren E. Brooke¹, Ashleigh Lin², Nikos Ntoumanis³, and Daniel F. Gucciardi¹

¹School of Physiotherapy and Exercise Science, Curtin University

²Telethon Kids Institute, The University of Western Australia, Perth, WA

³School of Psychology, Curtin University

Author Note

Lauren E. Brooke, School of Physiotherapy and Exercise Science, Curtin University;
Daniel F. Gucciardi, School of Physiotherapy and Exercise Science, Curtin University;
Ashleigh Lin, Telethon Kids Institute, The University of Western Australia, Perth, WA,
Australia; Nikos Ntoumanis, School of Psychology, Curtin University.

Lauren Brooke is supported by an Endeavour Postgraduate Scholarship. Daniel Gucciardi is supported by a Curtin Research Fellowship. Ashleigh Lin is supported by an NHMRC Career Development Fellowship (#1148793).

Correspondence concerning the article should be addressed to Lauren E. Brooke,
School of Physiotherapy and Exercise Science, Curtin University, GPO Box U1987, Perth.
E-mail: l.brooke@postgrad.curtin.edu.au

Abstract

Aims

The objective of this narrative review is to address the question: Should sport-based life skills interventions be developed for young people recovering from first episode psychosis?

Method

A prose was developed through a broad, critical narrative review of literatures on (i) first episode psychosis recovery (FEP); and (ii) the life skills and sport, highlighting the conceptual (and limited empirical) links between the two. This style of review allowed for a critical examination of evidence from seemingly distinct literatures to address a question yet to be explored empirically.

Results

The review process highlighted important overlaps between psychosis recovery and sport. A review of the FEP recovery literature reveals that important components of an individual's recovery following a psychotic episode are: 1) physical activity, 2) opportunities to build life skills, and 3) social connectivity. A review of the sport and life skills literature suggests that sport can be a powerful platform from which to: 1) promote physical activity, 2) teach life skills, and 3) foster social connectivity within vulnerable populations. Despite the clear links between the two fields, mental health interventions that combine both life skills training components and physical activity in a context that promotes social connectivity are scarce to none.

Conclusions

We suggest that sport-based interventions could be an opportunity to provide life skills training, social connectivity, and physical activity opportunities in one intervention to individuals recovering from their first psychotic episode. We call for their development, and provide empirically-based recommendations for intervention design.

Key words: first episode psychosis, sport, life skills, early intervention, functional recovery

SPORT AND FIRST EPISODE PSYCHOSIS

Is sport an untapped resource for recovery from first episode psychosis? A narrative review
and call to action

Targeting intervention to people at their first episode of psychotic illness has been shown to reduce functional (social and occupational) impairment later in life (McGorry et al., 2008). Over the past two decades, clinical services have emphasised early intervention, and evidence suggests that this shift coincides with improved remission rates (Lally et al., 2017). As well as the management of psychotic symptoms and co-morbid psychopathology, early intervention in psychosis includes practices that enable functional recovery. Functional recovery goals are supported in various ways, including integral efforts to: 1) increase physical activity (e.g., Firth, Cotter, Elliott, French, & Yung, 2015), 2) build life skills (e.g., Lemos-Giraldez, 2015), and 3) promote social connectedness (e.g., Alvarez-Jimenez et al., 2013). To date, the majority of intervention work has targeted only one or two of these elements directly. As such, there is a need for an approach in which physical activity, life skills and social connectivity are targeted in a coherent and integrative fashion. The overarching objective of this article is to present sport as an ideal context to assimilate the three.

For the purposes of this paper, it is important to clearly define and distinguish physical activity, sport, and exercise. The three concepts are closely related, yet there are important differences that are relevant in the context of this review. Physical activity has been defined as “any bodily movement produced by skeletal muscles that requires energy expenditure” (WHO, 2017), whereas exercise is “a subset of physical activity that is planned, structured, and repetitive, and has as a final or intermediate objective of the improvement of physical fitness” (AUSGovernment, 2011, p.7). Sport is also a subset of physical activity. Although it bears resemblance to exercise and some people may use sport to meet exercise requirements, not all exercise is sport. Sport is a broad concept that has been defined in

SPORT AND FIRST EPISODE PSYCHOSIS

various way, but always containing elements of physical activity, organisation, rules, and competition. For example, the Australian Government (2011) defines sport as a type of physical activity “involving physical exertion and skill as the primary focus of the activity, with elements of competition where rules and patterns of behaviour governing the activity exist formally through organisations” (p. 7). As we will discuss, it is through these embedded structures within sport that enable it to be a platform for engagement in physical activity, social connectivity, and life skills training. In this context, life skills are best defined as cognitive, emotional and behavioural skills learned in one context (e.g., sport) that are transferred to and used effectively in other contexts (e.g., education; Gould & Carson, 2008).

In this paper, we first provide a review of each physical activity, life skills, and social connectivity in regards to psychosis recovery in an aim to outline the relevant background information and to support our later call to action. We then connect sport to each of the three tenets to illustrate the opportunity that sport presents as a tool for functional recovery efforts in first episode psychosis (FEP). We conclude with a call to action for the research and development of sport-based life skills interventions for FEP, and offer empirically-based recommendations. Figure 1 illustrates the underpinnings of the argument presented.

Rationale for and Overview of Methodological Approach

The research question evolved organically through discussions pertaining to combined areas of expertise (sport and exercise psychology, health psychology, youth mental health/FEP). Sport was identified as a context and medium through which to teach life skills, which led to the research question about the potential utility of sport engagement to mental health promotion/use with a population who have experienced or are experiencing mental health problems. A preliminary search revealed a paucity of research relating sport-based life skills interventions and mental illness. Upon further discussions and a cursory review of the literature, the notion that sport-based life skills interventions may meet the needs of people

SPORT AND FIRST EPISODE PSYCHOSIS

recovering from FEP emerged. Feedback was sought from several local FEP clinicians and services in Perth, Australia, who provided support for the need and feasibility of the idea. Subsequently, a narrative review was chosen to determine existing empirical support of the idea. Our approach was informed by previous narrative reviews in which scholars have forwarded a thesis regarding the unrealised potential of certain intervention approaches within the health sector, both within the FEP literature (e.g., friends interventions in psychosis; Harrop, Ellett, Brand, & Lobban, 2015) and beyond (e.g., bike sharing schemes to promote physical activity; Bauman, Crane, Drayton, & Titze, 2017). Our approach has been considered by some scholars (e.g., Grant & Booth, 2009) to be called a critical review, in which a critical lens comparing diverse bodies of work can enable “conceptual innovation” to form a hypothesis, serving as a subsequent “launch pad” for further research (p. 93). A summary of the search and analysis process can be found in Table 1.

A more systematic approach (e.g., systematic review, meta-analysis, or meta-syntheses) was deemed an inappropriate option for this paper. The overarching goal of this review was to present an argument for sport’s *potential* utility within FEP recovery efforts because sport has not been explored empirically in this population. Instead, we aimed to strike a balance between purposeful selection and systematic coverage of the literature to help us best present a case for this thesis. In other words, we focused on identifying the most significant literature with regard to the aims of our paper, rather than producing a comprehensive search using systematic processes.

Physical Activity is Important for Psychosis Recovery and Prevention

Physical activity is particularly critical for people with severe mental illnesses like psychosis.

The protective and therapeutic health benefits (e.g., on physical health, cognition, healthy aging) of regular physical activity in the general population are well known. In regards to

SPORT AND FIRST EPISODE PSYCHOSIS

mental health, recent research has revealed that physical activity may prevent the development of depression (Harvey et al., 2017; Schuch et al., 2018), and well over two decades of research indicates that physical activity is an effective component to the treatment of a variety of mild mental illnesses like depression and anxiety (e.g., Biddle & Mutrie, 2007; Rosenbaum, Tiedemann, Sherrington, Curtis, & Ward, 2014). It is clear from this body of work that that physical activity is an accessible and affordable form of treatment that, in some cases, is as effective as psychotherapy (e.g., Paluska & Schwenk, 2000). It can be argued, however, that physical activity's protective health benefits are even more critical for individuals with severe mental illness (SMI). First, individuals with a SMI (i.e., schizophrenia, bipolar disorder, and major depressive disorder) have an increased risk of chronic physical disease, particularly metabolic syndrome (MetS) (Vancamfort et al., 2015) and subsequent cardiovascular disease (CVD), contributing to a significantly higher risk of developing and dying from CVD compared to that of the general population (Correll et al., 2017). Furthermore, studies indicate that the risk of diabetes for individuals with SMI is double that of the general population (Vancamfort et al., 2016), and, more specifically, that an increased risk of diabetes is present in people with FEP who are not being treated with antipsychotic medication (Pillinger, Beck, Stubbs, & Howes, 2017). The mortality rate for people with SMI is roughly two to three times higher than that of the general population, with their life expectancy shortened by 13-30 years (De Hert et al., 2011).

The effects of SMI on physical health are multi-faceted, but a large contributing factor is the use of anti-psychotic medication. This knowledge is concerning given that antipsychotic medications remain first line treatment of psychotic illnesses. The benefits of antipsychotics come at a high cost – high enough that “in any other scenario, the responsible physician's response would be to seek an alternative” (Lancet, 2011, p. 611). The side effects of antipsychotics are well-documented and include rapid weight gain, lethargy/sedation, and

SPORT AND FIRST EPISODE PSYCHOSIS

increased appetite contributing to the high incidence of cardiometabolic problems and diabetes within FEP populations (e.g., Foley & Morley, 2011; Tek et al., 2016). Although there is no difference in these risk factors between the general population and individuals at the onset of psychotic illness (Foley & Morley, 2011), the incidence of metabolic syndrome multiplies by five after only a few years of antipsychotic treatment (De Hert et al., 2011). As such, there has been a stern call for interventions and treatment protocols that counteract the negative effects of using antipsychotic medication in the treatment of psychotic illness, with increased physical activity being a top complementary choice (e.g., iphYs, 2013).

Physical activity interventions have been successful with SMI, and, more specifically, FEP populations.

Numerous studies have shown that for people with SMI, physical activity can improve cardiorespiratory fitness and/or lower BMI to protect against the deleterious health outcome and accompany the diagnoses (e.g., Vancamfort, 2017b; Rosenbaum, Hobson-Powell, Davison, Elliot, & Ward, 2017), alleviate symptoms of mental illness (e.g., Bonsaksen & Lerdal, 2012; Schuch et al., 2016), improve cognitive functioning (e.g., Firth et al., 2016e), enhance social competence and self-reliance (e.g., Soundy et al., 2014), and bolster markers of overall mental health and quality of life (e.g., Firth, Cotter, Elliott, French, & Yung, 2015; Soundy et al., 2014; Rosenbaum, Tiedemann, Sherrington, Curtis, & Ward, 2014). Interventions that use sport as a mode of physical activity for people with SMI have reported functional recovery and quality of life benefits such as a sense of achievement, purpose, and belonging; positive sense of identity and enhanced confidence; and positive social experiences (e.g., Carless & Douglas, 2016; Soundy et. al, 2015).

In recent years, there has been a growing amount of promising research on exercise-based early interventions specifically for the treatment and recovery of psychosis. The early stages of psychosis, particularly the time following a FEP, is considered a critical time in

SPORT AND FIRST EPISODE PSYCHOSIS

which the detrimental trajectory of the psychological and physical effects of psychosis could be altered (Hughes et al., 2014). Researchers have demonstrated that exercise for people with FEP can be successful in limiting antipsychotic induced weight gain (Curtis et al., 2016), and increasing aerobic fitness (Rosenbaum, Watkins, et al., 2015), both strong markers of metabolic syndrome prevention and psychosocial recovery. Alongside the physical health benefits, exercise interventions reduce psychotic symptoms (Firth, Carney, Jerome, et al., 2016c) and improve cognitive dysfunction (Firth et al., 2015), provide a welcomed distraction to psychotic symptoms such as hearing voices (Alexandratos et al., 2012), ease the stigma of mental illness through engagement in a normalised activity (Ellis, Crone, Davey, & Grogan, 2007), provide opportunities for interactive social engagement (Carless & Douglas, 2008), offer a sense of purpose and control (Alexandratos et al., 2012), and lead to less use of inpatient mental health services (Korge & Nunan, 2017). Importantly, there is evidence to suggest that physical activity interventions are feasible and may lead to sustained levels of physical activity post intervention (Firth, Carney, French, Elliott, & Yung, 2016b), and that cardiorespiratory fitness may protect against future psychosis (Kunutsor, Laukkanen, & Laukkanen, 2018).

The research supports the importance of regular physical activity for the physical and mental health of people with SMI and psychosis. However, despite these findings, people with SMI (Stubbs et al., 2016a; Vancamfort et al., 2017a) and, more specifically, FEP (Stubbs et al., 2016b), report levels of physical activity well under the World Health Organisation recommendations (WHO, 2017), and well below the general population. Furthermore, these groups report significantly higher levels of sedentary behaviour when compared to healthy controls (Vancamfort et al., 2017a; Stubbs et al., 2016c). Considering that both low levels of physical activity (WHO, 2017) and high levels of sedentary behaviour (e.g., Patterson et al., 2018) are independent risk factors of CVD in the general population,

SPORT AND FIRST EPISODE PSYCHOSIS

the combination only exasperates existing or future cardiometabolic problems in SMI or FEP, and makes proactive health behaviour less likely or possible (Vancamfort et al., 2017a). As such, it is unsurprising that reported levels of cardiorespiratory fitness in people with SMI are significantly lower than those of healthy controls (Vancamfort et al., 2017b). The inherent conundrum is that the increased need for physical activity within this population is coupled with increased barriers to exercise (e.g., weight gain makes exercise more critical, but also more daunting; Rubinstein & Breitborde, 2016). These findings highlight the need for continued and evolved physical activity interventions for people with psychotic illness that are both effective and engaging.

FEP physical activity interventions are typically one dimensional.

Exercise interventions show success in fostering both mental and physical health, but, for the most part, they do so through the one-dimensional focus on *individual* physical exercise. To date, FEP exercise interventions tend to be individually-focused and only provide exercise instruction, perhaps missing ripe opportunities for further functional recovery and social connectivity; both of which are critical components of psychosis recovery and prevention (McGorry & Goldstone, 2016). There are exceptions to this unidimensional focus on physical exercise, however, the impact on functional recovery or social functioning is generally unmeasured, or the additional components are not prominent in the intervention. For example, Curtis and colleagues (2016) found that an exercise intervention that had additional life skills/lifestyle intervention components (e.g., cooking classes and goal-setting) was successful in attenuating anti-psychotic weight gain in FEP, although they did not measure other components of recovery. Firth and colleagues (2016a) included group sport or exercise as an option in an FEP exercise intervention that measured various markers of recovery, but this group element was minimal overall (i.e. less than 10% of all recorded sessions).

SPORT AND FIRST EPISODE PSYCHOSIS

Given that early psychosis services are reliant on funding that is often scarce, there is a need to explore multi-dimensional group-based physical activity interventions that have the potential to offer ‘more bang for the buck’. Along the same lines, given that individuals with FEP tend to find it challenging to engage in interventions because of symptoms and other illness-related factors (e.g., increased anxiety, decreased motivation, social stigma; Firth, Rosenbaum, Stubbs, Gorczynski, et al., 2016; McCarthy-Jones, Marriott, Knowles, Rowse, & Thompson, 2013), there is a need to find ways to maximise the time that they engage with physical activity-focused programs. One possibility in this regard is to embed life skills training within physical activity interventions, with the acquisition and transfer of life skills as a primary outcome.

Life skills are Important for Psychosis Recovery and Prevention

What are life skills?

Broadly speaking, life skills can be defined as “those skills that enable individuals to succeed in the different environments in which they live, such as school, home and in their neighbourhoods. Life skills can be behavioural (communicating effectively) or cognitive (making effective decisions); interpersonal (being assertive) or intrapersonal (setting goals)” (Danish, Forneris, Hodge, & Heke, 2004, p.40). Life skills training occurs when these skills are learned in one context (e.g., sport) and successfully applied in another (e.g., education) (Gould & Carson, 2008). Life skills training aims to foster elements that promote positive health, not just target symptoms of ill-health. This focus is in line with the WHO definition of health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 2017a, para. 1) and mental health as “a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her

SPORT AND FIRST EPISODE PSYCHOSIS

or his community” (para. 2). These definitions are strikingly similar to that of functional recovery within FEP.

Life skills help the multifaceted psychosis recovery process.

It could be argued that life skills acquisition is at the crux of psychosis recovery, and embedded into functional recovery efforts. A core measure of recovery from psychosis is functional recovery, despite recurring symptoms (McGorry & Goldstone, 2016). One is said to have achieved a level of functional recovery post-psychotic episode when they regain the ability to live and function in an independent and meaningful way (Hughes et al., 2014). Functional recovery is fostered through a focus on the subjective and personal markers of recovery (e.g., changes in goals, feelings, and values; Morera, Pratt, and Bucci 2016) and opportunities for social, personal, vocational, and educational growth (e.g., Shepherd, 2016; Hughes, 2014). Someone who has achieved a level of functional recovery will demonstrate self-management of the illness (e.g., noticing and managing triggers; e.g., Lemos-Giraldez et al., 2014) and a growth-focused perspective (e.g., working toward goals), and will express feelings such as hope, optimism, self-belief, and control (Shepherd, 2016; Morera, Pratt, & Bucci, 2016). Both clinicians (Morera, Pratt, & Bucci, 2017) and patients (Pitt, Kilbride, Nothard, Welford, & Morrison, 2007) have rated targets of functional recovery as more important than symptom remission. Functional recovery is supported through development of the emotional, cognitive, and behavioural skills targeted within life skills training. If we bring our attention back to the definition of life skills training, one could argue that functional recovery and life skills training are essentially different terms for nearly the same concept. This is evidenced, in, for example, Lemos-Giraldez and colleagues’ (2015) recovery measure, the Stages of Recovery Instrument (STORI), which illustrates the notion that psychosis recovery is a process that leads to a satisfying life, rather than a binary (symptoms present or not) biomedical outcome, and includes indices of goal setting, self-awareness, confidence,

SPORT AND FIRST EPISODE PSYCHOSIS

control, and optimism. In essence, the psychosis recovery literature uses life skills as indicators of functional recovery; such life skills can be trained and transferred to other contexts. This overlap warrants research into psychosis recovery interventions that contain clear components of life skills training, and encourage transfer of these skills to other areas of life. Interventions utilising physical activity for SMI (e.g., Soundy 2014) and, more specifically, FEP (e.g., Firth et al., 2016) show encouraging results for the potential for physical activity (including sport) to be used to foster life skills training within this population. However, as previously discussed, much of this work is one-dimensional in that it only utilises individual exercise, and functional recovery markers tend to be secondary research outcomes to objective markers of primary outcomes like symptomatology and BMI. Sport may be one option to embed life skills training within FEP interventions and promote functional recovery through creating opportunities for social connectedness.

Social connectedness is important for psychosis recovery and prevention

Psychosis and social isolation.

Psychosis leads to social isolation and withdrawal for various reasons, including: 1) effects of both positive and negative symptoms, 2) effects of antipsychotic medication, and 3) the stigma surrounding mental illness, and, more specifically, psychotic illness. Firstly, the symptoms of psychosis (e.g., paranoia) and comorbid psychopathology (such as social anxiety) can threaten social relationships and connection (Mancuso, Horan, Kern, & Green, 2011; McCarthy-Jones et al., 2013). Furthermore, negative symptoms are predictors of poor social recovery and functioning (e.g., symptoms such as lethargy, avolition, and apathy make engaging in social interactions daunting), whereas negative symptoms such as inappropriate emotional responses and impaired attention may make social attempts unsuccessful (Gee et al., 2016; Schlosser et al., 2015). Secondly, the side effects of antipsychotic medication are profound. Significant weight gain is common, leading to shame and embarrassment that

SPORT AND FIRST EPISODE PSYCHOSIS

encourages withdrawal from social relationships (McCarthy-Jones et al., 2013; Tek et al., 2016). Lastly, the stigma surrounding mental illness cannot be underestimated. Research indicates that people who experience psychosis are one of the most stigmatised minority groups within society, and that most of the general population hold negative perceptions about people with psychosis (Vass et al., 2015). People with a psychotic illness are more likely to experience ostracism and bullying, which exacerbates the social divide (Harrop, Ellett, Brand, & Lobban, 2015). As psychosis normally develops between adolescence and young adulthood – a time where most young people are attempting to establish themselves as an independent adult – such severe social disruptions at this critical age in development are concerning, and extra care must be taken to promote functional recovery (Harrop et al., 2015; McGorry & Goldstone, 2016).

Psychosis, recovery, and social connectedness.

Social isolation that accompanies psychosis has detrimental effects on the individual and their recovery trajectory, and prohibits them from experiencing the well-documented benefits of social connectedness. It has been demonstrated that social engagement and social support are critical components of functional recovery following a psychotic episode. A meta-synthesis of qualitative studies exploring the experience of psychosis found that functional recovery comes largely through nonjudgmental support of family and friends, connections with others with a shared experience, and restoring severed relationships (McCarthy-Jones et al., 2013). In an examination of the quality and frequency of social interactions during clinical recovery of FEP, researchers found frequency of interactions with friends (but not the quality of such interactions) to be a significant indicator of clinical recovery (Bjornestad et al., 2017). This finding is promising as it suggests that even surface level interactions could aid in recovery, calling for further research that promotes social interaction. This finding echoes a “call to action” made earlier by Harrop and colleagues

SPORT AND FIRST EPISODE PSYCHOSIS

(2015) in which they presented a wealth of evidence to support the need for “friends interventions” for young people with psychosis. The need to counteract the tendency toward isolation and the benefits of social connectedness are clear - what is needed are more interventions specifically addressing these needs in people with early psychosis, and sport may be an optimal avenue. Physical activity interventions for SMI show promising effects on social components of recovery, including enhanced social competence (e.g., Soundy et al., 2014), and suggest that sport can provide positive relational experiences (Carless & Douglas, 2016) and critical opportunities to give and receive social support (Soundy et al., 2015). More specifically, in regards to FEP, researchers have demonstrated that physical activity can promote psychosocial functioning (e.g., Firth et al., 2016a; Firth et al., 2016b; Firth et al., 2016c), yet the use of sport for FEP has been explored in only a limited manner.

Sport is an ideal context in which to integrate physical activity, life skills, and social connectivity

Sport characteristics and reach.

Sport is far bigger than the sum of its components within society. Major sporting events draw massive following, and participation in organised sport is a societal norm for many cultures across the globe. In 1978, the United Nations (UN) declared access to sport for children a fundamental right, not a privilege (UN, 2014). The weight of sport’s cultural value is profound - sport has been described as a “global language,” and as having the power to transcend social, cultural, and political divides (Conrad & White, 2015). As such, sport has been used as a medium to promote international peace (e.g., Georgiadis & Syrigos, 2009), help trauma victims (e.g., Ravizza, 2008), support victims of natural disaster (e.g., Kunz, 2009), lead human rights moments (e.g., Donnelly, 2008), and teach valuable life skills to socially vulnerable youth (e.g., Hermens, Super, Verkooijen, & Koelen, 2017). Perhaps Nelson Mandela said it best when he noted, “We can reach far more people through sport

SPORT AND FIRST EPISODE PSYCHOSIS

than we can through political or educational programmes. In that way, sport is more powerful than politics” (Bailey, 2008, p. 85). The reach of sport is especially important in regards to FEP recovery when the previously discussed stigmatising properties of psychotic illness are considered (e.g., Wood et al., 2017). Beyond its potential to be a uniting force, sport also offers many health benefits.

The health benefits (physical, mental and developmental) of sport are widespread.

Sport provides an engaging and accessible environment to develop positive habits that contribute to healthy and productive living. A core component of sport is physical activity, the health (physical and mental) benefits of which are immense for mental illness and FEP. Beyond the physical activity, the structure (e.g., rules routine, discipline, feedback, social camaraderie, positive role models, mentorship) of sport yields a context ripe for developmental benefits. The effects of sport on development have been examined, with particular emphasis on positive youth development. Participation in sport can support the healthy growth of young people, including physical health benefits (e.g., healthy weight maintenance, enhanced cardio-respiratory functioning, decreased risk of diabetes and heart disease), psychosocial well-being (e.g. leadership development, enhanced self-esteem, enhanced academic performance), mental health benefits (e.g., fewer symptoms of depression, less drug use, and less incidence of suicidal behaviour) and physical developmental gains (e.g., increased motor skills) in its participants (e.g., Agans, Ettekal, Erickson, & Lerner, 2016; Holt, 2016; Vella, Swann, Allen, Schweickle, & Magee, 2017). Sport participants acquire a variety of important social, emotional and behavioural life skills (e.g., managing emotions, goal setting, and effective communication) that can be transferred and applied to important life contexts, such as independent living and positive community engagement (Gould & Carson, 2008). There is evidence that long-term participation in

SPORT AND FIRST EPISODE PSYCHOSIS

organised sport can sustain these benefits (Hermens, Super, Verkooijen, & Koelen, 2017; Holt, 2016). As such, there has been extensive effort into using sport as a framework and intervention context to promote the positive development of youth, in both healthy and vulnerable populations.

Sport has been used as a platform to teach life skills to vulnerable populations.

We have already presented evidence to support the importance of life skills in FEP recovery, and argued that the goal of functional recovery in FEP shares essential components with life skills training. Our proposal that sport may be a platform to teach life skills to people with FEP is supported by the existing evidence that demonstrates that the sporting environment can be a powerful teaching context, and this capacity has been capitalised by using sport to teach life skills to socially vulnerable youth. A recent systematic review of such literature indicates that the utility of this work is broad (Hermens et al., 2017). Multiple populations have been targeted (e.g., low socioeconomic background, delinquent, minority, immigrant), with a variety of intervention approaches (e.g., school-based, summer camp, after school), sports, (e.g., mixed sport, basketball, swimming, football), and life skills training methods (e.g., mentor training, leadership training, social skills instruction, critical thinking sessions) utilised. This work commonly uses interviewing and pre/post-test quantitative methods (rarely including a control group) to assess a variety of targeted emotional life skills (e.g., mood improvement, self-worth), cognitive life skills (e.g., self-confidence, motivation), and social life skills (e.g., communication, conflict resolution). Although there is room for enhanced methodological rigour within this body of research, overall, the existing evidence suggests that sport programs can be used as a platform to teach life skills to socially vulnerable youth. This preliminary evidence inspires further work, including application to other socially vulnerable populations, such as people with SMI.

Sport provides a platform for social connectivity.

SPORT AND FIRST EPISODE PSYCHOSIS

We previously presented evidence describing the challenges people with FEP face in regards to social isolation, and the need for social interaction for recovery. Sport offers an avenue to meet this need. Social connectivity is a key benefit of participation in organised sport. Sport creates opportunities for social relationships to flourish (e.g., through an inbuilt community), has the potential to nurture critical social skills (e.g., through role models and communication training) and support the development of one's social identity (e.g., through leadership development and belonging to a community; Conrad & White, 2015).

Unsurprisingly, therefore, youth sport participants report greater levels of confidence in social settings and greater satisfaction with their social environment, compared to their peers uninvolved in sport (Holt, 2016). The positive effects of sport participation for social connectivity extend beyond the general population. For example, socially vulnerable youth (e.g., from low socio-economic backgrounds) have demonstrated stronger social connections and life skills following a sport-based participation program (Hermens et al., 2017). Sport programs for individuals with SMI have been shown to help provide a positive sense of identity and purpose, increased social confidence, and an enjoyable social experience to look forward to (Soundy et al., 2015). With sport participation comes the opportunity to engage in a normalised activity, which can help ameliorate the negative stigma of mental illness that is so crippling to relationships (Conrad & White, 2015; Soundy et al., 2015). For these reasons, sport represents an ideal context in which to foster and sustain a sense of social connection with others.

Call to action and development recommendations for sport based life skills intervention to support FEP recovery

Call to action.

SPORT AND FIRST EPISODE PSYCHOSIS

Thus far, we have discussed the benefits of physical activity, life skills training, and social connectivity for the general population. We presented evidence to suggest that these three components are fundamentally important for people with SMI, and, more specifically, individuals with a FEP; the evidence suggests that the degree of recovery from psychosis may hinge on these three components. Because the fundamental components of sport include physical activity, social connectivity, and the potential for life skills development, we contend that sport-based life skills interventions designed specifically for people with FEP could aid in the recovery process. In the following sections, we detail three key elements to consider for the development of such interventions.

Early intervention greatly reduces chance of chronic illness.

Targeting people at their first episode of psychotic illness has been shown to reduce functional (social and occupational) impairment later in life. The effectiveness of early intervention is explained by at least four factors: 1) the years immediately following onset of psychosis are considered a critical period in the sense that individuals are most vulnerable to relapse (Hughes et al., 2014); 2) onset generally occurs at an especially sensitive developmental time, and at this early stage of illness individuals are less removed from the developmental trajectory of their healthy peers, and thus benefit most from early intervention (McGorry et al., 2008); 3) individuals are more likely and able to engage in help-seeking behaviour at this early stage, before the side-effects worsen (Hughes et al., 2014); and 4) people who are younger and less burdened by cardio-metabolic diseases are at a more optimal age to engage in and create physical activity habits (Firth, Carney, Elliott, et al., 2016a). In addition to these social and health benefits, early intervention is more cost effective; specifically, it is estimated that specialised early-intervention psychosis programs can offer greater recovery rates at one third the cost of standard care (Mihalopoulos, Harris, Henry, Harrigan, & McGorry, 2009).

Feasibility matters: considering barriers and enablers to participation

It is important that intervention designs account for the barriers and enablers to sport participation for people with FEP. Physical activity interventions for people with SMI have historically low recruitment and retention rates. Scholars urge that for people with FEP, it is critical that interventions offer personalisation for the intervention, even in group settings (e.g., offering varying options or supporting individual goal setting; e.g., Curtis et al., 2016; Firth et al., 2016a). Although it is important to cater to the individual, adherence can be maximised through a combination of group and individual work (Ward, White, & Druss, 2015). In a recent qualitative exploration of the effects and determinants of exercise participation in people with FEP, Firth and colleagues (2016c) found both autonomy (e.g., choosing the activity) and social support (e.g., having an exercise buddy) to be critical factors in engaging participants; in contrast, anxiety and lack of motivation were key barriers. In a subsequent survey study, Firth et al. (2016d) found that increased fitness/energy, distraction, and gaining confidence were the strongest motivating factors. Motivating factors are important, as they need to be prominent enough to override the psychosocial vulnerabilities created by both positive and negative symptoms that can make engagement challenging (Soundy et al., 2014). More broadly, the stigma of mental illness must be kept in mind such that interventions should include normalising components (e.g., marketing materials and attire of program facilitators that lessen the feeling of being “other” for the participants; see Gronholm, Thornicroft, Laurens, & Evans-Lacko, 2017). Considering the novelty of this call to action, it would be valuable to explore the feasibility of a sport based-life skills intervention specifically for young people with FEP via general perceptions of such a program, its preliminary effects, and the perceived barriers and enablers to engagement.

Methodological rigour is needed in regards to sport-based life skills interventions.

SPORT AND FIRST EPISODE PSYCHOSIS

One must be cautious of this common “sport evangelist” mindset. This mindset is the tendency within the field to “blindly believe that sport participation inevitably contributes to youth development because sport’s assumed essential goodness and purity is passed on to those who partake in it” (Coakley, 2011, p. 306). It is easy to fall into the trap of assuming that life skills will naturally be acquired and transferred to other domains through sport participation with little systematic effort, despite evidence on the contrary (Pierce, Gould, & Camire, 2017). One must be aware that sport also has the capacity to do harm (e.g., through exclusion or comparison to more successful peers; Conrad & White, 2015), and be mindful of the intervention design and processes to utilise and maximise the benefits of sport. The use of people with sport expertise and an understanding of relevant theory to develop and facilitate the work may support this effort. As with any intervention program, clarity and detail is imperative in regards to program components, life skills definition, life-skill measurement, and mechanisms of life-skill transfer (Pierce et al., 2017). Key considerations for life skills training are the notions of training and transferability; that is, life skills are developed in one context and then applied effectively in another domain, demonstrating the interactive nature of development. It is important to note that the transfer of life skills across contexts doesn’t just happen automatically, but is maximised via systematic attempts to create an environment that promotes transfer, including (i) similarity of context, (ii) opportunities to use skills, (iii) support for transfer, and (iv) rewards for transfer (Pierce, Gould, & Camire, 2017).

Limitations

This review is not without its limitations. The narrative review approach taken allowed for the amalgamation of separate research areas to highlight a gap in the research and clinical care practices. However, because our focus was on evidence that was relevant to our thesis, the unsystematic nature of our search meant that we may have missed important studies and/or been biased in selection and interpretation. Efforts to eliminate such bias

SPORT AND FIRST EPISODE PSYCHOSIS

included reflective team discussions. Furthermore, study quality was unassessed and therefore excluded from the synthesis of information.

Conclusions

The conceptual and empirical evidence presented in this paper highlights the potential for sport-based life skills interventions to be a powerful tool in the recovery of FEP, and the prevention of future relapse. We discussed recovery post-FEP as a complex process with two main goals: 1) minimise symptoms and 2) enable functional recovery. We have demonstrated that these two goals are supported by physical activity, life skills acquisition, and social connectivity. Against this conceptual backdrop, we argued that sport is an ideal platform to integrate these three components. As such, we provided a call to action that sport-based life skills interventions should be developed for those recovering from FEP and suggestions for intervention design.

Conflicts of Interest Statement

The authors certify that they have no conflicts of interest, financial or non-financial, in the subject matter or materials discussed in this manuscript.

References

- Agans, J. P., Ettekal, A. V., Erickson, K., & Lerner, R. M. (2016). Positive youth development through sport: a relational developmental systems approach. In N.L. Holt (Ed.) *Positive Youth Development Through Sport* (2nd ed., pp. 34-44). New York, NY: Routledge.
- Alexandratos, K., Barnett, F., & Thomas, Y. (2012). The impact of exercise on the mental health and quality of life of people with severe mental illness: a critical review. *British Journal of Occupational Therapy, 75*, 48-60.
doi:10.4276/030802212X13286281650956
- Allen, G., Rhind, D., & Koshy, V. (2015). Enablers and barriers for male students transferring life skills from the sports hall into the classroom. *Qualitative Research in Sport, Exercise and Health, 7*(1), 53-67. doi: 10.1080/2159676X.2014.893898
- Alvarez-Jimenez, M., Bendall, S., Lederman, R., Wadley, G., Chinnery, G., Vargas, S., . . . Gleeson, J. F. (2013). On the HORYZON: Moderated online social therapy for long-term recovery in first episode psychosis. *Schizophrenia Research, 143*, 143-149.
doi:https://doi.org/10.1016/j.schres.2012.10.009
- AUSGovernment. (2011). National Sport and Active Recreation Policy Framework.
Retrieved from
https://www.ausport.gov.au/__data/assets/pdf_file/0004/467563/National_Sport_and_Active_Recreation_Policy_Framework.pdf
- Bailey, R. (2008). Youth sport and social inclusion. In N.L. Holt (Ed.) *Positive Youth Development Through Sport* (2nd ed., pp. 85-96). New York, NY: Routledge.
- Bauman, A., Crane, M., Drayton, B. A., & Titze, S. (2017). The unrealised potential of bike share schemes to influence population physical activity levels—A narrative

SPORT AND FIRST EPISODE PSYCHOSIS

review. *Preventive medicine*, 103, S7-S14.

doi:<https://doi.org/10.1016/j.ypped.2017.02.015>

Biddle, S.J.H. (2000). Emotion, mood and physical activity. In S.J.H. Biddle, K.R. Fox, & S.H. Boutcher (Eds.) *Physical Activity and Psychological Well-Being*, (pp. 63-87). New York, NY: Routledge.

Biddle, S.J.H., & Mutrie, N. (2007). *Psychology of Physical Activity: Determinants, Well-Being and Interventions* (2nd ed.). New York, NY: Routledge.

Bjornestad, J., Hegelstad, W. T. V., Joa, I., Davidson, L., Larsen, T. K., Melle, I., . . .

Bronnick, K. (2017). "With a little help from my friends" social predictors of clinical recovery in first-episode psychosis. *Psychiatry Research*, 255, 209-214.

<https://doi.org/10.1016/j.psychres.2017.05.041>

Bonsaksen, T., & Lerdal, A. (2012). Relationships between physical activity, symptoms and quality of life among inpatients with severe mental illness. *British Journal of Occupational Therapy*, 75, 69-75. doi:10.4276/030802212X13286281651036

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101. doi: 10.1191/1478088706qp063o

Carless, D., & Douglas, K. (2008). Social support for and through exercise and sport in a sample of men with serious mental illness. *Issues in mental health nursing*, 29, 1179-1199. doi:10.1080/01612840802370640

Carless, D., & Douglas, K. (2016). The Bristol active life project: Physical activity and sport for mental health. In *Sports-Based Health Interventions* (pp. 101-115). Springer, New York, NY.

Clow, A., & Edmunds, S. (2014). *Physical activity and mental health*. Champaign, IL: Human Kinetics.

SPORT AND FIRST EPISODE PSYCHOSIS

- Coakley, J. (2011). Youth sports: What counts as “positive development?”. *Journal of sport and social issues*, 35, 306-324. doi:10.1177/0193723511417311
- Cohen, S. (2004). Social relationships and health. *American psychologist*, 59, 676.
- Conrad, D., & White, A. (2015). *Sports-Based Health Interventions: Case Studies from Around the World*: Springer.
- Correll, C. U., Solmi, M., Veronese, N., Bortolato, B., Rosson, S., Santonastaso, P., ... & Pigato, G. (2017). Prevalence, incidence and mortality from cardiovascular disease in patients with pooled and specific severe mental illness: a large-scale meta-analysis of 3,211,768 patients and 113,383,368 controls. *World Psychiatry*, 16, 163-180. doi:10.1002/wps.20420
- Curtis, J., Watkins, A., Rosenbaum, S., Teasdale, S., Kalucy, M., Samaras, K., & Ward, P. B. (2016). Evaluating an individualized lifestyle and life skills intervention to prevent antipsychotic-induced weight gain in first-episode psychosis. *Early Intervention in Psychiatry*, 10, 267-276. doi:10.1111/eip.12230
- Danish, S., Forneris, T., Hodge, K., & Heke, I. (2004). Enhancing youth development through sport. *World leisure journal*, 46, 38-49. doi:10.1080/04419057.2004.9674365
- De Hert, M., Correll, C. U., Bobes, J., Cetkovich-Bakmas, M., Cohen, D., Asai, I., . . . Ndeti, D. M. (2011). Physical illness in patients with severe mental disorders. I. Prevalence, impact of medications and disparities in health care. *World psychiatry*, 10(1), 52-77. doi:10.1002/j.2051-5545.2011.tb00014.x
- Donnelly, P. (2008). Sport and human rights. *Sport in Society*, 11, 381-394. doi:10.1080/17430430802019326
- Ellis, N., Crone, D., Davey, R., & Grogan, S. (2007). Exercise interventions as an adjunct therapy for psychosis: a critical review. *British journal of clinical psychology*, 46, 95-111. doi:10.1348/014466506X122995

SPORT AND FIRST EPISODE PSYCHOSIS

Firth, J., Carney, R., Elliott, R., French, P., Parker, S., McIntyre, R., . . . Yung, A. R. (2016a).

Exercise as an intervention for first-episode psychosis: a feasibility study. *Early intervention in psychiatry*. doi:10.1111/eip.12329

Firth, J., Carney, R., French, P., Elliott, R., & Yung, A. (2016b). Investigating the Short and Long-term Benefits of Exercise in Early Psychosis. *Schizophrenia Bulletin*, 43(suppl_1), S199. <https://doi-org.dbgw.lis.curtin.edu.au/10.1093/schbul/sbx024.102>

Firth, J., Carney, R., Jerome, L., Elliott, R., French, P., & Yung, A. R. (2016c). The effects and determinants of exercise participation in first-episode psychosis: a qualitative study. *BMC psychiatry*, 16, 36. doi:10.1186/s12888-016-0751-7

Firth, J., Cotter, J., Elliott, R., French, P., & Yung, A. R. (2015). A systematic review and meta-analysis of exercise interventions in schizophrenia patients. *Psychol Med*, 45, 1343-1361. doi:10.1017/S0033291714003110

Firth, J., Rosenbaum, S., Stubbs, B., Gorczynski, P., Yung, A. R., & Vancampfort, D. (2016d). Motivating factors and barriers towards exercise in severe mental illness: a systematic review and meta-analysis. *Psychol Med*, 46, 2869-2881. doi:10.1017/S0033291716001732

Firth, J., Stubbs, B., Rosenbaum, S., Vancampfort, D., Malchow, B., Schuch, F., ... & Yung, A. R. (2016e). Aerobic exercise improves cognitive functioning in people with schizophrenia: a systematic review and meta-analysis. *Schizophrenia Bulletin*, 43, 546-556. doi:10.1093/schbul/sbw115

Foley, D. L., & Morley, K. I. (2011). Systematic review of early cardiometabolic outcomes of the first treated episode of psychosis. *Arch Gen Psychiatry*, 68, 609-616. doi:10.1001/archgenpsychiatry.2011.2

Gee, B., Hodgekins, J., Fowler, D., Marshall, M., Everard, L., Lester, H., ... & Freemantle, N. (2016). The course of negative symptom in first episode psychosis and the

SPORT AND FIRST EPISODE PSYCHOSIS

relationship with social recovery. *Schizophrenia Research*, 174, 165-171. doi.org/10.1016/j.schres.2016.04.017

Georgiadis, K., & Syrigos, A. (2009). Olympic Truce: Sport as a platform for peace. *Athens: The International Olympic Truce Centre*. Athens: the International Olympic Truce Centre.

Gill, D. L., Hammond, C. C., Reifsteck, E. J., Jehu, C. M., Williams, R. A., Adams, M. M., . . . Shang, Y.-T. (2013). Physical activity and quality of life. *Journal of Preventive Medicine and Public Health*, 46(Suppl 1), S28. doi:10.3961/jpmph.2013.46.S.S28

Gould, D., & Carson, S. (2008). Life skills development through sport: Current status and future directions. *International review of sport and exercise psychology*, 1, 58-78. doi:10.1080/17509840701834573

Gronholm, P., Thornicroft, G., Laurens, K., & Evans-Lacko, S. (2017). Mental health-related stigma and pathways to care for people at risk of psychotic disorders or experiencing first-episode psychosis: a systematic review. *Psychological medicine*, 47,1867-1879. doi:10.1017/S0033291717000344

Hamer, M., Lavoie, K. L., & Bacon, S. L. (2014). Taking up physical activity in later life and healthy ageing: the English longitudinal study of ageing. *Br J Sports Med*, 48, 239-243. doi:10.1136/bjsports-2013-092993

Harrop, C., Ellett, L., Brand, R., & Lobban, F. (2015). Friends interventions in psychosis: a narrative review and call to action. *Early intervention in psychiatry*, 9, 269-278. doi:10.1111/eip.12172

Harvey, S. B., Øverland, S., Hatch, S. L., Wessely, S., Mykletun, A., & Hotopf, M. (2017). Exercise and the Prevention of Depression: Results of the HUNT Cohort Study. *American Journal of Psychiatry*, 175, 28-36. doi: 10.1176/appi.ajp.2017.16111223

SPORT AND FIRST EPISODE PSYCHOSIS

- Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: a theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine, 40*, 218-227. doi:10.1007/s12160-010-9210-8
- Hermens, N., Super, S., Verkooijen, K. T., & Koelen, M. A. (2017). A Systematic Review of Life Skill Development Through Sports Programs Serving Socially Vulnerable Youth. *Res Q Exerc Sport, 88*, 404-424. doi:10.1080/02701367.2017.1355527
- Holt, N. L. (2016). *Positive youth development through sport*. New York, NY: Routledge.
- Hughes, F., Stavely, H., Simpson, R., Goldstone, S., Pennell, K., & McGorry, P. (2014). At the heart of an early psychosis centre: the core components of the 2014 Early Psychosis Prevention and Intervention Centre model for Australian communities. *Australasian Psychiatry, 22*, 228-234. doi:10.1177/1039856214530479
- International Physical Health in Youth (iphYs) working group (2013). Healthy Active Lives (HeAL) consensus statement. Retrieved from www.iphys.org.au
- Korge, J., & Nunan, D. (2017). Higher participation in physical activity is associated with less use of inpatient mental health services: A cross-sectional study. *Psychiatry Research, 259*, 550-553. doi:<https://doi.org/10.1016/j.psychres.2017.11.030>
- Kunutsor, S. K., Laukkanen, T., & Laukkanen, J. A. (2018). Cardiorespiratory fitness is associated with reduced risk of future psychosis: A long-term prospective cohort study. *Schizophrenia Research, 192*, 473-474. doi: 10.1016/j.schres.2017.04.042
- Kunz, V. (2009). Sport as a post-disaster psychosocial intervention in Bam, Iran. *Sport in Societ, 12*, 1147-1157. doi: 10.1080/17430430903137803
- Lally, J., Ajnakina, O., Stubbs, B., Cullinane, M., Murphy, K. C., Gaughran, F., & Murray, R. M. (2017). Remission and recovery from first-episode psychosis in adults: Systematic review and meta-analysis of long-term outcome studies. *The British Journal of Psychiatry, 211*, 350-358. doi: 10.1192/bjp.bp.117.201475

SPORT AND FIRST EPISODE PSYCHOSIS

- Lancet, The (2011). No mental health without physical health (Editorial): *The Lancet*, 377, 611. doi:10.1016/S0140-6736(11)60211-0
- Lemos-Giraldez, S., Garcia-Alvarez, L., Paino, M., Fonseca-Pedrero, E., Vallina-Fernandez, O., Vallejo-Seco, G., . . . Andresen, R. (2015). Measuring stages of recovery from psychosis. *Compr Psychiatry*, 56, 51-58. doi:10.1016/j.comppsy.2014.09.021
- Lubans, D., Richards, J., Hillman, C., Faulkner, G., Beauchamp, M., Nilsson, M., . . . Biddle, S. (2016). Physical activity for cognitive and mental health in youth: A systematic review of mechanisms. *Pediatrics*, 138(3). doi:10.1542/peds.2016-1642
- Mancuso, F., Horan, W. P., Kern, R. S., & Green, M. F. (2011). Social cognition in psychosis: multidimensional structure, clinical correlates, and relationship with functional outcome. *Schizophr Res*, 125, 143-151. doi:10.1016/j.schres.2010.11.007
- McCarthy-Jones, S., Marriott, M., Knowles, R., Rowse, G., & Thompson, A. R. (2013). What is psychosis? A meta-synthesis of inductive qualitative studies exploring the experience of psychosis. *Psychosis*, 5, 1-16. doi:10.1080/17522439.2011.647051
- McGorry, P., & Goldstone, S. (2016). Preventive strategies to optimize recovery in psychosis. In E.J. Bromet (Ed.), *Long-term outcomes in psychopathology research: Rethinking the scientific agenda* (pp. 205-226). New York, NY: Oxford University Press; US.
- McGorry, P. D., Killackey, E., & Yung, A. (2008). Early intervention in psychosis: concepts, evidence and future directions. *World psychiatry*, 7, 148-156. doi: 10.1002/j.2051-5545.2008.tb00182.x
- Mihalopoulos, C., Harris, M., Henry, L., Harrigan, S., & McGorry, P. (2009). Is Early Intervention in Psychosis Cost-Effective Over the Long Term? *Schizophrenia bulletin*, 35, 909-918. doi:10.1093/schbul/sbp054

SPORT AND FIRST EPISODE PSYCHOSIS

- Miller, K. R., McClave, S. A., Jampolis, M. B., Hurt, R. T., Krueger, K., Landes, S., & Collier, B. (2016). The health benefits of exercise and physical activity. *Current Nutrition Reports, 5*, 204-212. doi:10.1007/s13668-016-0175-5
- Morera, T., Pratt, D., & Bucci, S. (2017). Staff views about psychosocial aspects of recovery in psychosis: A systematic review. *Psychol Psychother, 90*, 1-24. doi:10.1111/papt.12092
- Naci, H., & Ioannidis, J. P. (2013). Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study. *Bmj, 347*, doi:10.1136/bmj.f5577
- Paluska, S. A., & Schwenk, T. L. (2000). Physical Activity and Mental Health. *Sports Medicine, 29*, 167-180. doi:10.2165/00007256-200029030-00003
- Patterson, R., McNamara, E., Tainio, M., de Sá, T. H., Smith, A. D., Sharp, S. J., ... & Wijndaele, K. (2018). Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. *European Journal of Epidemiology*. doi: 10.1007/s10654-018-0380-1
- Penedo, F. J., & Dahn, J. R. (2005). Exercise and well-being: a review of mental and physical health benefits associated with physical activity. *Current opinion in psychiatry, 18*, 189-193. doi: 10.1097/00001504-200503000-00013
- Pierce, S., Gould, D., & Camire, M. (2017). Definition and model of life skills transfer. *International review of sport and exercise psychology, 10*, 186-211. doi:10.1080/1750984x.2016.1199727
- Pitt, L., Kilbride, M., Nothard, S., Welford, M., & Morrison, A. P. (2007). Researching recovery from psychosis: a user-led project. *The Psychiatrist, 31*(2), 55-60. doi: 10.1192/pb.bp.105.008532

SPORT AND FIRST EPISODE PSYCHOSIS

- Ravizza, D. (2008). At play in the fields of young soldiers in Northern Uganda. *Washington Network on Children and Armed Conflict/USAID DCOF*. Retrieved from <http://www.sfcg.org/programmes/childrenandyouth/pdf/ravizza-sport-conflict.pdf>
- Rosenbaum, S., Hobson-Powell, A., Davison, K., Elliot, C., & Ward, P. B. (2017). Role Of Physical Activity In Closing The Life Expectancy Gap of People With Mental Illness (Abstract). *Medicine & Science in Sports & Exercise*, *49*, 842-843.
doi:10.1249/01.mss.0000519266.05834.b1
- Rosenbaum, S., Tiedemann, A., Sherrington, C., Curtis, J., & Ward, P. B. (2014). Physical activity interventions for people with mental illness: a systematic review and meta-analysis. *The Journal of Clinical Psychiatry*, *75*, 964-974. doi: 10.4088/JCP.13r08765
- Rosenbaum, S., Watkins, A., Teasdale, S., Curtis, J., Samaras, K., Kalucy, M., . . . Ward, P. B. (2015). Aerobic exercise capacity: an important correlate of psychosocial function in first episode psychosis. *Acta Psychiatrica Scandinavica*, *131*, 234.
doi:10.1111/acps.12350
- Rubinstein, E. B., & Breitborde, N. J. K. (2016). The Double-Edged Nature of Recovery in First-Episode Psychosis. *Current Psychiatry Reviews*, *12*, 357-365.
doi:10.2174/1573400512666160927143712
- Ruegsegger, G. N., & Booth, F. W. (2017). Health Benefits of Exercise. *Cold Spring Harbor Perspectives in Medicine*. doi:10.1101/cshperspect.a029694
- Seppala, E., Rossomando, T., & Doty, J. R. (2013). Social connection and compassion: important predictors of health and well-being. *Social Research*, *80*, 411-430.
<http://www.jstor.org/stable/24385608>
- Shepherd, G. (2016). Recovery-Related Brief Interventions for Psychosis. In *Brief Interventions for Psychosis* (pp. 139-161). Springer, Cham, Switzerland.

SPORT AND FIRST EPISODE PSYCHOSIS

- Schlosser, D. A., Campellone, T. R., Biagiante, B., Delucchi, K. L., Gard, D. E., Fulford, D., ... & Vinogradov, S. (2015). Modeling the role of negative symptoms in determining social functioning in individuals at clinical high risk of psychosis. *Schizophrenia Research, 169*, 204-208. doi: 10.1016/j.schres.2015.10.036
- Schuch, F. B., Vancampfort, D., Firth, J., Rosenbaum, S., Ward, P. B., Silva, E. S., ... & Fleck, M. P. (2018). Physical activity and incident depression: a meta-analysis of prospective cohort studies. *American Journal of Psychiatry*. doi: 10.1176/appi.ajp.2018.17111194
- Schuch, F. B., Vancampfort, D., Richards, J., Rosenbaum, S., Ward, P. B., & Stubbs, B. (2016). Exercise as a treatment for depression: a meta-analysis adjusting for publication bias. *Journal of Psychiatric Research, 77*, 42-51. doi: 10.1016/j.jpsychires.2016.02.023
- Soundy, A., Freeman, P., Stubbs, B., Probst, M., Coffee, P., & Vancampfort, D. (2014). The transcending benefits of physical activity for individuals with schizophrenia: a systematic review and meta-ethnography. *Psychiatry Research, 220*, 11-19. doi: 10.1016/j.psychres.2014.07.083
- Soundy, A., Freeman, P., Stubbs, B., Probst, M., Roskell, C., & Vancampfort, D. (2015). The Psychosocial Consequences of Sports Participation for Individuals with Severe Mental Illness: A Metasynthesis Review. *Advances in Psychiatry, 2015*. doi: doi.org/10.1155/2015/261642
- Soundy, A., Wampers, M., Probst, M., De Hert, M., Stubbs, B., Vancampfort, D., . . . Ströhle, A. (2013). Physical activity and sedentary behaviour in outpatients with schizophrenia: A systematic review and meta-analysis. *International Journal of Therapy & Rehabilitation, 20*, 588-596.

SPORT AND FIRST EPISODE PSYCHOSIS

- Stephoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, *110*, 5797-5801. doi: 10.1073/pnas.1219686110
- Stubbs, B., Firth, J., Berry, A., Schuch, F. B., Rosenbaum, S., Gaughran, F., ... & Vancampfort, D. (2016a). How much physical activity do people with schizophrenia engage in? A systematic review, comparative meta-analysis and meta-regression. *Schizophrenia Research*, *176*, 431-440. doi: 10.1016/j.schres.2016.05.017
- Stubbs, B., Koyanagi, A., Schuch, F., Firth, J., Rosenbaum, S., Gaughran, F., . . . Vancampfort, D. (2016b). Physical activity levels and psychosis: a mediation analysis of factors influencing physical activity target achievement among 204 186 people across 46 low-and middle-income countries. *Schizophrenia Bulletin*, *43*, 536-545. doi: doi.org/10.1093/schbul/sbw111
- Stubbs, B., Williams, J., Gaughran, F., & Craig, T. (2016c). How sedentary are people with psychosis? A systematic review and meta-analysis. *Schizophrenia Research*, *171*, 103-109. doi: 10.1016/j.schres.2016.01.034
- Tek, C., Kucukgoncu, S., Guloksuz, S., Woods, S. W., Srihari, V. H., & Annamalai, A. (2016). Antipsychotic-induced weight gain in first-episode psychosis patients: a meta-analysis of differential effects of antipsychotic medications. *Early Intervention in Psychiatry*, *10*, 193-202. doi:10.1111/eip.12251
- UN. (2014). UN treaties. Retrieved from <https://www.un.org/sport/content/resources/un-treaties>
- Vass, V., Morrison, A. P., Law, H., Dudley, J., Taylor, P., Bennett, K. M., & Bentall, R. P. (2015). How stigma impacts on people with psychosis: The mediating effect of self-esteem and hopelessness on subjective recovery and psychotic experiences. *Psychiatry Research*, *230*, 487-495. doi:10.1016/j.psychres.2015.09.042

SPORT AND FIRST EPISODE PSYCHOSIS

- Vancampfort, D., Correll, C. U., Galling, B., Probst, M., De Hert, M., Ward, P. B., ... & Stubbs, B. (2016). Diabetes mellitus in people with schizophrenia, bipolar disorder and major depressive disorder: a systematic review and large scale meta-analysis. *World Psychiatry, 15*, 166-174. doi: 10.1002/wps.20309
- Vancampfort, D., Firth, J., Schuch, F. B., Rosenbaum, S., Mugisha, J., Hallgren, M., ... & Carvalho, A. F. (2017a). Sedentary behavior and physical activity levels in people with schizophrenia, bipolar disorder and major depressive disorder: a global systematic review and meta-analysis. *World Psychiatry, 16*, 308-315. doi:10.1002/wps.20458
- Vancampfort, D., Rosenbaum, S., Schuch, F., Ward, P. B., Richards, J., Mugisha, J., ... & Stubbs, B. (2017b). Cardiorespiratory fitness in severe mental illness: a systematic review and meta-analysis. *Sports Medicine, 47*, 343-352. doi: 10.1007/s40279-016-0574-1
- Vancampfort, D., Stubbs, B., Mitchell, A. J., De Hert, M., Wampers, M., Ward, P. B., ... & Correll, C. U. (2015). Risk of metabolic syndrome and its components in people with schizophrenia and related psychotic disorders, bipolar disorder and major depressive disorder: a systematic review and meta-analysis. *World Psychiatry, 14*, 339-347. doi: 10.1002/wps.20252
- Vella, S. A., Swann, C., Allen, M. S., Schweickle, M. J., & Magee, C. A. (2017). Bidirectional Associations between Sport Involvement and Mental Health in Adolescence. *Medicine and Science in Sports and Exercise, 49*, 687-694. doi:10.1249/MSS.0000000000001142
- WHO. (2017). Physical Activity Fact Sheet. Retrieved from <http://www.who.int/mediacentre/factsheets/fs385/en/>

SPORT AND FIRST EPISODE PSYCHOSIS

Ward, M. C., White, D. T., & Druss, B. G. (2015). A meta-review of lifestyle interventions for cardiovascular risk factors in the general medical population: Lessons for individuals with serious mental illness. *The Journal of Clinical Psychiatry*, *76*, e477-486. doi: 10.4088/JCP.13r08657

Wood, L., Byrne, R., Burke, E., Enache, G., & Morrison, A. P. (2017). The impact of stigma on emotional distress and recovery from psychosis: The mediatory role of internalised shame and self-esteem. *Psychiatry Research*, *255*, 94-100.
doi:10.1016/j.psychres.2017.05.016

SPORT AND FIRST EPISODE PSYCHOSIS

Table 1

Methods: Search and Analysis Process

Phase	Description
Review style	<ul style="list-style-type: none"> • Narrative review with a critical approach. • Goal was to review distinct research areas to assess the question: <i>Should sport-based life skills interventions be developed for young people recovering from first episode psychosis?</i>
Search strategy: <i>approach</i>	<ul style="list-style-type: none"> • Deductive approach: psychosis recovery literature was examined through a sport lens, and the sport and life skills literature was examined through a psychosis recovery lens. This approach has its benefits in that it allows undiscovered connections to be explored, yet has limitations (e.g., unsystematic exhaustive search, potential bias in selection and interpretation).
Search strategy: <i>process</i>	<ul style="list-style-type: none"> • Broad search of psychosis recovery literature (focus on recent systematic reviews and meta-analyses/syntheses) using terms such as “psychosis recovery”, “psychosis” and “functional recovery” • Broad search of sport and life skills literature (focus on recent systematic reviews and meta-syntheses), using terms such as “sport” AND “life skills”. • Broad search of general sport components (e.g., definition, reach). • Continually and intuitively narrowed search as overlaps emerged, using the basic components of sport (e.g., physical activity, group/social dynamics, and life skills training) as a foundation for the searches (e.g., “physical activity” OR sport OR exercise AND “psychosis recovery”; “social connectivity” AND “psychosis recovery”).
Data Management	<ul style="list-style-type: none"> • All papers of interest were uploaded to NVivo 11 to allow them to be coded as read.
Theme identification/drawing conclusions	<ul style="list-style-type: none"> • Using the sources as “data”, the phases of thematic analysis (Braun & Clark, 2006) were used to manage and deductively analyse sources and minimise bias (i.e., familiarise oneself with data, search for themes, review themes, define and name themes, produce the report). • Papers were coded as they were read to help identify overlapping themes. • Initial themes were both broad (e.g., psychosis recovery in general, life skills transfer within sport; side effects of antipsychotic medication) and narrow (e.g., physical activity and FEP recovery; sport to break stigma; stigma and FEP recovery) in nature. • Themes that did not support the hypothesis (e.g., potential harm of sport, benefits of individual support for FEP, and barriers to engagement) were included, and are discussed in intervention design recommendations

SPORT AND FIRST EPISODE PSYCHOSIS

Figure 1. Sport- based life skills interventions should be used in first episode psychosis (FEP) recovery. This figure illustrates the underpinnings of the argument presented in the narrative review.