

**The Development, Implementation, and Evaluation of a  
Community-Based Intervention to Increase Levels  
of Physical Activity Among Military Veterans that are Wounded,  
Injured, and/or Sick**

**By**

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## **Abstract**

Military veterans that are wounded, injured, and/or sick (WIS) face significant physical, mental, and social challenges following discharge from their military service; often leading to mental health issues and suicidal ideation. The principal aim of the research reported in this thesis was to develop a better understanding of physical activity behaviour among veterans that are WIS, and provide practical recommendations by which it can be increased, through the development, implementation, and evaluation of a community-based physical activity intervention. To achieve this, the United Kingdom Medical Research Council (UKMRC) Complex Intervention Development and Evaluation Guidance and the Behaviour Change Wheel (BCW) were utilised as guiding frameworks. An evidence base was established related to the likely effects of a physical activity intervention through a systematic review, which identified a number of positive psychosocial effects for the target population. Following the identification of the evidence-base, the BCW was used to inform two separate, yet related studies. Firstly, a qualitative semi-structured interview methodology explored the perceived barriers to, and benefits of physical activity among a sample of veterans that are WIS (N=9). A range of perceived barriers and benefits were identified in this study. In particular, physical capability, psychological capability, physical opportunity, and reflective motivation were prominent barriers to physical activity engagement. The second study was designed to overcome the limitations of the first study by developing and distributing a questionnaire based upon the themes identified in the first, qualitative study, to a larger sample of veterans that are WIS (N= 105). In contrast to the findings of the qualitative study, quantitative statistical analyses revealed that physical activity self-efficacy was the key barrier to physical activity engagement. Based on these findings, a walking group intervention was designed to overcome low physical activity self-efficacy barriers while providing an environment where physical activity self-efficacy could be developed. Unfortunately, despite the researcher's best efforts

in planning and preparation, the intervention did not commence due to the COVID-19 public health crisis. However, the intervention design was evaluated for acceptability and feasibility and found to be highly acceptable among participants who had expressed interest in participating in the walking group intervention (N=10). These findings were compared to a similar acceptability and feasibility evaluation of an existing group-based exercise intervention (N=5) which led to the refinement of the walking group intervention and the development of eight recommendations for future practice and intervention design. The findings stemming from research reported within this thesis provided several novel contributions to knowledge. Most notably, the research is the first to apply the UKMRC guidance and BCW in relation to a physical activity intervention aimed at military veterans that are WIS. In combination with knowledge from the wider literature, research findings reported in this thesis can help inform the design of future physical activity interventions, leading to increased physical activity behaviour among veterans that are WIS.

## Declaration

I declare that the work contained in this thesis is entirely my own. Most of the work has been submitted to academic journals, presented at international conferences, and used for veteran charity policy design. A list of these contributions can be seen below:

### Journal Publications:

**Walker, R.,** Smith, P. M., Limbert, C., & Colclough, M. (2020). The Psychosocial Effects of Physical Activity on Military Veterans That Are Wounded, Injured, and/or Sick: A Narrative Synthesis Systematic Review of Quantitative Evidence. *Military Behavioral Health*, 8(3), 292-307. <https://doi.org/10.1080/21635781.2020.1746445>.

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## Contents

Acknowledgements .....	ii
Abstract.....	iii
Declaration.....	v
Chapter 1 Introduction .....	1
1.1 Purpose of this thesis .....	14
1.1.1 Target population and definition of terms.....	14
1.1.2 Target behaviour .....	16
1.1.3 Intervention development framework.....	16
<i>1.1.3.1 Theories and frameworks used within physical activity behaviour change</i> .....	16
1.1.3.1.1 Social Cognitive Theory and Self-Efficacy Theory .....	17
1.1.3.1.2 Self-Determination Theory .....	18
1.1.3.1.3 The Transtheoretical Model .....	21
1.1.3.1.4 The Theory of Planned Behaviour .....	21
<i>1.1.3.2 Implementation problems and limitations of traditional theories and frameworks of behaviour change</i> .....	22
<i>1.1.3.3 The Behaviour Change Wheel</i> .....	23
1.1.3.3.1 Rationale for the adoption of the Behaviour Change Wheel .....	27
<i>1.1.3.4 The United Kingdom Medical Research Council Complex Intervention Development and Evaluation Guidance</i> .....	29
1.1.4 Novel aspects of the planned research .....	30
1.2 Philosophical assumptions .....	31
1.3 Structure of thesis .....	31
1.3.1 Contents of Chapter Two .....	31
1.3.2 Contents of Chapter Three .....	32
1.3.3 Contents of Chapter Four .....	32
1.3.4 Contents of Chapter Five .....	33
1.3.5 Contents of Chapter Six .....	33
1.3.6 Contents of Chapter Seven.....	34
1.3.7 Contents of Chapter Eight.....	34
1.4 Specific objectives .....	34
Chapter 2 The Psychosocial Effects of Physical Activity on Military Veterans that are Wounded, Injured, and/or Sick: A Narrative Synthesis Systematic Review of Quantitative Evidence.....	36
2.1 Introduction.....	36
2.1.1 Objectives .....	37
2.2 Methods.....	38
2.2.1 Search strategy for relevant literature .....	38
2.2.2 Inclusion/exclusion criteria .....	39

2.2.3 Data extraction/synthesis .....	40
2.2.4 Risk of bias .....	41
2.3 Results.....	53
2.3.1 Narrative Synthesis of Results .....	55
2.3.1.1 <i>Post-traumatic Stress Disorder</i> .....	55
2.3.1.2 <i>Depression, Anxiety, and Stress</i> .....	57
2.3.1.3 <i>Quality of Life</i> .....	58
2.3.1.4 <i>Sleep Quality</i> .....	59
2.3.1.5 <i>Positive / Negative Affect</i> .....	60
2.3.1.6 <i>Perceived functional impairment</i> .....	60
2.3.1.7 <i>Mindfulness</i> .....	61
2.3.1.8 <i>Social Wellbeing</i> .....	61
2.3.1.9 <i>Other Effects</i> .....	62
2.4 Discussion .....	62
2.5 Strengths, limitations and future recommendations.....	66
2.6 Summary .....	69
Chapter 3 Identifying the Perceived Barriers to, and Benefits of Physical Activity Among British Military Veterans that are Physically Wounded, Injured, and/or Sick: A Qualitative Behaviour Change Wheel Perspective.....	71
3.1 Introduction.....	71
3.1.1 Objectives .....	72
3.2 Methodology .....	72
3.2.1 Philosophical assumptions .....	72
3.2.2 Participants.....	73
3.2.3 Interview guide .....	76
3.2.4 Procedure .....	77
3.2.5 Data analysis .....	78
3.2.6 Ethics.....	78
3.3 Results.....	79
3.3.1 Perceived barriers.....	81
3.3.1.1 <i>Psychological Capability</i> .....	81
3.3.1.2 <i>Physical Capability</i> .....	82
3.3.1.3 <i>Physical Opportunity</i> .....	83
3.3.1.4 <i>Social Opportunity</i> .....	86
3.3.1.5 <i>Automatic Motivation</i> .....	87
3.3.1.6 <i>Reflective Motivation</i> .....	87
3.3.2 Perceived benefits .....	89
3.3.2.1 <i>Reflective Motivation</i> .....	89



3.4 Discussion.....	91
3.4.1 Overview of findings .....	91
3.4.2 Behaviour Change Wheel implications.....	93
3.5 Strengths, Limitations and future recommendations .....	94
3.6 Summary .....	96
Chapter 4 Identifying the Perceived Barrier to, and Benefits of Physical Activity Among British Military Veterans that are Physically Wounded, Injured, and/or Sick: Building upon Qualitative Findings Through Survey-Based Research.....	97
4.1 Introduction.....	97
4.1.1 Objectives .....	98
4.2 Methodology .....	99
4.2.1 Participants.....	99
4.2.2 Measurement tools .....	102
4.2.2.1 <i>Perceived barriers to, and benefits of physical activity questionnaire</i> .....	102
4.2.2.2 <i>Physical activity assessment questionnaire</i> .....	104
4.2.3 Data analysis .....	104
4.2.4 Ethics.....	105
4.3 Results.....	106
4.3.1 Comparisons between demographic variables and physical activity levels.....	106
4.4 Discussion.....	112
4.4.1 Perceived barriers to physical activity .....	113
4.4.2 Beliefs about physical capability and physical activity .....	114
4.4.3 Perceived benefits of physical activity.....	114
4.4.4 Behaviour Change Wheel Implications .....	115
4.4.4.1 <i>COM-B analysis</i> .....	115
4.4.4.2 <i>Intervention functions</i> .....	117
4.4.4.2.1 Education .....	117
4.4.4.2.2 Persuasion .....	118
4.4.4.2.3 Incentivisation.....	119
4.5 Strengths, limitations, and future research.....	120
4.6 Summary .....	123
Chapter 5 The Development of a Walking Group Intervention for British Military Veterans that are Wounded, Injured, and/or Sick .....	125
5.1 Introduction.....	125
5.1.1 Objectives .....	125
5.2 Methodology .....	126
5.2.1 Intervention design.....	126
5.2.2 Meeting with key stakeholders associated with the intervention.....	128

5.2.3 Methodology of causal modelling of intervention .....	130
5.3 The intervention: An outdoor walking group for veterans that are WIS and their significant others.....	132
5.3.1 Intervention overview .....	132
5.3.2 Location .....	136
5.3.3 Duration and frequency.....	136
5.3.4 Activities .....	137
5.3.5 Intervention aims.....	137
5.3.6 Intervention functions and Behaviour Change Techniques .....	138
5.3.6.1 Incentivisation .....	140
5.3.6.2 Persuasion.....	141
5.3.6.3 Enablement .....	142
5.3.6.4 Modelling .....	144
5.3.7 Outcome of stakeholder meeting and APEASE criteria assessment.....	145
5.4 Planned evaluation of the pilot walking group intervention .....	146
5.4.1 Evaluation methodology .....	146
5.4.1.1 Target population of intervention .....	147
5.4.1.2 Recruitment .....	147
5.4.2 Quantitative methodology.....	149
5.4.2.1 Participants.....	149
5.4.2.2 Measurements tools.....	150
5.4.2.2.1 Psychological measures .....	150
5.4.2.2.2 Physiological measures .....	151
5.4.2.3 Procedure.....	153
5.4.2.3.1 Psychological measures .....	153
5.4.2.3.2 Physiological measures .....	153
5.4.2.4 Methods of analysis.....	153
5.4.2.4.1 Analysis of psychological data .....	153
5.4.2.4.2 Analysis of physiological data .....	154
5.4.3 Qualitative methodology.....	154
5.4.3.1 Sample.....	154
5.4.3.2 Procedure.....	154
5.4.3.3 Analytical techniques .....	155
5.4.4 Ethics.....	155
5.4.5 Processes of change .....	156
5.4.6 walking group intervention causal model .....	157
5.4.7 Implications of the 2019/20 Coronavirus (COVID-19) public health pandemic .....	159
5.5 Summary .....	161

Chapter 6 Evaluating the Acceptability and Feasibility of Two Physical Activity Interventions for British Military Veterans that are Physically Wounded, Injured, or Sick.....	162
6.1 Introduction.....	162
6.1.1 Objectives .....	165
6.2 Part One – The evaluation of the acceptability and the feasibility of a planned walking group intervention among veterans that are WIS. ....	166
6.2.1 Methodology .....	166
6.2.1.1 <i>Philosophical assumptions</i> .....	166
6.2.1.2 <i>Participants</i> .....	166
6.2.1.3 <i>The walking group intervention</i> .....	169
6.2.1.4 <i>Interview guide</i> .....	169
6.2.1.5 <i>Procedure</i> .....	171
6.2.1.6 <i>Data analysis</i> .....	171
6.2.1.7 <i>Ethics</i> .....	172
6.2.2 Results.....	172
6.2.2.1 <i>Awareness of the walking group</i> .....	172
6.2.2.2 <i>Motives for participating in the walking group (Beliefs about outcomes)</i> .....	173
6.2.2.3 <i>Group walking as an activity for veterans that are WIS</i> .....	175
6.2.2.4 <i>Emphasising the social aspects of walking</i> .....	177
6.2.2.5 <i>Inclusion of significant others</i> .....	177
6.2.2.6 <i>Incentives</i> .....	179
6.2.2.7 <i>Activities</i> .....	180
6.2.2.8 <i>Inter-charity collaboration</i> .....	181
6.2.2.9 <i>Overcoming low physical activity self-efficacy in veterans that are WIS</i> .....	182
6.2.2.10 <i>Feasibility</i> .....	184
6.2.2.11 <i>Other suggestions for changes to the walking group intervention</i> .....	186
6.2.2.12 <i>Participants’ ideal activity</i> .....	187
6.3 Part Two - The evaluation of the acceptability and feasibility of a Help for Heroes led group-based exercise class intervention for veterans that are WIS. ....	188
6.3.1 Methodology .....	188
6.3.1.1 <i>Philosophical assumptions</i> .....	188
6.3.1.2 <i>The group-based exercise class intervention</i> .....	188
6.3.1.3 <i>Participants</i> .....	189
6.3.1.4 <i>Interview guide</i> .....	191
6.3.1.5 <i>Procedure</i> .....	191
6.3.1.6 <i>Data analysis</i> .....	192
6.3.1.7 <i>Ethics</i> .....	192
6.3.2 Results.....	192

6.3.2.1 Awareness of the group-based exercise class intervention.....	192
6.3.2.2 Motives for participating in the exercise class intervention ( <i>Beliefs about outcomes</i> ) .....	193
6.3.2.3 Group-based exercise classes as an activity for veterans that are <i>WIS</i> .....	194
6.3.2.4 Effects of intervention on current levels of physical activity .....	195
6.3.2.5 Inclusion of significant others.....	196
6.3.2.6 Incentives .....	197
6.3.2.7 Inter-charity collaboration .....	199
6.3.2.8 Overcoming low physical activity self-efficacy in veterans that are <i>WIS</i> .....	200
6.3.2.9 Thoughts surrounding the lack of new participants over the last 18-months .....	201
6.3.2.10 Feasibility .....	201
6.3.2.11 Other suggestions for changes to the group-based exercise intervention.....	203
6.3.2.12 Participants' ideal activities .....	204
6.4 Discussion.....	204
6.4.1 Evaluation of intervention acceptability and feasibility.....	204
6.4.2 Overcoming low physical activity self-efficacy in veterans that are <i>WIS</i> .....	210
6.4.3 Participant ideal physical activity .....	211
6.5 Specific recommendations for changes to the planned walking group.....	211
6.6 Limitations, strengths and recommendations for future research .....	214
6.7 Summary .....	217
Chapter 7 Participation in Physical Activity and Support Initiatives for Veterans: The Researcher's Reflections .....	218
7.1 Introduction.....	218
7.1.1 Reflection: Combining Research and Practice through the Researchers' Experiences .....	218
7.1.2 Objectives .....	219
7.2 Methodology .....	220
7.3 Context and reflexivity: My 18-months participating in Veteran Support Groups.....	221
7.4 Reflections .....	224
7.4.1 Reflection One – “Accessing the inaccessible” .....	224
7.4.2 Reflection Two – “I’ll join in next week...” .....	227
7.4.3 Reflection Three – “I’m just not able...” .....	231
7.4.4 Reflection Four – “Nobody wants to hear your moaning...” .....	234
7.4.5 Reflection Five – “I’m always wary around civilians...” .....	236
7.4.6 Reflection Six – “I can’t afford to lose my income” .....	240
7.4.7 Reflection Seven – “I don’t want to use a wheelchair...” .....	243
7.4.8 Reflection eight – “I don’t want to compete in the Invictus Games...” .....	246
7.4.9 Reflection Nine – “What happens to the majority who aren’t selected for Invictus?” .....	249
7.4.10 Reflection Ten – “They’re not a veteran...” .....	252

7.4.11 Reflection Eleven – “They’re our veterans...” .....	255
7.5 Possible directions of future research .....	257
7.6 Summary .....	259
Chapter 8 Implications and Recommendations for Future Practice: Encouraging Physical Activity Behaviour in Veterans that are Wounded, injured, and/or Sick.....	
8.1 Introduction.....	260
8.2 Overview and discussion of findings .....	262
8.3 Recommendations for practice.....	270
8.3.1 Create a physical activity pathway by offering less physically intense activities.....	270
8.3.2 Where possible, use reward-style incentives to promote initial engagement in physical activity.....	273
8.3.3 Inspire and inform by promoting physical activity related stories of veterans that are WIS .....	275
8.3.4 Make physical activity social.....	277
8.3.5 Provide the option for significant others to participate in the physical activity.....	279
8.3.6 Get outdoors and immersed in nature .....	282
8.3.7 Make physical activity inclusive but not always with adaptive equipment .....	283
8.3.8 Seek opportunities to collaborate with other organisations and charities .....	284
8.4 Infographic of recommendations .....	285
8.5 Recommendations for future research .....	287
8.6 Comments on the BCW and physical activity behaviour change .....	289
8.7 Concluding remarks .....	290
References.....	293

## List of Tables

<b>Table 2.1</b> <i>Descriptions of Studies Included Within the Systematic Review</i> .....	42
<b>Table 2.2</b> <i>QualSyst Analysis Results for Studies Included Within the Systematic Review</i> .....	50
<b>Table 3.1</b> <i>Demographic Information of Participants</i> .....	74
<b>Table 3.2</b> <i>COM-B Analysis of Perceived Barrier to Physical Activity Engagement Among Veterans that are WIS</i> .....	79
<b>Table 3.3</b> <i>COM-B Analysis of Perceived Benefits to Physical Activity Among Veterans that are WIS</i> .....	80
<b>Table 4.1</b> <i>Participant Demographic Information</i> .....	99
<b>Table 4.2</b> <i>Selected Perceived Barriers to, and Benefits of Physical Activity Questionnaire Themes</i> .....	102
<b>Table 4.3</b> <i>Differences in Mean (<math>\pm</math>SD) Values of Godin-Shepard Leisure Time Physical Activity Questionnaire Total Scores and Demographic Information</i> .....	106
<b>Table 4.4</b> <i>Factor Loadings of Perceived Barriers to Physical Activity Engagement</i> .....	108
<b>Table 4.5</b> <i>Spearman's Rho Correlation Matrix of Factors and Physical Activity Levels</i> .....	109
<b>Table 4.6</b> <i>Spearman's Rho Correlation Matrix of Perceived Benefits and Physical Activity Levels</i> .....	111
<b>Table 4.7</b> <i>COM-B Analysis of the Perceived Barriers to Physical Activity Engagement Among Veterans that are WIS</i> .....	115
<b>Table 5.1</b> <i>Methods Used in the Development of the Intervention</i> .....	130
<b>Table 5.2</b> <i>Intervention Functions and their Related BCTs That Have Been Incorporated Within the Intervention</i> .....	139

<b>Table 5.3</b> <i>APEASE Criteria Assessment of the Walking Group Intervention</i> .....	145
<b>Table 6.1</b> <i>Demographic Information of Participants of Part One</i> .....	167
<b>Table 6.2</b> <i>Demographic Information of Participants of Part Two</i> .....	189

## List of Figures

<b>Figure 1.1</b> <i>The Quality Parasport Participation Framework</i> .....	08
<b>Figure 2.2</b> <i>Social Cognitive Theory Model of Reciprocal Interactions</i> .....	17
<b>Figure 3.3</b> <i>Self-Determination Theory Continuum</i> .....	20
<b>Figure 1.4</b> <i>The Behaviour Change Wheel with Adapted Theoretical Domains Framework</i> <i>Ring</i> .....	24
<b>Figure 1.5</b> <i>Capability, Opportunity, Motivation – Behaviour (COM-B) Model</i> .....	24
<b>Figure 1.6</b> <i>Matrix of Links Between COM-B and Intervention Functions</i> .....	27
<b>Figure 1.7</b> <i>Key Elements of the Development and Evaluation Process of Complex</i> <i>Interventions</i> .....	30
<b>Figure 2.1</b> <i>Flow Chart of the Screening Process of Studies Included Within the Systematic</i> <i>Review</i> .....	54
<b>Figure 4.1</b> <i>Mean Values of Perceived Benefits of Physical Activity for the Total Sample, Male,</i> <i>Female, Active, and Insufficiently Active Participants</i> .....	110
<b>Figure 5.1</b> <i>Intervention Stakeholder Meeting Activity Sheet</i> .....	129
<b>Figure 5.2</b> <i>Walking Group Study Recruitment Poster</i> .....	147
<b>Figure 5.3</b> <i>Causal Modelling of Walking Group Intervention for Veterans that are WIS</i> .....	157
<b>Figure 7.1</b> <i>The Gibbs Reflective Cycle</i> .....	219
<b>Figure 8.1</b> <i>Infographic of Recommendations for Physical Activity Behaviour Change Among</i> <i>Veterans that are Wounded, Injured, and/or Sick</i> .....	285



# Chapter 1

## Introduction

Since the end of World War I in 1918, the United Kingdom Armed Forces (UKAF) have seen consistent deployment on operations around the world. In fact, in 2014, media sources suggested that the year 2015 would be the first year of peace for Britain in 100 years, following the withdrawal of the UKAF from Afghanistan (Cobain et al., 2014). Sadly, this history of conflict has left many veterans with mental and/or physical health conditions and disabilities. A recent analysis of UKAF and veteran statistics estimated that as many as 67,515 UKAF military personnel and veterans are likely to have suffered mental and/or physical health problems as a result of their service (Williamson et al., 2019), often leading to discharge. Among these discharges, 60% have been attributed to musculoskeletal conditions (Williamson et al., 2019), many of which may have occurred during training (Sharma et al., 2015). This has resulted in a large number of veterans with physical health conditions living within the UK.

Not only may veterans with physical health conditions face significant challenges associated with their physical or mental health, but they may also experience difficulties in transitioning from military life into the civilian world (Ahern et al., 2015). Veterans with poorer physical health may be at an even greater risk of a difficult transition in comparison to their healthy peers (MacLean et al., 2014), perhaps a product of a forced medical discharge from the military (Blackburn, 2017).

Military culture has been considered notably different from its civilian counterpart, drawing the attention of researchers from various fields. Among early studies related to military culture, Soeters (1997) identified *individualism* as lower, and *masculinity* and *power distance* as higher among 13 military cultures. This suggests that military personnel value the needs of the group over the individual, heroism and assertiveness are esteemed, and leaders tend to act in an

autocratic and paternal manner. More recent research has suggested that military and civilian cultures differ in their social, cultural, and symbolic capital (Cooper et al., 2018; Cooper et al., 2017). Comparatively, skills highly revered in military culture that often lead to promotion and advancement, may not translate similar value in the civilian world. For example, the ability to march for miles with heavy equipment is of rare use among most civilian vocations. Transitional challenges may be the result of the *Hysteria Effect*, caused by a loss of cultural and physical capital that a person has accumulated, leading to fear, anxiety, and resistance to change (Cooper et al., 2018).

Veterans may need to navigate many challenges during their transition into the civilian world. Among these challenges, Ahern et al. (2015) identified that veterans may face the loss of their military family, which previously acted as a caretaker and provided structure. In contrast, the unfamiliarity of a new normal, which can be characterised by a lack of support, structure, sense of purpose, and increased feelings of disconnection. Similarly, Blackburn (2017) noted that the military to civilian transition is a particularly stressful and confusing time for veterans that can encompass a range of mental, social, financial, personal, and family related challenges, with social and family support being key coping mechanisms. Unsuccessful transitions into the civilian world can result in exacerbating previous conditions such as mental health disorders and substance misuse, which may result in suicide (Pease et al., 2015).

The accumulation of these physical, mental, and social challenges may, in part, explain the high rates of suicide among the veteran community (Gutierrez et al., 2016), and why veterans with service-related conditions and PTSD or major depression are at an increased risk of premature death due to assault, accident, or suicide (Maynard et al., 2018).

Considering these high rates of suicide and death, it is imperative that interventions and strategies are developed that support veterans, especially those with physical health conditions.

One increasingly used method of increasing holistic wellbeing in veterans with physical health conditions is physical activity (Brittain & Green, 2012). Physical activity for veterans with physical health conditions has rich history that is still prevalent in today's society.

Olympic Games (n.d.) and Brittain and Green (2012) suggested that as early as 1948, in the years following the end of World War II, Sir Ludwig Guttmann, a neurologist at Stoke Mandeville Hospital, England, began organising sporting competitions for World War II veterans with spinal injuries. This would develop into the Paralympic Games, the largest, global sporting competition for people with varied disabilities. In their review of the literature, Brittain and Green (2012) noted that Sir Guttmann believed sport and physical activity held many benefits for those recovering from spinal cord injuries. Maintaining physical activity allowed patients to uphold a high level of physical fitness and often reduced spinal injury complications that can arise from physical inactivity. Notably, those patients who participated in the sporting competitions were less likely to experience a hospital readmission. Apart from the physical, however, Guttmann believed that sport and physical activity held significant psychosocial implications. Guttmann noticed that a large advantage of sport and physical activity was in its recreational value that restores joy and playfulness inherent in human beings that can help develop self-confidence, self-dignity, self-discipline, and competitive spirit; all of which are essential for overcoming the mental health challenges associated with sudden trauma.

More recently, Guttmann's revolutionary ideas have led to a number of sport and physical activity recovery programmes across the globe. Namely, the Battle Back Centre (The Royal British Legion, n.d.) and Tedworth House (Help for Heroes, n.d.- a) in the UK, Canada's Soldier On (n.d.), and the Wounded Warrior Project (n.d.) in America are just some examples of modern day organisations that focus on sport and physical activity-based recovery for veterans with mental or physical health conditions.

Despite this historic application of physical activity in the recovery process of veterans with physical health conditions, research in relation to its effects on this population did not gain traction until the beginning of the 21<sup>st</sup> century, some 60-years following Guttmann's revolutionary idea. Many of the initial enquiries within this field of research utilised qualitative methodology. Among participants of the UK Battle Back Centre, for example, Professor David Carless and his team from Leeds Beckett University began exploring the impact of sport and physical activity on veterans with mental and physical health conditions using a narrative analysis approach (Douglas & Carless, 2015; Carless et al., 2014; Carless, 2014; Carless et al., 2013).

With a focus on the lived experience of individuals, Carless and his colleagues identified a number of positive outcomes associated with sport and physical activity participation at the Battle Back Centre. Realising personal capability despite your injuries, providing an awareness of opportunities that exist to veterans, giving hope, and meeting other veterans with similar experiences were some common outcomes noted in their research (Carless et al., 2014; Carless, 2014; Carless et al, 2013). Even those veterans who may not be particularly willing to participate in sport or physical activity may find that it provides opportunities to speak with others who are going through similar hardships (Douglas & Carless, 2015).

Gradually, the building of a critical mass of research in an international context led to the first systematic review of this area, published by Caddick and Smith (2014). Combining 11 qualitative and quantitative studies, Caddick and Smith (2014) identified that sport and physical activity had three domains of effect on the wellbeing of combat veterans with a mental or physical health condition – *subjective wellbeing*, *psychological wellbeing*, and *motivation*. Subjective wellbeing reflected a person's perceived satisfaction in their lives and the balance of positive and negative emotions. Sport and physical activity had a positive impact on subjective wellbeing through increasing active coping with conditions related to their

disability, decreasing PTSD symptoms, providing positive affectual experiences, and improving quality of life. Whereas, psychological wellbeing considers wellbeing in terms of personal flourishing and the fulfilment of human potential. Sport and physical activity had a number of positive effects on psychological wellbeing and included improving determination and inner strength, providing a focus on ability and broadening horizons, and allowing for cultivating a new positive identity/self-concept. Sport and physical activity also provided outdoor ecotherapeutic opportunities that had a positive effect on both subjective wellbeing and psychological wellbeing as it provided a sense of achievement/accomplishment while also improving social wellbeing. The motivational impact of sport and physical activity included improved motivation for living and improved motivational processes, such as the desire to participate in sport and physical activity.

Although focusing on combat veterans with mental or physical health conditions, rather than specifically veterans with a physical health condition, Caddick and Smith's (2014) review provided the first comprehensive grouping of research in the field of sport and physical activity for veterans with health conditions. Few studies included in the review by Caddick and Smith (2014), however, were interventional and none utilised randomised controlled trial (RCT) design. Although this significantly limited the review due to the biases that may occur in non-RCT research, it provided an overview of the possible effects of physical activity that provided a rationale and direction for future inquiry.

In the years following the Caddick and Smith (2014) review, more interventional research studies were conducted and published, some using an RCT designs. Some focused on veterans with mental health disorders (Lanning et al., 2018; Hall et al., 2018; Reinhardt et al., 2018), leading to a systematic review of the effect of outdoor recreation on PTSD (Greer & Vin-Raviv, 2019). Others focused on obese veterans (Batch et al., 2018; Lutes et al., 2017; Dahn et al.,

2011), while others explored the effect of physical activity among veterans with a physical disability or health condition (Morgan et al., 2019; Townsend et al., 2018; Bennett et al., 2017).

With the increase of more rigorous research in this area, Shirazipour, Tennant, et al., (2019) conducted a scoping review of the psychosocial aspects of physical activity participation for injured and ill military personnel (service members and veterans); separating the findings between qualitative and quantitative methodologies. Shirazipour, Tennant, et al. (2019) identified that qualitative research tended to focus on the outcomes of participation, with outcomes including improved social connection, rebuilding a sense of identity, increased confidence, and increased positive feelings during physical activity. The contextual environment linked to benefits that physical activity might provide, mainly highlighting the importance of nature-based activities and the essentialness of facilitating a social environment. In likeness to the qualitative studies, those with a quantitative methodology predominantly focused on the outcomes of participation; demonstrating positive psychosocial outcomes following physical activity, such as increased confidence, quality of life, positive affect, and social functioning. The results of this review further demonstrated the potential benefits of increasing physical activity behaviour among service personnel and veterans with physical health conditions.

Despite the potential benefits of physical activity for injured or ill service and military personnel, the research as of 2019 held significant limitations that restricted the understanding of the application of physical activity. Shirazipour, Tennant, et al. (2019) outlined six knowledge gaps and limitations in the literature. These included:

- 1) A lack of longitudinal research;
- 2) A lack of understanding of diverse types of physical activity;

- 3) A lack of consideration for the systemic influences of the injury/illness and physical activity experience;
- 4) A lack of understanding of female service personnel and veterans;
- 5) A requirement to increase the diversity of psychosocial outcome measures in research; and
- 6) A lack of consideration of programme implementation.

Due to these limitations, it remained difficult to understand and design an optimal physical activity intervention, warranting additional, rigorous research within this subject area.

Despite the limitations surrounding physical activity research for veterans with physical health conditions, an evidence base was building for its support. In order to further the understanding of physical activity promotion among veterans with health conditions, researchers began to explore the quality experiences of physical activity, specifically focusing upon veterans with a physical disability (Shirazipour, Aiken, et al., 2019, 2018; Shirazipour, Tennant, et al., 2017). To guide this research, Shirazipour and her colleagues adopted the quality Para sport participation framework, and the research upon which it was based (Martin Ginis et al., 2017), to conceptualise quality experience (Evans et al., 2018). The Quality Para sport Participation Framework (see Figure 1.1) provides guidelines that promote quality experiences within disability sport. This framework defines quality experience as:

*“An athlete’s broad subjective evaluation that his or her sport involvement is (or has been) satisfying, enjoyable, and generates personally valued outcomes”*

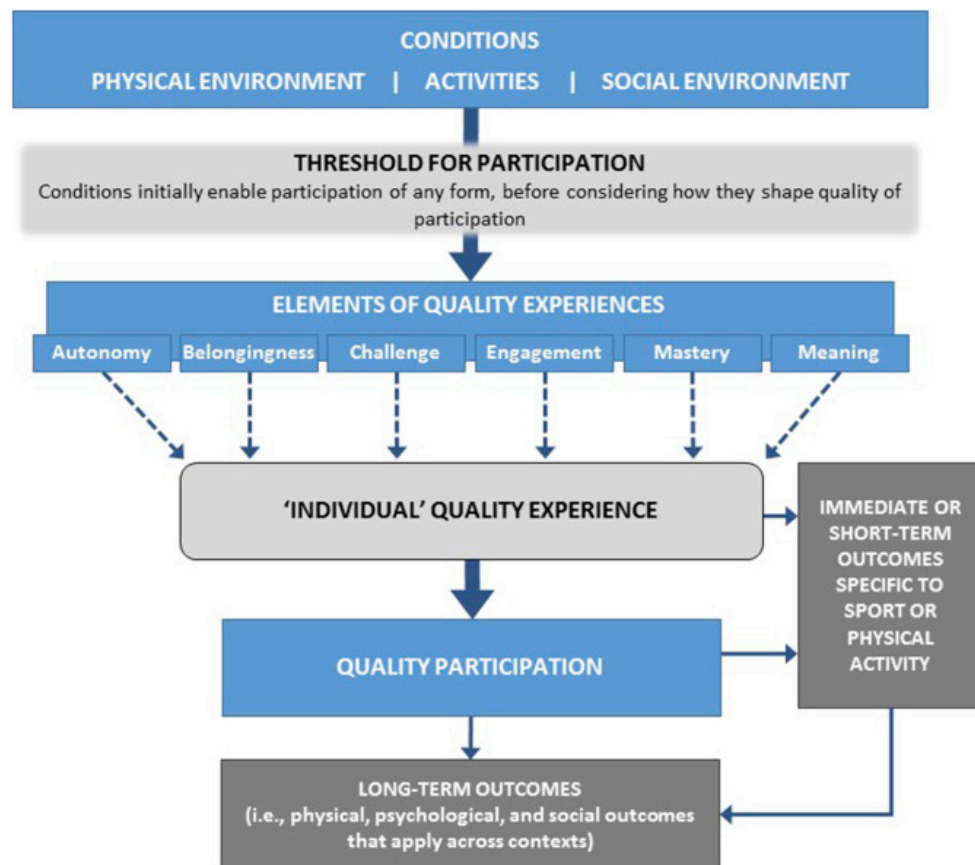
(Evans et al., 2018, pp. 86)

Quality experiences consist of six elements: 1) autonomy; 2) belongingness; 3) challenge; 4) engagement; 5) mastery; and 6) meaning. The framework identifies three conditions that support quality experiences, or that are necessary for access or participation; physical

environment, activities, and social environment. Shirazipour et al. (2017) noted that experiences that athletes have within Para sport are likely to influence whether they enter sport and maintain involvement over time.

Figure 1.1

*The Quality Para Sport Participation Framework*



Prior to the publication of the Quality Para sport Participation Framework, Shirazipour et al. (2017) explored what may constitute quality physical activity among military veterans with a physical disability. Through exploring quality participation, Shirazipour et al. (2017) identified two overarching themes: 1) elements that constituted quality physical activity experiences; and 2) conditions enabling access to quality physical activity experiences. In the first overarching theme, four themes emerged representing an element of quality participation. These were group cohesion, challenge, having a role, and independence and choice. Shirazipour et al. (2017) noted that these link to the six elements of quality experience identified within Martin Ginis et



al. (2017), that would later be incorporated into the Quality Para sport Participation Framework. Namely, group cohesion relating to belongingness, independence and choice to autonomy, having a role associated to belongingness and meaning, and challenge to the mastery, meaning and challenge elements of the framework.

Within the overarching theme of conditions enabling access to quality physical activity, three sub-themes were identified based upon the Quality Para sport Participation Framework; the physical environment, the social environment, and programme structure. The physical environment included accessibility, such as feeling comfortable within the environment and its practicality, and the geography of the environment. Social environment consisted of the role that family and friends play and the attitude of the public towards individual injuries. Whereas, programme structure identified a number of requirements for the coaches or instructors to promote participation and safety, including a good coaching knowledge, being tough on participants, not limiting participants based on disability, and understanding the individual. In addition, more general programme related barriers were identified, such as the climate, ensuring safety, and program and participant resources (*e.g.* financing and accommodation).

Following the identification of conditions and elements of quality participation among veterans with a physical disability, using three separate physical activity programmes, Shirazipour et al. (2018) identified four implementation strategies that may promote quality physical activity experiences: 1) fostering social connections; 2) challenge participants; 3) tailor programme outcomes to match participant needs; and 4) include knowledgeable coaches/instructors. This study highlighted the importance of physical activity programme design in the creation of quality physical activity experiences.

Building upon the qualitative results of Shirazipour et al. (2017), Shirazipour, Aiken, et al. (2019) employed a quantitative methodology to explore the relationships between precursors

to quality physical activity participation, quality elements, and participation outcomes of two physical activity programmes for veterans with a physical disability. Precursors to quality participation included the interpersonal and technical skill of the coaches. For quality elements of participation, the elements of meaning, belongingness, and explored challenges previously identified by Shirazipour et al. (2017). Participation outcomes included moderate to vigorous physical activity behaviour, intentions, planning, and family integration. It was suggested that the quality element of *belongingness* mediated the relationship between coach interpersonal skills and the physical activity indicators of planning and intention post-programme. Belongingness also mediated the relationship between coach interpersonal skills and family integration post-programme, and at a three month follow up. This study was the first to identify linkages between quality programme conditions and elements, stressing the importance of the coaches' interpersonal skills in developing quality experiences and participation outcomes.

Shirazipour et al (2017) provided an initial understanding of conditions and elements of quality physical activity for veterans with a physical disability. However, while the focus of such research focused upon the *quality* of physical activity, there exists a significant gap in the behavioural, or *quantity*, understanding of physical activity for veterans with a physical health condition. This includes the lack of an in-depth analysis of motivational and behavioural factors that encourage or discourage physical activity participation. In fact, this gap is highlighted in the data within Shirazipour, Aiken, et al. (2019) that identified a significant decrease in moderate to vigorous physical activity behaviour between pre and 3-month follow up measures of programmes that sought to increase participant physical activity levels. This suggests that long-term physical activity behaviour decreased among those who participated in these physical activity programmes, highlighting the need for additional behavioural research. While the quality of physical activity programmes is an important research direction, ensuring that the quantity of physical activity is maintained or increased is equally important to ensuring the

positive effects of physical activity can be gained among veterans with physical health condition.

Although the small sample size of Shirazipour, Aiken, et al. (2019) may have resulted in an unrealistic portrayal of physical activity outcomes, researchers stress the importance of adequate pre-intervention research in the development of behaviour change interventions (Michie et al., 2011, 2014). Many interventions may not conduct suitable pre-intervention research. In fact, a systematic review revealed that only 22.5% of guidelines and implementation studies were considered to use theories of behaviour change, with a further 4.3% applying only select constructs (Davies et al., 2010). By implementing a systematic approach to intervention design, which allows for evaluation and theory to be developed, a diagnostic approach can help identify why an intervention may have failed, new knowledge gained, and improvements made to the intervention to ensure that it achieves its desired goals (Michie et al., 2014). To date, however, only a relatively small number of studies have examined the physical activity behaviour of veterans with health conditions.

Buis et al. (2011) identified attitudes towards, preferred types of, and barriers to physical activity among post-operational deployment veterans using questionnaire-based methodology. Amongst their sample, participants recognised that physical activity could reduce stress, have a positive impact on health and, overall, participants perceived it to be important. During active duty, participants predominantly cited running, walking, gym-based exercise, and occupational activities as common physical activity types, of which they performed around two different types per day. However, following deployment, types of physical activity participated in decreased. Although, outdoor-based physical activity was more prominent post-deployment. Participants' favourite activities included running, gym-based exercise, sport, walking, and outdoor physical activity. In terms of barriers to physical activity, 39% reported health

conditions that made physical activity difficult and 52% reported chronic pain that interfered with physical activity.

Littman et al. (2014) examined the barriers to, and facilitators of physical activity among older adult veterans with lower limb loss. In this, Littman et al. (2014) distributed a scale designed for people with lower limb loss to identify barriers and facilitators of physical activity and a self-report measure of physical activity levels. They observed walking or wheeling, prescribed exercise by an occupational therapist, gardening, and yard work as the most common forms of physical activity within their sample. Factors found to correlate positively to physical activity behaviour, included higher socioeconomic status, lower television watching, and a history of frequent vigorous physical activity prior to injury. Similar to findings of Buis et al. (2011) was the fact that pain represented a prominent barrier to physical activity. Resource-related barriers provided another prominent barrier, with financial assistance to join a gym and support from family cited as key facilitators. Not interested in physical activity and low knowledge were negatively associated to physical activity levels.

Using a qualitative approach, Littman et al. (2017) investigated the barriers to, and facilitators of physical activity among veterans with lower limb amputations. Among the interviewees, facilitators included acceptance of limb loss, confidence, creating a daily routine involving physical activity, sufficient resources, supportive others, perceiving physical activity to be beneficial, and a history of physical activity. Barriers, however, included illnesses and injuries, poorly fitting prosthetics, low self-efficacy, insufficient resources, unsupportive others and hassle (*i.e.* inconvenience) of physical activity.

These researchers made important steps in the identification of physical activity behaviour among veterans with health conditions. However, the sample used within their respective studies may be a limiting factor in the increase of physical activity behaviour among veterans

with physical health conditions. For example, not all veterans with physical health conditions are amputees. In fact, lower limb amputees constituted only 370 military personnel discharged between October 2001 and September 2014 (Diehle & Greenberg, 2015), a relatively low number compared to the total medical related discharge of 36,506 between 1991 and 2014 (Williamson et al., 2019). The number of lower limb amputees is also likely to be decreasing along with the UKAF's lack of combat operational activity. The research conducted with veterans with lower limb loss may have limitations in the context of translating and applying knowledge to veterans with physical health conditions other than lower limb loss. It is also worth noting that the work by Buis et al. (2011) did not specifically target veterans with health conditions.

Evaluating physical activity behaviour among UKAF veterans with physical health conditions is a prominent gap in the current literature. Addressing this gap is imperative for two reasons. Firstly, with the decline of combat operations, many veterans with physical health conditions will not experience operational deployment such as the sample of Buis et al. (2011). In fact, musculoskeletal injuries constitute 60% of medical discharges from the UKAF (Williamson et al., 2019), many of which may occur during training (Sharma et al., 2015). Therefore, identifying barriers and facilitators among these individuals is necessary. Secondly, many prominent charities in the UK, such as Help for Heroes (n.d.- b), target their physical activity interventions at veterans with physical health conditions. In order to develop successful behaviour change, Michie et al. (2014, 2011) stressed the importance of population-specific research. Thus, the main aim of the research reported in this thesis was to target the broader population of veterans with a physical health condition.

## **1.1 Purpose of this thesis**

The purpose of the research reported in this thesis is to develop a better understanding of physical activity behaviour among veterans that are WIS, and provide practical recommendations by which it can be increased, through the development, implementation, and evaluation of a community-based physical activity intervention. Funding of the research reported within this thesis was supported by Help for Heroes, a prominent UK charity, who aimed to implement the intervention outlined in this thesis, if pilot investigation proves successful, and use findings to inform their current practice. In addition to their support, the researcher was required to conduct 90-hours of work within Help for Heroes, which consisted of participation within various physical activity interventions for veterans with physical health conditions in the South Wales area.

### **1.1.1 Target population and definition of terms**

Whilst most of the research relating to physical activity and veterans has combined injured and ill serving military personnel and veterans, this thesis will focus on military veterans only, and not those who are still serving. The experiences of veterans and military personnel are likely to differ; particularly in relation to the loss of purpose and difficulties transitioning into the civilian world that a veteran may face post-discharge (Blackburn, 2017; Ahern et al., 2015; MacLean et al., 2014). This may result in greater levels of social isolation and significantly exacerbate mental health problems. Combining findings associated with veterans and serving military personnel would make the drawing of conclusions and recommendations linked to practical applications challenging and less precise.

The intervention designed as a result of this research will focus upon the needs of veterans with physical health conditions. In comparison to those without health conditions, veterans with physical health conditions may face significant challenges relating to their physical and mental

health, that may increase their risk of experiencing a difficult transition to the civilian world (Blackburn, 2017; Ahern et al., 2015; MacLean et al., 2014). Physical activity may help veterans with physical health conditions to develop new identities and cope with their physical conditions (Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014), in addition to gaining more general benefits similar to those without physical health conditions, such as improved mental health (Greer & Vin-Raviv, 2019). Therefore, veterans with a physical health condition may be more vulnerable and may benefit from physical activity participation to a greater extent.

To be clear, the research outlined in this thesis applies the following definitions: using information from the British Ministry of Defence, a veteran is defined as:

*“...anyone who has served for at least one day in Her Majesty’s Armed Forces (Regular or Reserve) or Merchant Mariners who have seen duty on legally defined military operations.”*

(Ministry of Defence, 2017)

The researcher decided to employ the term *veterans that are wounded, injured, and/or sick (WIS)* to describe veterans with physical health conditions. This term has been used in a great deal of research in this area (Thandi et al., 2018) and a veteran that is WIS includes a wide range of physical conditions and disabilities. In this context, a veteran who is WIS is someone who has experienced a significant physical injury and/or illness, which they gained either during or after military service and which influences their daily living.

While this differs slightly from the Help for Heroes definition, which requires injuries or illness to have occurred either during or as a direct result of a veteran’s military service, to enable them to receive support (Help for Heroes, n.d.- b), the researcher considered the time or location of the injury or illness to be irrelevant to the research question. It may also exclude a vulnerable group who may significantly benefit from research findings.

### **1.1.2 Target behaviour**

Both Shirazipour, Tennant, et al. (2019) and Caddick and Smith (2014) noted the diverse range of physical activity and its potential effects on veterans. However, in the context of this thesis, rather than focusing on a specific type of activity, physical activity in its broadest sense was selected as the target behaviour and outcome of the intervention. For the purpose of this thesis, the World Health Organisation's (WHO) definition of physical activity will be used:

*“...any bodily movement produced by skeletal muscles that requires energy expenditure...”*

(WHO, 2019)

Not only will this allow for a wide range of activities to be included under this conceptualisation of physical activity, but align with the practice of Help for Heroes in the South Wales area that constitutes many different physical activities, including surfing, group-based exercise classes, and sport. The analysis of physical activity in a broad sense will, therefore, provide Help for Heroes with practical findings that can help improve and inform their current, varied approaches to community-based physical activity.

### **1.1.3 Intervention development framework**

#### ***1.1.3.1 Theories and frameworks used within physical activity behaviour change***

A plethora of theories of motivation and behaviour change have been developed since the mid-20<sup>th</sup> century. Within physical activity promotion, Social Cognitive Theory and its related Self-Efficacy Theory (Bandura, 1997), Self-Determination Theory (Deci & Ryan, 2012), the Transtheoretical Model (Prochaska & Velicer, 1997), and the Theory of Planned Behaviour (Ajzen, 1991) are among the most frequently applied. Whilst different in their philosophies and approaches, many of these theories have been successfully applied to encourage physical activity behaviour (McAuley & Blissmer, 2000; McEachan et al., 2011; Teixeira et al., 2012).

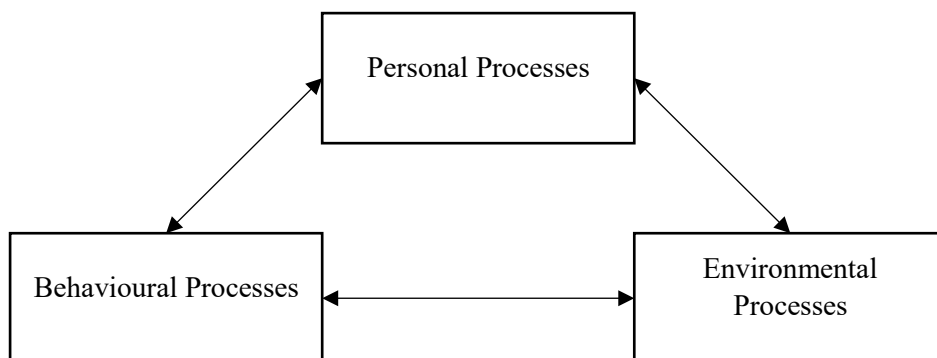


#### 1.1.3.1.1 Social Cognitive Theory and Self-Efficacy Theory

Social Cognitive Theory is psychological perspective on human functioning, originally proposed by Bandura (1991, 1997), that emphasises the role of the social environment on motivation, learning, and self-regulation (Bandura, 1991, 1997; Schunk & DiBenedetto, 2020). It proposes that human functioning depends on three interacting factors; personal, environmental, and behavioural (See Figure 1.2). For example, according to this theory, if a person is told that they are performing a physical activity well (environmental), this may increase their perception of learning progress and increase their self-efficacy (personal), encouraging them to continue engaging in the physical activity (behavioural).

Figure 1.2

*Social Cognitive Theory Model of Reciprocal Interactions*



Self-efficacy is a critical personal factor of determining behaviour, according to Social Cognitive Theory, that reflects the individual's belief that they can successfully perform a behaviour (Schunk & DiBenedetto, 2020; Bandura, 1997). Self-efficacy appraisal is a cognitive process derived from four sources: 1) performance accomplishments; 2) vicarious experiences; 3) forms of social persuasion; and 4) physiological/emotional indexes (Schunk & DiBenedetto, 2020; Bandura, 1997). Performance accomplishments, either personal or the observation of others, is the most reliable source of self-efficacy (Schunk & DiBenedetto, 2020; Bandura, 1997). Successful accomplishments can increase self-efficacy, while unsuccessful

accomplishments lower it. Verbal persuasion, such as verbal encouragement, can increase self-efficacy. Vicarious experiences involve watching an individual successfully performing an action. However, verbal persuasion and vicarious experiences require subsequent success in order to increase self-efficacy. Physiological/emotional indexing (*i.e.* the emotional/physical response to a situation) reflects changing one's beliefs and perceptions about their physiological and/or emotional reactions.

Increased self-efficacy positively effects motivation (Schunk & DiBenedetto, 2020; Bandura, 1997) and has been shown to have a positive and reciprocal relationship in the context of physical activity behaviour (McAuley et al., 2011; McAuley & Blissmer, 2000). Increased physical activity self-efficacy has been noted as a common outcome of physical activity participation among veterans with physical disabilities (Shirazipour, Tennant, et al., 2019), and has been used to promote physical activity among older veterans with PTSD (Hall et al., 2020).

#### **1.1.3.1.2 Self-Determination Theory**

Self-Determination theory (SDT) is a theory of motivation first proposed by Deci and Ryan (1980). It was conceptualised from a humanistic perspective; hence, it is focused upon the fulfilment of needs, self-actualisation, and the realisation of human potential. A key facet of SDT lies in its distinction between intrinsic and extrinsic sources of motivation. Intrinsic motivation reflects engaging in a behaviour for its inherent satisfaction, which is usually accompanied by feelings of joy, excitement, and accomplishment. Extrinsic motivation refers to engaging in a behaviour to obtain an outcome that is separate to the behaviour; thus, the motivation is sourced externally, such as for social approval or to avoid punishment. Self-Determination Theory conceptualises qualitatively different types of extrinsic motivation ranging from external regulation, a more controlled form of motivation, and integrated regulation, a more autonomous form of extrinsic motivation. Extrinsic sources of motivation are thought to regulate or encourage short-term behaviour, but are not as effective in sustaining

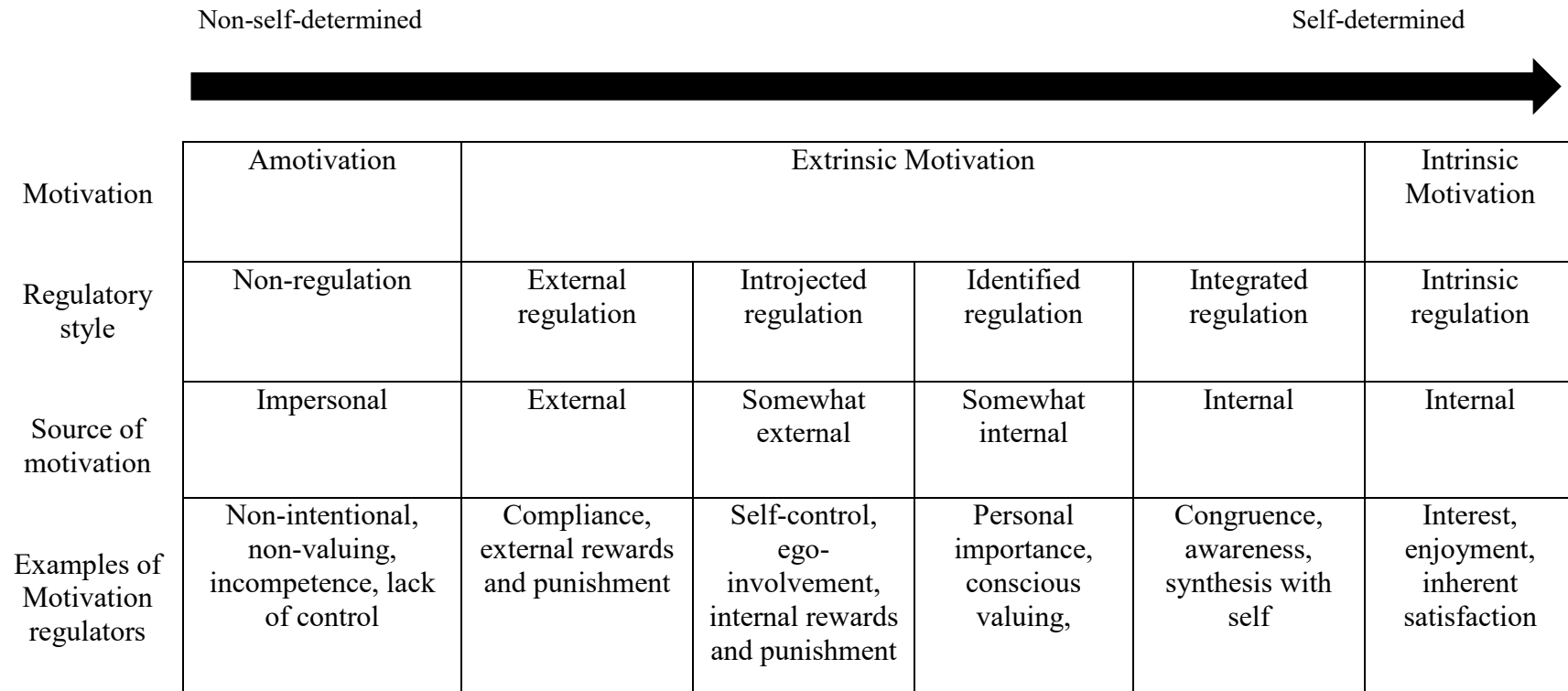
or maintaining the behaviour over time as intrinsic motivation, which has been found to encourage long-term behaviour stemming from one's enjoyment and value of the behaviour. Self-Determination Theory is commonly illustrated as a continuum, ranging from amotivation (*i.e.* an absence of motivation), through extrinsic forms of motivation and finally to intrinsic motivation. This continuum can be seen in Figure 1.3.

Another facet of SDT lies in its conceptualisation of basic psychological needs (Deci & Ryan, 1980). These psychological needs are considered essential nutrients for psychological wellbeing and consist of: 1) *Autonomy*, the feeling that one can act upon their interests of values (*e.g.* choosing what physical activity to participate in); 2) *Relatedness*, perceptions of connecting with others (*e.g.* with other members of a fitness class) and; 3) *Competence*, feelings of competence in challenging tasks (*e.g.* feedback from a coach or instructor). Self-Determination theory posits that the fulfilment of these needs will support the development of intrinsic forms of motivation and progress an individual towards the right of the continuum presented in Figure 1.3.

Self-Determination Theory has been widely applied in physical activity. A systematic review has provided evidence towards the use of SDT in physical activity promotion (Teixeira et al., 2012). In this review, identified regulation was shown to predict short-term/initial participation in physical activity and intrinsic motivation was more predictive of sustained participation; a finding that supports the theoretical perspective of SDT.

Figure 1.3

*Self-Determination Theory Continuum*



#### **1.1.3.1.3 The Transtheoretical Model**

The Transtheoretical Model is a behaviour change model that centres around an individual's readiness for change (Prochaska & Velicer, 1997). It consists of five stages of behaviour change whereby individuals utilise 10 cognitive and behavioural processes to advance to the next stage. The Transtheoretical Model conceptualises movement through the stages as cyclical, rather than linear; hence individuals can progress or regress within the stages whilst intending to change behaviour. The five stages are:

- 1) Precontemplation: No awareness or intention to change behaviour;
- 2) Contemplation: Awareness of a need for behaviour change, but have not yet committed to change;
- 3) Preparation: Beginning to plan to change behaviour and are committed to change;
- 4) Action: Individuals have made an overt change to their behaviour; and
- 5) Maintenance: Maintenance of behaviour change and trying to prevent relapse.

The Transtheoretical Model has been frequently applied to physical activity behaviour change (Kleis et al., 2020), particularly towards the end of the 20<sup>th</sup> century (Marshall & Biddle, 2001). However, contemporary evidence towards its effectiveness within physical activity behaviour is mixed. A recent systematic review of interventions based upon the Transtheoretical Model, whereby participants were encouraged and supported to progress through the stages, reported that six out of 11 randomised controlled trials observing no differences in physical activity behaviour between control and experimental groups (Kleis et al., 2020).

#### **1.1.3.1.4 The Theory of Planned Behaviour**

The Theory of Planned Behaviour (TPB) is a prominent theory within health behaviour change (Ajzen, 1991). The TPB is a social-cognitive paradigm that suggests that attitude (evaluation of a behaviour), subjective norms (perceived social pressure to perform behaviour), and

perceived behavioural control (ability to perform the behaviour) are antecedents to behavioural intention, which subsequently determines behaviour. Meta-analysis has shown support towards the use of the TPB within physical activity behaviour change, with intentions being noted as a key predictor of physical activity behaviour (McEachan et al., 2011).

#### ***1.1.3.2 Implementation problems and limitations of traditional theories and frameworks of behaviour change***

The wide range of available theories and behaviour change models present a challenge to the behavioural researcher. Indeed, decades of evidence that supports many of the prominent theories of motivation and behaviour change do not make selection any easier. Each theory offers unique insight and perspectives related to physical activity behaviour change. However, the question remains as to which theory or model would be most appropriate for the context in which it will be applied. Many theories include similar, overlapping constructs, such as the effect of self-efficacy on motivation being prominent in SCT, SDT, and TPB. Yet, when applied individually, these theories and models do not cover the full range of antecedents and influences of behaviour (Michie et al., 2011). For example, the TPB does not consider the roles of impulsivity, habit, self-control, associative learning, and emotional processing; all of which may be important aspects of changing a target behaviour (Michie et al., 2011). It is for this reason that contemporary researchers stress the importance of basing theory selection upon a comprehensive evaluation of implementation and behavioural problems; a lack of which may risk the inclusion of irrelevant theoretical concepts (Atkins et al., 2017; Cane et al., 2012; Michie et al., 2014). This, unfortunately, does not happen in many cases where researchers design behaviour change strategies using what Michie et al. (2014, pp. 14) described as the strategy of “what seemed like a good idea at the time”.

Another limitation that may be viewed within the application of motivation and behaviour change theories without a comprehensive evaluation of implementation and behavioural

problems is their postulation that intentions, *i.e.* the motivation to enact a behaviour, are a primary antecedent of behaviour. In particular, the Transtheoretical Model and TPB emphasise the role of intentions. Although previous research has identified a strong relationship (.43) between intention and physical activity behaviour (McEachan et al., 2011), meta-analysis has revealed a 46% gap between intentions and actual physical activity (Rhodes and de Bruijn, 2013). This phenomenon has been coined an “intention-behaviour gap”, which suggests that intentions may be poor predictors of behaviour, including that involving physical activity.

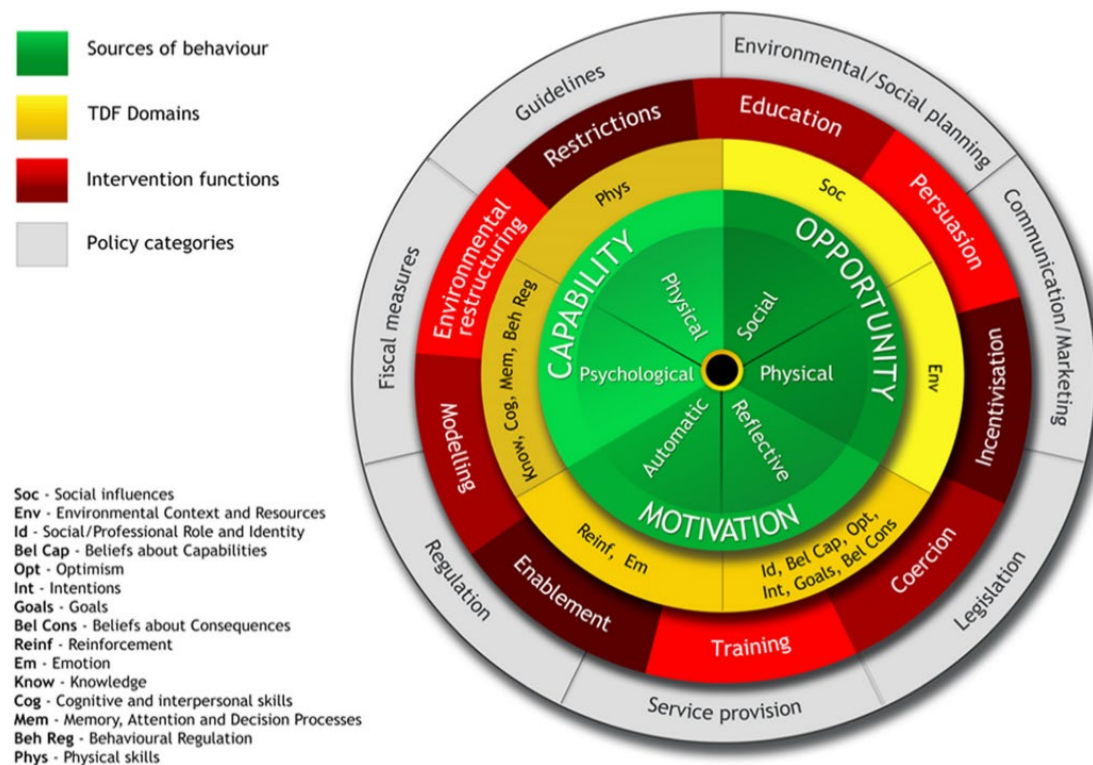
Following systematic review, researchers proposed as many as 38 demographic, environmental, and individual-level moderators of the physical activity intention-behaviour relationship (Rhodes & Dickau, 2013). Thus suggesting that physical activity behaviour has a wide range of potential antecedents that are necessary to consider when attempting to address any intention-behaviour gap.

#### ***1.1.3.3 The Behaviour Change Wheel***

To overcome these challenges surrounding theory selection, the BCW was developed to collate and synthesise the most prominent theories of motivation and behaviour change (Michie et al., 2011, 2014). The BCW provides a tool for assessing behavioural antecedents, appropriate theories, and implementation and behavioural problems; equipping practitioners with a comprehensive means of evaluating the behaviour and developing population and context-specific strategies to promote behaviour change. The BCW and its associated Capability, Opportunity, Motivation – Behaviour (COM-B) model can be seen in Figures 1.4 and 1.5.

Figure 1.4

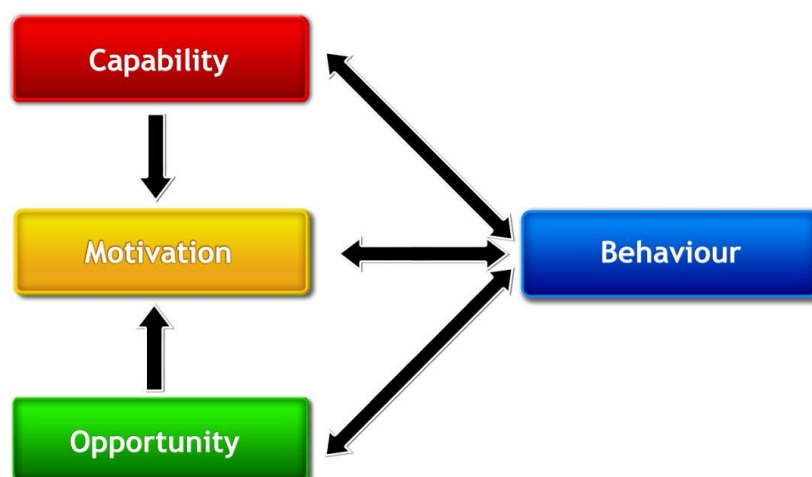
*The Behaviour Change Wheel with Adapted Theoretical Domains Framework Ring*



Note. Reproduced with permission from Michie S, Atkins L, West R. (2014) The Behaviour Change Wheel: A Guide to Designing Interventions. London: Silverback Publishing.  
[www.behaviourchangewheel.com](http://www.behaviourchangewheel.com).

Figure 1.5

*Capability, Opportunity, Motivation – Behaviour (COM-B) Model*



Note. Reproduced with permission from Michie S, Atkins L, West R. (2014) The Behaviour Change Wheel: A Guide to Designing Interventions. London: Silverback Publishing.  
[www.behaviourchangewheel.com](http://www.behaviourchangewheel.com).



Developed using 19 frameworks of behaviour change, which authors identified through systematic review, the model encourages the evaluation of interrelated processes that effect behaviour. As seen in Figure 1.4, within the centre of the BCW lies the COM-B model, which consists of three categories. The first category of ‘Capability’ comprises psychological and physical components. The former refers to the individual’s capability to engage in the thought processes (*e.g.*, reasoning and comprehension) which are necessary for engagement in a specific behaviour. The latter reflects whether an individual is physically capable of engaging in the behaviour. For example, understanding the benefits of physical activity and having the skills to participate in a physical activity reflects psychological and physical capability, respectively. ‘Opportunity’ describes all the external factors that lie outside the individual that prompt or facilitate behaviour, this includes: physical opportunity, *i.e.* the type of opportunity provided by the environment; and social opportunity, *i.e.* the social norms that effect the way we think about things. In a physical activity context, this could include having access to physical activities, such as sport, and the attitude of those around you towards physical activity. Finally, ‘Motivation’ conceptualises brain processes that energize and direct behaviour and is separated into: reflective motivation, involving evaluations and plans; and automatic motivation, concerning emotions and impulses that arise from associated learning or innate dispositions. For example, reflective motivation concerns concepts such as self-efficacy, or one’s belief in their capability to do physical activity; whereas automatic motivation can include emotional responses to physical activity, such as joy or fear. As Figure 1.5 depicts, these categories are interrelated, with capability and opportunity directly effecting motivation; whereas, motivation can only influence capability and opportunity through the behaviour. This suggests that those who have the opportunity and capability to do physical activity, are more likely to participate in physical activity; such as those who have the ability to and access to scenic and safe walking routes, will be more motivated to walk.

The next ring of the BCW, following COM-B, is the Theoretical Domains Framework (TDF) (Cane et al., 2012). A group of health psychologists developed the TDF as a tool for other, non-psychology disciplines to assess behaviour change, to help overcome intervention implementation problems, and to inform intervention development. Originally, the TDF comprised of 12 theoretical domains; however, Cane et al. (2012) later expanded this to 14 domains which were mapped to the components of the COM-B model. The 14 theoretical domains, which are listed in Figure 1.4 (illustrated in the yellow ring), also depict how each category of the TDF relates to the COM-B model. For example, the social influences TDF domain (denoted as “soc” in the BCW illustration) corresponds to the social opportunity aspect of the BCW and COM-B model.

The penultimate ring of the BCW presents a matrix of COM-B components and intervention functions that may be beneficial in order to help identify and overcome behavioural and implementation problems when attempting to implement a behaviour change strategy. For example, education is a suggested intervention function for increasing psychological capability. This matrix is depicted in Figure 1.6, below, where the grey squares denote suggested intervention functions.

Figure 1.6

*Matrix of Links between COM-B and Intervention Functions*

COM-B Components		Intervention								
		Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environmental restructuring	Modelling	Enablement
Capability	Psychological									
	Physical									
Opportunity	Physical									
	Social									
Motivation	Automatic									
	Reflective									

Note. Reproduced with permission from Michie S, Atkins L, West R. (2014) *The Behaviour Change Wheel: A Guide to Designing Interventions*. London: Silverback Publishing.  
[www.behaviourchangewheel.com](http://www.behaviourchangewheel.com).

Finally, the outermost ring denotes policy categories, which can be used to deliver subsequent interventions. For example, service provision, such as providing physical activity services for people with disabilities, can be used to support behaviour change strategies and increase physical activity within this population.

#### 1.1.3.3.1 Rationale for the adoption of the Behaviour Change Wheel

The BCW has seen application in many different areas of health related behaviour change, including reducing sedentary behaviour in the workplace (Munir et al., 2018), audiology (Barker et al., 2016), and physical activity (Seppälä et al., 2018). However, in comparison to

other frameworks and theories, it has seen relatively fewer applications in a physical activity context. Despite this, the BCW provides three advantages over other, more traditional theories of motivation and behaviour change.

Firstly, the model provides a clear structure to support the development and evaluation of behaviour change interventions that has been shown to be successful within physical activity (Munir et al., 2018; Seppälä et al., 2018). As the primary objective of this thesis is to develop and evaluate a pilot physical activity intervention, it provides guidance, not only in the development of the intervention, but in the pre-intervention research, which informs its design and evaluation.

Secondly, 'Help for Heroes', the organisation that is co-funding the research reported in this thesis, aims to apply the research findings to their community-based support centres to promote physical activity among veterans that are WIS. The BCW provides a straightforward method of presenting research findings, purposefully designed to allow communication of complex information to non-academics (Michie et al., 2014). The use of the BCW, therefore, offers a unique method of translating the research findings reported in this thesis to its associated non-academic audience.

Thirdly, the BCW provides a tool to assess the wide range of potential behavioural and implementation problems. In this, it conceptualises the impact of the environment and individual capabilities on behaviour; an outcome of its synthesis of a wide range of theories and models. As Michie et al., (2014) suggested, even if an individual has the motivation to ride a bike, if there is no bike and/or opportunity to learn the skills required to ride it, the person will not be able to ride the bike. These additional antecedents of behaviour change are important considerations, particularly within physical activity among populations with disabilities, such as veterans that are WIS, who may require additional skills and equipment to be able to

participate in physical activity. Furthermore, this comprehensive evaluation of behavioural and implementation problems, as noted above, is key to addressing phenomena such as the intention-behaviour gap.

#### ***1.1.3.4 The United Kingdom Medical Research Council Complex Intervention Development and Evaluation Guidance***

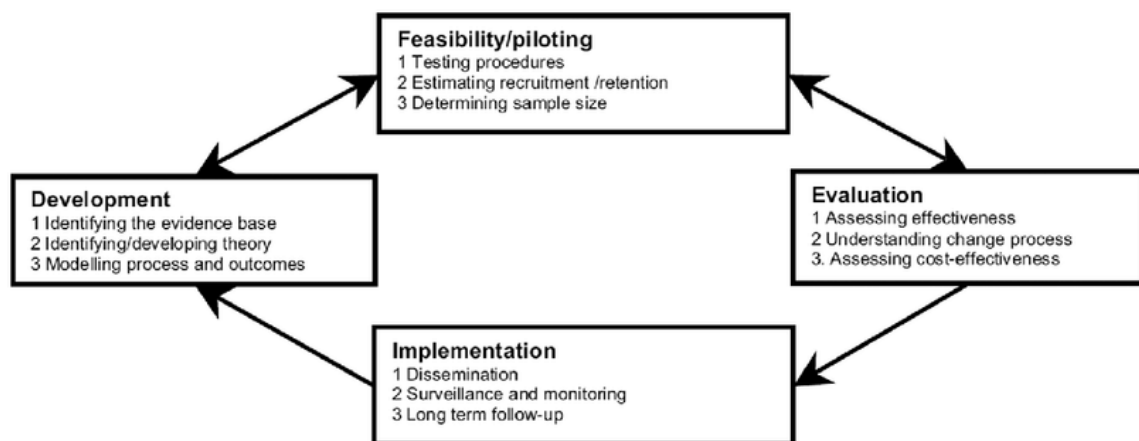
Although the BCW provides a framework related to assessing and eliciting behaviour change, the United Kingdom Medical Research Council (UKMRC) Complex Intervention Development and Evaluation Guidance was selected as a guiding process for the overall development, design, and implementation of the physical activity intervention (O'Cathain et al., 2019; Moore et al., 2015; Craig et al., 2013; Craig et al., 2008; Campbell et al., 2000). The UKMRC suggests that researchers should decide upon an evidence-informed approach to intervention development. In this regard, the UKMRC guidance specifically notes that the Behaviour Change Wheel (BCW; Michie et al., 2014, 2011) as a complementary framework. Thus, the BCW and UKMRC guidance are used in conjunction throughout the research conducted in this thesis.

The UKMRC guidance suggests that healthcare interventions are often complex in nature (O'Cathain et al., 2019). This is certainly true in the case of physical activity and veterans that are WIS where a number of interacting components and behaviours need to be considered in the development of an intervention. Namely, the complex interaction between physical, mental, and social conditions that will likely exist among the veteran participants of the intervention. To aid practitioners in the development and implementation of complex interventions, the United Kingdom Medical Research Council (UKMRC) created a guiding framework that has been widely applied and cited (O'Cathain et al., 2019; Moore et al., 2015; Craig et al., 2013; Craig et al., 2008; Campbell et al., 2000).

According to this framework, complex intervention development and evaluation requires a number of considerations. Four key elements of this guidance consist of the *development*, *feasibility/piloting*, *evaluation*, and *implementation*. As seen in Figure 1.7, the process of development and evaluation of complex interventions is not linear, with the development, feasibility/piloting, and evaluation elements informing one another before the implementation of the intervention. For the purpose of the research reported in this thesis, the development, feasibility/piloting, and evaluation will comprise the focus of the research, using a theoretical and evidence-based approach (O'Cathain et al., 2019).

Figure 1.7

*Key Elements of the Development and Evaluation Process of Complex Interventions*



*Note.* Reproduced from Craig et al. (2013).

#### 1.1.4 Novel aspects of the planned research

The research reported in this thesis is the first to apply the BCW to the development of a physical activity intervention specifically designed for veterans that are WIS. This provides a novel contribution to knowledge focused upon the application of the BCW in a unique culture of military veterans, which differs considerably compared with a civilian culture (Cooper et

al., 2017; Cooper et al., 2018). In addition to adding to the general evidence base surrounding physical activity and the BCW, the research reported in this thesis provides a unique insight into the physical activity behaviour of veterans that are WIS and the implications for behaviour change and intervention development.

## **1.2 Philosophical assumptions**

The research reported in this thesis is based in critical realism. Sullivan (2019) describes a critical realism approach as not entirely objective, but can produce forms of knowledge that are more accurate than others. To some extent, one can compare knowledge to the actual likeness of the world; however, research in itself is a subjective process and always conducted in a unique social and cultural context (Sullivan, 2019). This means that the researcher accepts subjectivity as an inevitable part of the research process. The researcher considers this to be of particular importance as his experiences of military service are likely to impact upon the research. In this view, Sullivan (2019) suggested that it is important for the researcher to be ‘reflexive’ – requiring the researcher to reflect upon how their own attitudes, views, and experiences, which themselves may influence and impact upon the interpretation of research.

## **1.3 Structure of thesis**

Four key elements of complex intervention design are underpinned by three considerations (See Figure 1.7). This thesis will consist of eight chapters that aim to address these considerations in the development and feasibility/piloting processes.

### **1.3.1 Contents of Chapter Two**

Research reported in Chapter Two outlines a systematic review of the available evidence relating to physical activity interventions for veterans that are WIS. Outcomes of physical activity interventions and comparisons of types of physical activity will be analysed to inform

the intervention's design. This chapter will primarily focus on identifying the evidence base surrounding physical activity interventions for veterans that are WIS, as suggested in the development of complex interventions (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008; Campbell et al., 2000).

### **1.3.2 Contents of Chapter Three**

Continuing a focus on the intervention's development, research reported in Chapter Three outlines a study which was designed to identify the perceived barriers to, and benefits of physical activity among veterans that are WIS using qualitative methods. The Behaviour Change Wheel (BCW) has been selected as the guiding theory to underpin the research conducted throughout this thesis and will be used to interpret the physical activity behaviour of veterans that are WIS and make recommendations for intervention design. The rationale and application of the BCW will be discussed further in Chapter Three. This chapter centres on identifying/developing theory related to the target behaviour of the intervention.

### **1.3.3 Contents of Chapter Four**

Building upon research reported in Chapter Three, data identified through qualitative methods will be developed into a questionnaire and distributed to a larger sample of veterans that are WIS alongside a self-report measure of physical activity behaviour. Using quantitative analysis, key perceived barriers to, and benefits of physical activity will be identified, and data analysed using the BCW. This chapter will finalise the identification and development of theory surrounding the target behaviour of the intervention.



### **1.3.4 Contents of Chapter Five**

Chapter Five reports on the design of the pilot physical activity intervention based upon the research reported in Chapters Two, Three and Four in conjunction with an informal focus group consisting of key stakeholders of the physical activity intervention and individuals experienced in this area. Causal modelling will be conducted to provide information related to the design and evaluation of the intervention, as suggested by the UKMRC (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008; Campbell et al., 2000). This will allow for an evidence-informed, pragmatic physical activity intervention to be developed.

### **1.3.5 Contents of Chapter Six**

Following the completion of the intervention's development, the evaluation and feasibility of the pilot intervention using a mixture of qualitative and quantitative methodologies was planned to be reported in this chapter. As suggested by the UKMRC (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008; Campbell et al., 2000), testing procedures, estimated recruitment/retention, and determining adequate sample size for a larger scale intervention were to be considered in this chapter. However, due to the COVID-19 public health crisis, the research reported in this chapter required the researcher to modify the original plans. Conducting the intervention itself was not possible due to social distancing rules forming a major part of the methods of control of the pandemic. Thus, the subsequent evaluation of the feasibility of the pilot intervention was not possible. Therefore, to create further knowledge that ensure the needs of stakeholders of this thesis's needs are met, an evaluation of the feasibility and acceptability of an existing and proposed intervention was completed. Evaluating interventions for their acceptability and feasibility are key components of successful complex intervention development (O'Cathain et al., 2019). Using the findings from two separate physical activity interventions for veterans that are WIS, the researcher will identify

general aspects of acceptability and feasibility and make recommendations for the intervention developed as part of the research outlined in this thesis.

### **1.3.6 Contents of Chapter Seven**

Chapter Seven consists of a reflective report that considers the researcher's experiences of working with this project's supporting organisation, Help for Heroes, in community-based physical activity interventions for veterans that are WIS. This chapter will help make sense of the complex situation of veterans that are WIS and physical activity behaviour and allow the researcher's practical experiences to add to the understanding of research conducted throughout this thesis. It will also allow the researcher to reflect upon his own learning, experiences, and impact upon results that will promote the researcher's personal development.

### **1.3.7 Contents of Chapter Eight**

The final chapter summarises the outcomes of the research reported in this thesis. In addition to suggestions relating to the direction of future research, the researcher has identified clear recommendations linked to the design, development and implementation of physical activity interventions for veterans that are WIS.

## **1.4 Specific objectives**

This research reported in this thesis had five objectives that were to:

- 1) Consolidate and evaluate the current evidence surrounding the effects of physical activity on veterans that are WIS using a systematic review of the literature, and where possible, compare activity types;

- 2) Use a mixed methodology and BCW approach to identify perceived barriers to, and benefits of physical activity among veterans that are WIS, specifically among those with low current levels of physical activity;
- 3) Employ findings outlined within this thesis, and the wider literature, to develop a physical activity intervention that aims to increase physical activity levels among veterans that are WIS;
- 4) Evaluate the intervention developed and a separate Help for Heroes led exercise intervention for acceptability and feasibility using a qualitative methodology to provide recommendations for improvements to the developed intervention and general considerations for the acceptability and feasibility of physical activity interventions for veterans that are WIS;
- 5) Consolidate research findings from this thesis and provide general recommendations that practitioners can apply to their current and future practice.

## **Chapter 2**

# **The Psychosocial Effects of Physical Activity on Military Veterans that are Wounded, Injured, and/or Sick: A Narrative Synthesis Systematic Review of Quantitative Evidence.**

### **2.1 Introduction**

The United Kingdom Medical Research Council (UKMRC) guidelines for developing and evaluating complex interventions states that a substantial evaluation of the current evidence base must be conducted so that the desired result of the intervention can be expected (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008). Systematic and scoping reviews have shown that physical activity can have a number of psychosocial benefits for veterans/service personnel (Shirazipour, Tennant, et al., 2019; Greer and Vin-Raviv, 2019; Caddick and Smith, 2014). However, their combination of qualitative, cross-sectional, and interventional research is a limiting factor when applied in a physical activity intervention context. In fact, Caddick and Smith (2014) did not include any randomised controlled trial (RCT) research in their review. Subjective experience of the individual has been used effectively to inform and improve physical activity initiatives in the United Kingdom (Douglas & Carless, 2015; Carless et al., 2014; Carless, 2014; Carless et al., 2013). However, collating and comparing quantitative, interventional studies would provide a more objective understanding of the psychological and social effects of physical activity.

Moreover, the population and types of physical activity evaluated by existing reviews within this research area differ (Shirazipour, Tennant, et al., 2019; Greer and Vin-Raviv, 2019; Caddick and Smith, 2014). For example, Shirazipour, Tennant, et al. (2019) targeted veterans/service personnel with physical health conditions and a range of physical activity types; whereas, Greer and Vin-Raviv (2019) included veterans with PTSD and focused solely upon outdoor recreation. These differences may limit the application to the target population

and behaviour of the intervention that will be designed as part of the research reported in this thesis; that is, veterans that are wounded, injured, and sick (WIS) (see Chapter One, section 1.1.1 for definitions). It is therefore necessary for the relevant evidence to be collated and reviewed.

As outlined in Chapter One, section 1.1.2, a broad definition of physical activity was adopted for the target behaviour of the research reported in this thesis. Not only does this allow for the inclusion of a wide range of physical activities but will allow the comparison of activity types in the evaluation of the current evidence base; overcoming the *lack of knowledge of diverse types of physical activity* knowledge gap identified by Shirazipour, Tennant, et al. (2019). The researcher considered overcoming this knowledge gap an important aspect of developing and implementing an optimal physical activity intervention.

It is clear that no systematic reviews to date have focused upon the collection and comparison of the results of physical activity interventional research among veterans that are WIS. To overcome this gap in the literature, this chapter reports on a systematic review that compared RCT, quasi-experimental, and among participant interventional research, identifying the psychosocial effects of these physical activity interventions on veterans that are WIS, and where possible compared physical activity types. However, due to the limited amount of published work associated with military veterans, the scope of the review was expanded to include reports on veterans with mental illness.

### **2.1.1 Objectives**

This review had three objectives:

- 1) Collate and evaluate results of RCT, quasi-experimental, and among participant interventional research surrounding physical activity and veterans that are WIS or are experiencing mental health conditions;
- 2) Compare interventional studies and analyse and report the psychosocial effects of physical activity interventions on veterans that are WIS using a narrative synthesis approach; and
- 3) Where possible, compare and contrast outcomes between different types of physical activity used in the interventional studies.

## **2.2 Methods**

### **2.2.1 Search strategy for relevant literature**

Key databases were searched including Google Scholar, PubMed, SPORTDiscus, psycINFO, psycARTICLES, Scopus, Medline, and Summon. These databases are similar to those used in other systematic reviews within this area (Greer & Vin-Raviv, 2019; Caddick & Smith, 2014). This ensured that prominent databases that focus upon psychology, sport, exercise, and medicine-related research were considered within the review process. The primary search strategy was conducted using the following search strings:

- String 1: ‘Wounded OR Injured OR Sick OR Ill AND Veteran\* OR Military OR Soldier\*
- String 2: AND Physical Activity OR Exercise OR Sport OR Outward Bound
- String 3: AND Intervention OR Programme\*

String one was used to identify research relating to the population which this review was aimed at. However, due to a lack of studies, which included veterans that are physically WIS, search terms and inclusion criteria was broadened to include military veterans with mental illness.

Mental health conditions, such as PTSD and depression, are a common outcome of injury and military service (Fulton et al., 2015; Pease et al., 2015; Williamson et al., 2019); thus, it is likely that veterans that are WIS may be experiencing a mental illness.

Mental Health Wales defines “Serious Mental Illness” as:

*“diagnoses which typically involve psychosis (losing touch with reality or experiencing delusions) or high levels of care, and which may require hospital treatment”*

(Mental Health Wales, n.d.)

However, as the intervention that will be developed as part the of the research reported in this thesis will not be able to provide the appropriate support for veterans who have mental health conditions that cause them to experience psychosis or that require high levels of care, studies that focused on these individuals were excluded from the review.

String two ensured that research was within the context of physical activity and included a wide range of activity types. String three narrowed the search to articles in the field of physical activity interventional studies.

Depending on the database used, these terms were either searched in full, or reduced if the database did not have a sufficiently large number of articles. This primary search was supplemented by hand searching, citation searching, and contacting lead authors in the field to identify studies that may not have been published at the time of this systematic review.

### **2.2.2 Inclusion/exclusion criteria**

Inclusion criteria included:

- Studies whose sample included veterans that are WIS, as defined above, or those experiencing mental illness;

- Studies that focused their analysis upon the psychological and/or social effects of physical activity;
- Studies where clear pre/post intervention comparisons were considered and reported;
- Studies that were conducted on western military participants, *e.g.*, Australia, America; United Kingdom, in order to avoid cross-cultural factors impacting analysis; and
- Studies that utilised a quantitative approach to data collection.

Exclusion criteria included:

- Studies that focused upon veterans with mental health conditions that caused them to experience psychosis or require high levels of care and ;
- Studies that included non-military/veteran personnel in their sample, and;
- Studies that were not published in English.

### **2.2.3 Data extraction/synthesis**

Data from the studies, which met the inclusion criteria of the review, were extracted and tabulated according to the following characteristics: 1) Author and date; 2) Country of origin; 3) Study design; 4) Study sample; 5) Type of physical activity intervention; 6) Types of measures; 7) Measurement tools utilised; and 8) Outcomes. Summary details for all publications included within this systematic review are provided in Table 2.1.

Due to the various types of interventions, measures, and measurement tools, statistical analysis was deemed inappropriate for this review. Therefore, data was considered and synthesised through a narrative lens. Following tabulation, data was categorised into types of outcome measures, such as post-traumatic stress disorder (PTSD) and quality of life (QoL), and then compared with other interventions. Textual descriptions of these comparisons can be found under the relevant subheading in the results section.



#### **2.2.4 Risk of bias**

Each study included in this review was assessed using the QualSyst tool for quantitative studies (Kmet et al., 2004). QualSyst uses 14 questions, each of which is answered with either a 'yes' (2 points), 'partial' (1 point), or 'no' (0 points). The total score was then divided by the total possible score of 28 for a quality score. For example, a study which scored 14 points would be given a score of 0.5 ( $14/28 = 0.5$ ). However, as the use of summary scores, such as this, has been widely criticised (Colle et al., 2002; Jüni et al., 1999) and is not recommended by the Cochrane Handbook (Higgins & Green, 2011), the 14 questions are reported as standalone scores and summary scores were not calculated and compared, instead the individual question scores have been colour coded to make interpretation easier.

The QualSyst tool was selected due to its ability to assess quantitative studies of various design, including randomised controlled trial (RCT), quasi-experimental, and among participants designs. The QualSyst tool has been applied to systematic reviews in many areas of research including medical research (Dhooria et al., 2016) and psychology (Chastin et al., 2015). Results of the QualSyst analysis are presented in Table 2.2.

Table 2.1

*Descriptions of Studies Included Within the Systematic Review*

	Author and date	Country of origin	Study length and design	Sample	Physical activity intervention	Measures	Measurement tools	Outcomes
1	Bennett et al., (2014)	USA	5-day pre/post quasi-experimental	34 veterans with PTSD or injury and their significant others.	5-day outdoor recreation and sport combined with couples' therapy for veterans and their significant others.	Relationship with significant other, PTSD, PTG	Revised dyadic adjustment scale (RDAS), Post-traumatic stress checklist - civilian/military (PCL - C/M), Post-traumatic growth inventory (PTGI)	Significant post-intervention decrease in PTSD symptom in both experimental groups. Significant increase in dyadic relationship scores in experimental group B. PTG did not significantly differ in either of the experimental groups following the intervention.
2	Bennett et al., (2017)	USA	13-week longitudinal among participants	40 veterans with combat related disabilities	4-day therapeutic fly-fishing programme	PTSD, depression, perceived stress, functional impairment, self-determination, and leisure satisfaction	the Posttraumatic Stress Disorder Checklist Military (PCLM), Patient Health Questionnaire-9 (PHQ-9), Perceived Stress Scale (PSS), Walter Reed Functional Impairment Scale (WRFIS), Basic Needs Satisfaction in Life Scale (BNSLS), the Leisure Satisfaction Scale (LSS)	Significant post-intervention improvements in PTSD, depression, perceived stress, and functional impairment. However, none of these measures were statistically significant at a 3-month follow up. Conversely, leisure satisfaction was found to be significantly greater at a 3 month follow up compared to baseline, but not significantly greater post-intervention. Basic needs satisfaction did not differ at any of the three time points.

3	Cushing et al., (2018)	USA	6-week pre/post among participants	18 veterans with PTSD	1-hour weekly yoga sessions for 6 weeks.	PTSD, sleep quality, mindfulness, anxiety; depression	PTSD Checklist-Military version (PCL-M), Patient Health Questionnaire (PHQ-8), Beck Anxiety Inventory (BAI), Pittsburgh Sleep Quality Index (PSQI), Mindful Attention Awareness Scale (MAAS)	Large significant post-intervention improvements in PTSD, sleep quality, depression, anxiety, and mindfulness.
4	Duvall & Kaplan (2014)	USA	4-week longitudinal among participant	98 veterans with mental ill-health and/or substance abuse disorder	4-7-day residential outdoor activity intervention.	Perceived stress, attentional functioning, positive and negative affect, tranquillity, social functioning, life outlook.	4-item version of the Perceived Stress Scale, modified version of the Attentional Functioning Index, adapted items from the Positive and Negative Affect Schedule, a 3-item modified version of the UCLA Loneliness Scale, 3-item modified version of the Social Connectedness Scale, 9-item	Significant post-intervention improvements in attentional functioning, positive affect, negative affect, tranquillity, social functioning, and life outlook, but perceived stress did not significantly differ. Significant improvements at 1-month follow up measures compared to post-intervention scores in positive affect, but not for any of the other measures. Further analysis revealed participants with more frequent everyday health issues benefited from the intervention to a greater extent than those with

							measure of life outlook adapted from the State Hope Scale and the Seeking of Noetic Goals Test	less frequent everyday health issue in all of the measures.
5	Gehrke et al., (2018)	USA	8-week pre/post among participant	17 veterans with PTSD	8 weekly 3 hour equine therapy sessions. The programme focused on PTSD specific issues and building connection and trust with their horses while increasing self-confidence.	positive and negative affect	Positive and Negative Affect Scale (PANAS)	Significant post-intervention improvement in positive/negative affect.
6	Goldstein et al., (2018)	USA	12-week pre/post RCT	47 veterans with PTSD	12-week 3 x 1 hour per week exercise sessions, including aerobic exercise, strength training, and yoga, integrated with principles of Mindfulness Based Stress Reduction (MBSR).	PTSD symptoms, QoL, leisure time, feasibility, and acceptability.	Clinician-Administered PTSD Scale (CAPS), World Health Organization Quality of Life (WHOQOL-BREF), Feasibility and Acceptability Questionnaire, Godin Leisure-Time Exercise Questionnaire	Significant post-intervention improvements in PTSD, mental components of QoL, and leisure time in the experimental group compared to a waitlist control. Yet, no significant difference in physical components of QoL.
7	Johnston et al., (2015)	USA	10-week pre/post among participant with benchmarked control comparison	12 active duty and veterans with PTSD	90-minute twice weekly for 10 weeks yoga intervention	PTSD, resilience, mindfulness	The Clinician Administered PTSD Scale (CAPS) for the DSM-IV, Resilience Scale	Significant post-intervention reduction in PTSD scores, but not for resilience and mindfulness. Following benchmarking results, the treatment effect of the

							(RS). Five-Facet Mindfulness Questionnaire (FFMQ)	intervention was lower than the benchmarked treatment effect but significantly higher than the benchmarked control condition.
8	Lanning et al., (2017)	USA	4-month longitudinal among participants with additional qualitative analysis	51 veterans and active duty service members	90-minute therapeutic horse-riding sessions once per week for 8 weeks designed specifically for veterans. The participants learned basic horse care and riding skills along with communication skill	PTSD, QoL, Self-reported physical and psychological functioning	Post-traumatic Stress Disorder Checklist Military (PCL-M); PCL-5; SF-36v2 Quality of Life Assessment; World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0)	Large to medium decreases in PTSD symptoms at mid, post, and 2 months following the intervention. Small differences in physical components of QoL at mid, post, and 2-months post intervention; whereas, medium to large improvements in mental components of QoL were observed at all three time points. Small increase of physical functioning at mid-intervention, but was not sustained post and 2-months post-intervention.
9	Lanning et al., (2018)	USA	4-month longitudinal quasiexperimental with among participant follow-up measure	89 veterans with PTSD	8-week therapeutic riding intervention	PTSD, depression, QoL, physical functioning	PTSD Checklist Military (PCLM-M), PTSD Checklist-5 (PCL-5), Short Form-36 question version 2 Quality of Life Assessment (SF36v2), World Health Organization Disability Assessment Schedule 2.0 (WHODAS- 2.0), Major Depression Inventory (MDI)	Small differences in PTSD, depression, QoL, and physical functioning between experimental group and non-randomised control group mid-intervention. Medium post-intervention improvements in mental components of QoL, PTSD, and depression in comparison to the control group, but small differences in all other measures. Small differences among participants in all measures between post-intervention and a 2-month follow up.

10	Lundberg et al., (2011)	USA	5-day pre/post among participant	18 WIS veterans	5 day adapted sport and recreation retreat for veterans and their significant others	QoL, Mood-state, and perceived competence	World Health Organization's Quality of Life Assessment (WHOQOL), Profile of Mood States-Brief (POMS-B), a four-item modified version of the Perceived Competence Scale (PCS).	Significant post-intervention effect on QoL, with only the mental components subscale being significant, mood state, and perceived competence.
11	McCarthy et al., (2017)	Australia	8-week pre/post among participant	30 veterans with PTSD	8 weekly 90 minute yoga intervention	PTSD, Depression, anxiety, stress, sleep quality, sensory profile, QoL.	PTSD checklist (PCL), the Depression, Anxiety and Stress Scale (DASS), the Pittsburgh Sleep Quality Index (PSQI), the Adult/Adolescent Sensory Profile, the SF36 Quality of Life assessment	Significant post-intervention improvements in PTSD, depression, anxiety, stress, sleep quality, and QoL. Significant post-intervention decreases in all sensory profile subscales bar sensation seeking.
12	Mehling et al., (2018)	USA	12-week pre/post RCT	47 veterans with PTSD	12-week 3 x 1 hour per week exercise sessions, including aerobic exercise, strength training, and yoga, integrated with principles of Mindfulness Based Stress Reduction (MBSR).	Mindfulness, interoceptive awareness, positive state of mind	39-item Five Facet Mindfulness Questionnaire (FFMQ), Multidimensional Assessment of Interoceptive Awareness (MAIA), Positive	Elements of mindfulness, interoceptive awareness and positive state of mind significantly improved in the experimental group compared to a waitlist control group.

							States of Mind Scale (PSOM),	
13	Morgan et al., (2019)	UK	10-14-day pre/post among participant, with additional qualitative analysis	10 WIS veterans	10-14 day scuba diving intervention offering WIS veterans the opportunity to progress through accredited diving qualifications.	Psychological components of ill-health	General Health Questionnaire-28 (GHQ-28)	No significant post-intervention difference in GHQ-28 scores.
14	Reinhardt et al., (2018)	USA	10-week pre/post RCT	51 veterans with PTSD	10 week 90 minutes twice weekly yoga intervention	PTSD	Clinician-Administered PTSD Scale (CAPS), Post traumatic stress checklist - military/civilian (PCL-M/C), Impact of Events Scale-Revised (IES-R)	Large non-significant post-intervention difference between experimental group and waitlist control in PCL-M and IES-R scores. However, only a significant CAPS Reexperiencing subscale time interaction was observed following ANOVA.
15	Rogers et al., (2014)	USA	5-week pre/post among participants	14 veterans with PTSD	5 weekly 4 hour surf sessions. Each session focused on specific themes such as role identity, leadership and trust, community building, problem solving, and transitioning.	PTSD, depression	Post-traumatic Stress Checklist-Military (PCL-M), Major Depression Inventory (MDI)	Both PTSD and depression scores significantly decreased among participants between baseline and post-intervention measures.

16	Romaniuk et al., (2018)	Australia	13-week longitudinal quasiexperimental	47 WIS veterans and their partners (Individual, n = 25; Couples, n = 22)	5-day residential equine assisted therapy programme for individual veterans or veterans and their significant other	PTSD, Depression and Anxiety, Happiness, QoL.	Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5), Depression Anxiety Stress Scale– 21 (DASS-21), The Oxford Happiness Questionnaire (OHQ), Quality of Life, Enjoyment and Satisfaction Questionnaire– Short Form (Q-LES-Q-SF)	Significant post-intervention improvements in PTSD, Depression, Happiness, and QoL in both individual and couple group post intervention, with anxiety only significantly improving in the individual programme. However, all measures were maintained to a greater extent among participants of the couples' programme compared with the individual programme.
17	Staples et al., (2013)	USA	6-week pre/post among participant	12 veterans with PTSD	1-hour twice weekly yoga sessions for 6 weeks.	PTSD, Sleep quality, Anger, QoL	PTSD checklist military version (PCL-M), The Pittsburgh Sleep Quality Index (PSQI), The State-Trait Anger Expression Inventory-2 (STAXI-2) Outcome Questionnaire 45.2 (OQ-45.2).	No significant post-intervention difference in PTSD symptoms, anger, and QoL total scores. However, the Hyperarousal subscale of the PCL-M significantly decreased. Sleep quality significantly improved post-intervention.
18	Townsend et al., (2018)	USA	13 -week longitudinal among participant	127 injured service members and veterans	5-day retreat-style seasonal outdoor activity (e.g. snowmobiling, rafting, equine activities, fishing,	PTSD, anxiety and depression, self-reported physical and mental health functioning	Post-traumatic Stress Disorder Checklist Military (PCL-M), Depression, Anxiety, and Stress	Significant decrease in PTSD symptoms at baseline, post-intervention, 3-months post-intervention, and 6-months post intervention. Depression, anxiety, stress, physical



					hiking) for veterans and their significant others. Marriage counselling and education related to veteran reintegration used in conjunction to recreational activities.		scale (DASS), Veterans RAND Health Survey (VR-12)	functioning did not significantly decrease at all time points. Mental health functioning significantly increased post-intervention, but returned to baseline levels at 3 and 6-months post-intervention.
19	Vella et al., (2013)	USA	8-week longitudinal among participant	74 veterans with PTSD	Residential 2 day, 3-night, fly-fishing intervention.	PTSD, depression, anxiety, stress, positive/negative affect, perceived stress, sleep quality	Post-traumatic Stress Disorder Checklist Military (PCL-M), Brief Symptom Inventory-18 (BSI), Positive and Negative Affect Scale (PANAS), Perceived Stress Scale (PSS), Pittsburgh Sleep Quality Inventory (PSQI)	Significant post-intervention improvements in positive affect, negative affect, anxiety, depression, and somatic symptoms of stress. Comparisons with no post-intervention measure revealed significant improvements in sleep quality, perceived stress and PTSD symptoms at a 6-week follow-up.

Table 2.2

*QualSyst Analysis Results for Studies Included Within the Systematic Review*

	Vella et al., (2013)	Townsend et al., (2018)	Staples. et al., (2013)	Romaniuk et al., (2018)	Rogers et al., (2014)	Reinhardt et al., (2018)	Morgan et al., (2019)	Mehling et al., (2018)	McCarthy et al., (2017)	Lundberg et al., (2011)	Lanning et al., (2018)	Lanning et al., (2017)	Johnston et al., (2015)	Goldstein et al., (2018)	Gehrke et al., (2018)	Duvall & Kaplan (2014)	Cushing et al., (2018)	Bennett et al., (2017)	Bennett et al., (2014)
Q1. Question or objective sufficiently described?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q2 . Study design evident and appropriate to answer study question?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q3, Method of subject selection described and appropriate?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q4. Subject characteristics or input variables/information sufficiently described?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q5. If random allocation to treatment group was possible, is it described?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Q6. If interventional and blinding of investigators to intervention was possible, is it reported?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q7. If interventional and blinding of subjects to intervention was possible, is it reported?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q8. Outcome measure(s) well defined and robust to measurement/misclassification bias?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q9. Sample size appropriate?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q10. Analysis described and appropriate?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q11. Some estimate of variance is reported for the main results/outcomes?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q12. Controlled for confounding	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q13. Results reported in sufficient detail?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Q14. Do the results support the conclusion?	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Note. ● = Yes ● = Partial ● = No.



### 2.3 Results

Following a rigorous screening process (see Figure 2.1), 19 studies were eventually included within this systematic review. Studies originated from three countries, 16 from the USA, two from Australia, and one from the UK. The 19 studies used a mixture of quantitative methodologies, including three RCTs, three quasi-experimental non-randomised designs, and 13 among participant analyses. Sample sizes ranged from 10 to 127 participants. Physical activity intervention length varied from two days to 12 weeks. For the purpose of this review, studies which adopted only pre/post measures are referred to as *pre/post* studies; while those with post-intervention follow up measures are referred to as *longitudinal*. All 19 studies included pre/post-intervention measures, however, only seven included longitudinal measures which ranged from one to six months post-intervention. Forty-one unique measurement tools were utilised, predominantly self-report questionnaires, apart from the Clinician-Administered PTSD Scale (CAPS) which was implemented in three studies. These measurement tools evaluated a variety of outcomes including:

- 14 studies measured post-traumatic stress;
- 9 studies measured depression, anxiety, and/or stress;
- 8 studies measured quality of life;
- 4 studies measured sleep quality;
- 4 studies measured positive/negative affects;
- 3 studies measured perceived functional impairment;
- 3 studies measured mindfulness; and
- 2 studies measured social wellbeing.

Further, single studies also considered measures of:

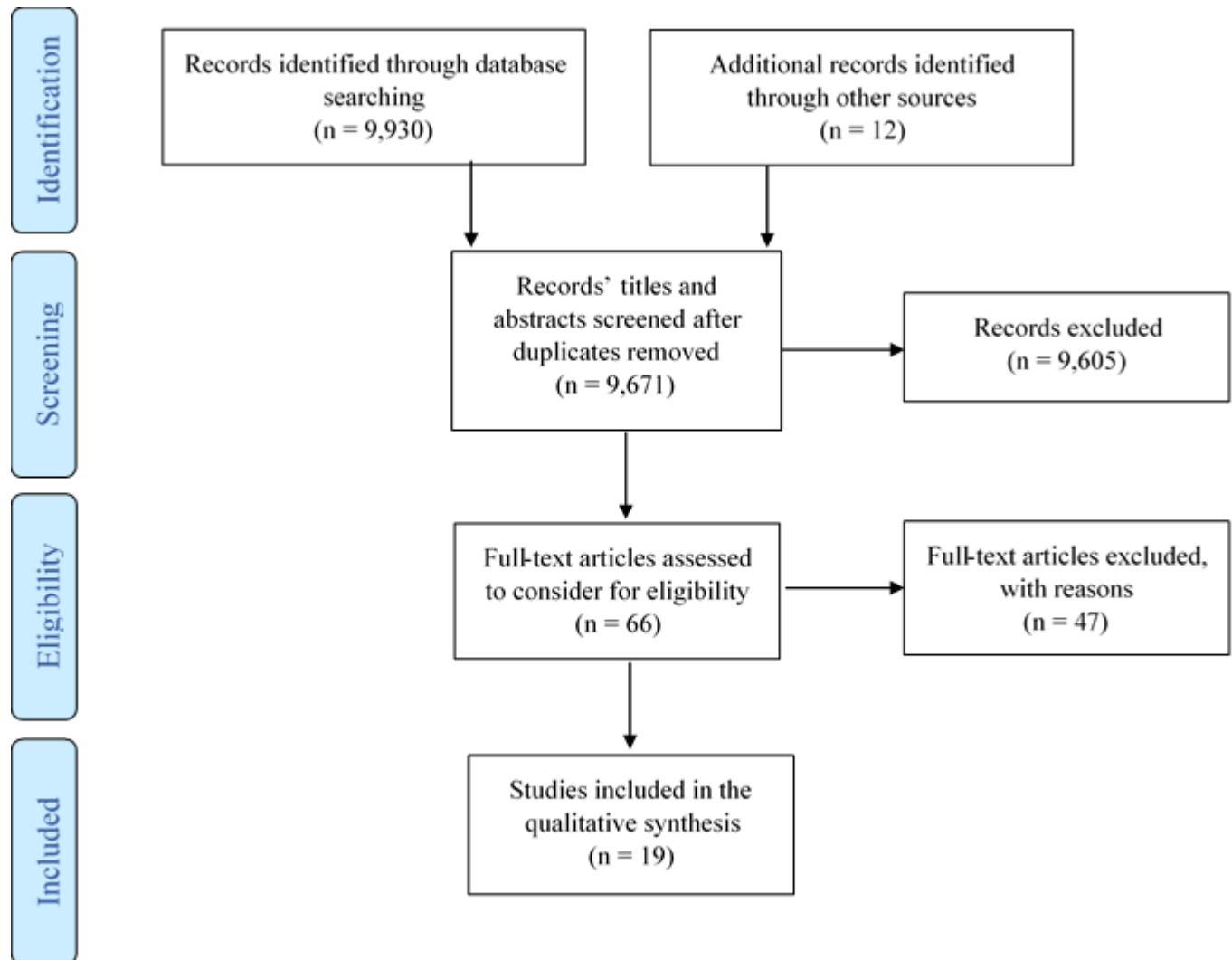
- perceived mood;

- competence;
- happiness;
- tranquillity;
- attentional functioning;
- life-outlook;
- leisure time;
- interoceptive awareness;
- psychiatric disorders,
- anger,
- post-traumatic growth,
- resilience,
- self-determined motivation; and
- leisure satisfaction measurements.

Descriptions of all studies and their respective outcomes are summarised in Table 2.1.

Figure 2.1

*Flow Chart of the Screening Process of Studies Included Within the Systematic Review*



### 2.3.1 Narrative Synthesis of Results

#### 2.3.1.1 Post-traumatic Stress Disorder

Fourteen studies met the inclusion criteria for this section of the review, with five yoga (Reinhardt et al., 2018; Cushing et al., 2018; McCarthy et al., 2017; Johnston et al., 2015; Staples et al., 2013), five outdoor recreation (Townsend et al., 2018; Bennett et al., 2017; Rogers et al., 2014; Bennett et al., 2014; Vella et al., 2013), three horse-riding (Lanning et al.,

2018; Romaniuk et al., 2018; Lanning et al., 2017), and one a multi-exercise intervention, combined with mindfulness-based stress reduction (MBSR) (Goldstein et al., 2018).

Despite an RCT by Reinhardt et al. (2018) finding no significant difference in PTSD scores post-intervention, the majority of yoga intervention studies included in this review suggested that yoga did have a positive, post-intervention impact on PTSD (Cushing et al., 2018; McCarthy et al. 2017; Johnston et al., 2015; Staples et al., 2013). Specifically, where the three subscales of hyperarousal, re-experiencing, and avoidance were included in the analysis, yoga appeared to have the greatest impact on the hyperarousal subscale (Cushing et al., 2018; McCarthy et al., 2017).

While not specifically a yoga intervention, the study by Goldstein et al. (2018) employed a multi-exercise intervention, which included a yoga component and was combined with MBSR. Participants in the experimental group observed a large, significant decrease in PTSD symptoms, compared to a control group.

Outdoor recreation appeared to reduce PTSD symptoms immediately following participation (Townsend et al., 2018, Bennett et al., 2017; Rogers et al., 2014; Bennett et al., 2014; Vella et al., 2013). However, among the three studies where follow-up measures were reported (Townsend et al., 2018; Bennett et al., 2017; Vella et al., 2013), two studies observed a significant longitudinal improvement. One at 6-weeks post-intervention (Vella et al., 2013) and one at 6-months post-intervention in participants of the only of the three interventions to include veterans' significant others (Townsend et al., 2018).

Two horse-riding studies used the same sample and intervention but employed different methodologies (Lanning et al., 2018; Lanning et al., 2017). Both noted moderate to large, significant improvements within participants (Lanning et al., 2017) compared to a control group (Lanning et al., 2018); reported benefits, 2-months beyond the end of the respective



intervention, were evident in both studies. Furthermore, Romaniuk et al. (2018) found significant improvements immediately following their horse-riding intervention. However, positive effects were maintained in a “couples’ programme” at 3 months follow-up, but benefits were not observed at this time for participants who completed an “individual programme”.

### ***2.3.1.2 Depression, Anxiety, and Stress***

Nine studies met the inclusion criteria for this section of the review, consisting of five outdoor recreation (Townsend et al., 2018; Bennett et al., 2017; Rogers et al., 2014; Vella et al., 2013; Lundberg et al., 2011), two yoga (Cushing et al., 2018; McCarthy et al., 2017), and two horse-riding interventions (Romaniuk et al., 2018; Lanning et al., 2017).

Outdoor recreation had a positive, post-intervention effect on depression (Townsend et al., 2018; Bennett et al., 2017; Rogers et al., 2014; Vella et al., 2013; Lundberg et al., 2011). However, neither of the three studies with longitudinal measures found a positive effect at 6-weeks (Vella et al., 2013), 3 months (Bennett et al., 2017), nor 6-months (Townsend et al., 2018) after the respective interventions had finished, even with inclusion of veterans’ significant others (Townsend et al., 2018).

Two outdoor recreation studies observed mixed findings regarding their effect on anxiety. One study reported a moderate, but significant post-intervention reduction in anxiety scores, however, it was not maintained at a 6-weeks follow-up (Vella et al., 2013). In contrast, Townsend et al. (2018) observed no differences in anxiety levels between any time points from baseline to 6-months post-intervention.

The influence of outdoor recreation on stress was also mixed, with three studies observing a positive, post-intervention effect on stress (Townsend et al., 2018; Bennett et al., 2017; Vella et al., 2013); however, this effect was not maintained at any of the follow-up measures (Townsend et al., 2018; Bennett et al., 2017; Vella et al., 2013). One other study reported no

significant differences in stress scores at any time points, including a 4-week follow-up (Duvall & Kaplan, 2014). However, among participants with frequent, everyday health issues, Duvall and Kaplan (2014) observed significant decreases in stress scores between baseline and the 4-week follow-up.

Yoga was found to have a positive, post-intervention effect on the symptoms of depression (Cushing et al., 2018; McCarthy et al., 2017), anxiety (Cushing et al., 2018; McCarthy et al., 2017), and stress (McCarthy et al., 2017).

Horse-riding interventions were found to have a positive impact on the symptoms of depression (Romaniuk et al., 2018; Lanning et al., 2017), anxiety (Romaniuk et al., 2018), and stress (Romaniuk et al., 2018). While Lanning et al. (2017) reported only a small difference (significance not calculated) between post-intervention and a 3-month follow-up, Romaniuk et al. (2018) found that reductions in depression, anxiety, and stress were maintained to a much greater extent in a “couples” version of the intervention, compared to the individuals’ version. In direct contrast, moderate-to-large increases in depression, anxiety, and stress were reported for participants completing an “individual programme” between post-intervention and 3-month follow-up.

### ***2.3.1.3 Quality of Life***

Eight studies met the inclusion criteria of this section, with three focused upon horse-riding (Lanning et al., 2018; Romaniuk et al., 2018; Lanning et al., 2017), two on yoga (McCarthy et al., 2017; Staples et al., 2013), two employed outdoor recreation (Townsend et al., 2018; Lundberg et al., 2011), and one multi-activity intervention combined with MBSR (Goldstein et al., 2018).

Horse-riding had a positive post-intervention effect on QoL among participants (Romaniuk et al., 2018; Lanning et al., 2017) and in comparison to a control group (Lanning et al., 2018).

However, this was not sustained 2-months after the end of the intervention (Lanning et al., 2018; Lanning et al., 2017) or at the point of 3-months follow-up (Romaniuk et al., 2018), even when significant others were included in the intervention (Romaniuk et al., 2018).

The post-intervention effects of yoga on QoL were mixed, with one study reporting significant improvements (McCarthy et al., 2017), but another reporting no difference between pre- and post-intervention evaluations (Staples et al., 2013).

Two outdoor recreation interventions initially had a positive effect on the mental components of QoL immediately post-intervention (Townsend et al., 2018; Lundberg et al., 2011), however, this beneficial effect was not maintained after either 3- or 6-months follow-up (Townsend et al., 2018). It is also noteworthy that outdoor recreation had no significant effect on the physical components of QoL (Townsend et al., 2018; Lundberg et al., 2011).

Multi-activity exercise classes with components of MBSR led to a medium post-intervention improvement within the mental components of QoL, compared to a group of waitlist control participants, but no significant difference was observed within the physical components of QoL (Goldstein et al., 2018).

#### ***2.3.1.4 Sleep Quality***

Four studies met the inclusion criteria of this section of the review and included three yoga (Cushing et al., 2018; McCarthy et al., 2017; Staples et al., 2013) and one outdoor recreation intervention (Vella et al., 2013).

All three yoga interventions reported positive post-intervention effects on sleep quality (Cushing et al., 2018; McCarthy et al., 2017; Staples et al., 2013). Similarly, one outdoor recreation intervention reported a significant, positive improvement in sleep quality up to 6-weeks post-intervention (Vella et al., 2013).

### ***2.3.1.5 Positive / Negative Affect***

Four studies met the criteria to be included in this section of the review, including two outdoor recreation (Duvall & Kaplan, 2014; Vella et al., 2013), one horse-riding (Gehrke et al., 2018), and one multi-exercise activity intervention combined with MBSR (Mehling et al., 2018).

Outdoor recreation had a significant post-intervention effect on positive affect (Duvall & Kaplan, 2014; Vella et al., 2013), which was maintained after 1-month (Duvall & Kaplan, 2014) and 6-weeks post-intervention (Vella et al., 2013). This effect was particularly prominent among participants who experienced frequent everyday health issues, and who Duvall and Kaplan (2014) suggested may generally have a lower positive affect. Similarly, outdoor recreation reduced negative affect post-intervention (Duvall & Kaplan, 2014; Vella et al., 2013), and this beneficial change was maintained 1-month (Duvall & Kaplan, 2014) and 6-weeks after the respective interventions finished (Vella et al., 2013). This effect was found to be more prominent among participants with frequent, everyday health issues (Duvall & Kaplan, 2014).

One horse-riding intervention study (Gehrke et al., 2018) and a multi-exercise activity combined with MBSR intervention study (Mehling et al., 2018) observed positive post-intervention effects.

### ***2.3.1.6 Perceived functional impairment***

Three studies met the inclusion criteria for this section of the review, with two horse-riding (Lanning et al., 2018; Lanning et al., 2017) and one outdoor recreation intervention (Bennett et al., 2017). Horse-riding led to a small improvement in perceived functioning at mid- and post-intervention, compared to a control group (Lanning et al., 2018). However, in the study by Lanning et al. (2017), perceived functioning scores only slightly improved mid-intervention, but returned to near baseline post-intervention. Using the same analysis, both studies noted a

further decrease at 2-months follow-up (Lanning et al., 2018; Lanning et al., 2017). Outdoor recreation had a positive, post-intervention effect on perceived functional impairment; however, this was not sustained at 3-months follow-up (Bennett et al., 2017).

#### ***2.3.1.7 Mindfulness***

Three studies met this section's inclusion criteria, with two yoga interventions (Cushing et al., 2018; Johnston et al., 2015) and one multi-exercise combined with MBSR (Mehling et al., 2018). The post-intervention effect of Yoga on mindfulness was mixed; one study reported the positive impact of yoga on participant mindfulness in comparison to a control group (Cushing et al., 2018), but another study reported no change in mindfulness scores (Johnston et al., 2015). In contrast, one multi-exercise combined with MBSR intervention resulted in a significant post-intervention improvement in mindfulness, compared to a control group (Mehling et al., 2018).

#### ***2.3.1.8 Social Wellbeing***

Two studies met the inclusion criteria of this section of the systematic review, both of which were outdoor recreation interventions (Duvall & Kaplan, 2014; Bennett et al., 2014). Using a three-arm design with two similar experimental groups and one control condition, Bennett et al. (2014) reported a significant, post-intervention difference in dyadic relationship scores in experimental group B in comparison to the control group; whereas, experimental group A's scores did not statistically differ to the control condition. However, another study reported that their conceptualisation of social functioning, calculated using the Loneliness Scale and Social Connectedness Scale, significantly increased post-intervention, particularly among participants who reported frequent everyday health issues (Duvall & Kaplan, 2014).

### **2.3.1.9 Other Effects**

Other positive effects of physical activity interventions included improvements in perceived mood (Lundberg et al., 2011), competence (Lundberg et al., 2011), happiness (of which the couples' programme maintained their scores to a greater extent at a 3-month follow up compared to the individual programme) (Romaniuk et al., 2018), tranquillity (Duvall & Kaplan, 2014), attentional functioning (Duvall & Kaplan, 2014), life-outlook (Duvall & Kaplan, 2014), leisure time (Goldstein et al., 2018), and some aspects of interoceptive awareness (Mehling et al., 2018). The latter concept is concerned with encouraging an individual to consider and integrate bodily sensations with cognitive processes, allowing one to explore their emotional state.

Physical activity interventions were not shown to have a significant effect on psychiatric disorders (Morgan et al., 2019), anger (Staples et al., 2013), post-traumatic growth (Bennett et al., 2014), resilience (Johnston et al., 2015), self-determined motivation (Bennett et al., 2017), and leisure satisfaction (Bennett et al., 2017).

## **2.4 Discussion**

This review has collated and analysed recent RCT, quasi-experimental, and among participant quantitative evidence surrounding the psychological effects of physical activity interventions on veterans that are WIS or who are experiencing mental health conditions using a narrative synthesis approach.

Post-traumatic stress disorder (PTSD) has been noted as being particularly prominent among military veterans (Williamson et al., 2019), with as many as 23% of Operation Enduring Freedom/Iraqi Freedom veterans suffering from the disorder (Fulton et al., 2015). Corresponding with the results of previous reviews surrounding physical activity for veterans that are WIS (Greer & Vin-Raviv, 2019; Caddick & Smith, 2014) and non-military/veteran

specific meta-analyses (Rosenbaum et al., 2015), the various modes of physical activity interventions that met the inclusion criteria of this review had a positive, post-intervention effect on PTSD, particularly in symptoms of hyperarousal. Furthermore, some studies highlighted the short-term positive intervention effects of less than 2-months in some participants (Lanning et al., 2018; Romaniuk et al., 2018; Townsend et al., 2018; Lanning et al., 2017; Vella et al., 2013). Many these studies reported an increase in PTSD scores between post-intervention and a relatively short-term follow-up. studies which included veterans' significant others appeared to maintain reductions in PTSD scores to a greater extent, with one study observing a significant reduction at 6-months compared to baseline (Townsend et al., 2018), and 3-months post-intervention, compared to participants undertaking an individual version of their intervention (Romaniuk et al., 2018). This finding is contrary to a similar review published by Shirazipour, Tennant, et al. (2019), which suggested that physical activity may be impacted by and improve family relationships but does not necessarily require the inclusion of a family member. The general trend identified in this review suggests that the inclusion of significant others may lengthen the positive effects of a physical activity intervention. However, as only a small number of studies included in this review incorporated significant others, more research is required to add strength to this preliminary finding.

Overall, outdoor recreation appeared to be the type of physical activity that was most consistent in effectively reduced PTSD symptoms post-intervention. However, to what degree this effect is likely to be sustained remains unclear. This aligns with findings of previous reviews that advocate the therapeutic effect of veterans interacting with nature (Shirazipour, Tennant, et al., 2019; Greer & Vin-Raviv, 2019; Caddick & Smith, 2014).

With the increased likelihood of mental health conditions such as depression, anxiety, and stress disorders among veterans (Williamson et al., 2019; Pease et al., 2015; Fulton et al., 2015), reducing symptoms of these may positively impact upon their wellbeing. Generally, a

positive, post-intervention effect on symptoms of depression, anxiety, and stress was observed following participation in the various types of physical activity, despite the effects of outdoor recreation on anxiety and stress being mixed. However, whether a positive improvement can be maintained post-intervention is unclear, with conflicting results stemming from horse-riding and outdoor recreation interventions. A recent systematic review identified that outdoor recreation can have a beneficial impact on the psychological wellbeing of veterans with PTSD, especially in the context of reductions in perceived levels of depression and stress (Greer & Vin-Raviv, 2019), and building upon this, the findings of the review outlined in this chapter suggest that positive reductions in depression, anxiety, and stress may be greater among participants with ongoing and frequent everyday health issues (Duvall & Kaplan, 2014), and maintained for a longer duration when significant others are included within the intervention (Romaniuk et al., 2018).

Comparing physical activity types, all studies included in this systematic review, with the exception of one outdoor recreation study, observed a reduction in depression scores. Whereas, horse riding and yoga appeared to be more effective in decreasing levels of stress and anxiety. Perhaps the absence of mindfulness in outdoor recreation that can be found within yoga (Salmon et al., 2009) and animal therapy (Schramm et al., 2015), which has been linked to reductions in anxiety (Vøllestad et al., 2012), can explain this finding.

In comparison to the general population, veterans may have a lower health-related QoL (Oppezzo et al., 2016; Kazis et al., 1998). Despite previous reviews suggesting that sport or physical activity can improve veterans' QoL (Greer & Vin-Raviv, 2019; Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014), the evidence presented in this review shows mixed findings for the impact of physical activity on overall QoL. Total QoL scores increased in several studies post-intervention; however, this finding was not maintained at follow-up measures, even when significant others were included (Townsend et al., 2018; Romaniuk et



al., 2018). While all three types of physical activity, horse-riding, outdoor recreation, and yoga, observed positive effects on QoL post-intervention, among studies where physical and mental aspects of QoL were separated (Goldstein et al., 2018; Lundberg et al., 2011), greater improvements were reported for mental components. This may suggest that short-term physical activity participation has a greater immediate effect on the mental components of QoL, rather than the physical.

Both yoga and outdoor recreation types of physical activity were found to have a positive post-intervention effect on sleep quality. While there is limited current evidence on the effect of physical activity on veterans' sleep quality, research within other populations, such as older adults (Reid et al., 2010) and obese adolescents (Mendelson et al., 2016), has reported improved sleep quality. Therefore, these studies may strongly hint at the fact that a similar benefit can be experienced by veterans who engage with physical activity; however, which mode of physical activity is more effective remains unclear.

Positive and negative affect significantly improved post-intervention among horse-riding, outdoor recreation, and multi-exercise physical activity interventions, with larger effects observed for individuals with ongoing, frequent health issues (Duvall & Kaplan, 2014). Although this finding is limited by the small number of studies, it aligns with the finding of other reviews in this area (Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014). All outdoor recreation, horse-riding, and multi-activity exercise with mindfulness components which measured positive/negative affect observed significant improvements, yet more research is needed in this area before meaningful and robust comparisons of physical activity types can be made.

An immediate positive, post-intervention effect on perceived functional impairment was observed following both outdoor recreation and horse-riding, however, this was not maintained

at the point of follow-up in any of the studies. While neither outdoor recreation nor horse-riding appeared to be more effective than the other, due to the nature of perceived functional impairment, consistent participation in physical activity may be required to further improve or maintain physical functioning post-intervention. The lack of significant findings could therefore be caused by a lack of continued engagement in physical activity following the intervention.

Physical activity interventions can improve participants' mindfulness. Two out of three studies that analysed participant mindfulness observed a significant improvement. However, each of these interventions contained a potentially confounding component of mindfulness training. Therefore, it is unclear to what extent the physical activity and/or mindfulness training was responsible for the increases in mindfulness, making any comparison between physical activity modes difficult.

Physical activity may provide a medium whereby veterans can increase their social interaction and associated wellbeing (Greer & Vin-Raviv, 2019; Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014). While this review is limited in the small number of studies which analysed social wellbeing, physical activity may increase social wellbeing, particularly among those with frequent everyday health issues (Duvall & Kaplan, 2014). As only outdoor recreation studies in this review evaluated social wellbeing, comparisons of different types of physical activity was not possible. However, the group-based design of the outdoor recreation activities could help explain the increase in social wellbeing.

## **2.5 Strengths, limitations and future recommendations**

A key strength of this systematic review is its evaluation of interventional research. The three contemporary reviews in this area have consisted of the evaluation of research based upon a mixture of qualitative and quantitative methodologies. This review is therefore novel in its

approach, evaluation, and findings related to the effects of physical activity through an interventional lens.

This review is not without limitations, however, and contains one conceptual and three methodological limitations. Conceptually, this review utilised a very broad definition of physical activity, resulting in many different types of activities being considered and included. This may be considered a limitation, as comparing indoor yoga to outdoor recreation may be challenging due to large differences in modes and execution of interventions, which may impact on various other aspects of the intervention, such as the opportunity for social interaction. Indeed, Shirazipour, Tennant, et al. (2019) noted that a lack of understanding related to how physical activity interventions are implemented and how this subsequently impacts upon experiences and outcomes, represents a clear knowledge gap within the current literature. Even within physical activity with similar modes of delivery, a difference in implementation style may impact on outcomes. This limitation is particularly prominent among physical activity interventions that include additional and complementary, non-physical activity components, such as marriage counselling and mindfulness-based stress reduction. However, as the aim of this review was to collate and compare the effects of various physical activity interventions on veterans that are WIS or who are experiencing mental health conditions, a narrative synthesis gives an understanding of how each intervention has the potential to provide a positive effect, without the various types of physical activity interventions impacting the results. Nevertheless, the non-standardised modality and delivery of physical activity interventions may lead to unreliable comparisons and outcomes, therefore, findings presented herein should be interpreted with caution.

From a methodological perspective, a narrative synthesis approach in itself may be viewed as a limitation. While such an approach was deemed an effective tool to explore and synthesise the varied interventions, measures, and measurement tools, the absence of statistical analysis

in a narrative synthesis renders cause and effect relationships indeterminate. Despite this, the approach used in this review allows the reader to gain a good understanding of the current state of research relating to the effects of physical activity and veterans that are WIS or who are experiencing mental health conditions.

In addition, the various designs of studies which met the inclusion criteria of this review may be considered a limitation. Few studies in this review adopted an RCT design, with many of the studies adopting an among participant and/or quasi-experimental design. The result of this research approach may have led to bias and the occurrence of a type 1 statistical error within respective studies. Furthermore, many studies included within this review typically employed small samples and many lacked longitudinal follow-up measures, both of which prevent the complete understanding of the effect of any physical activity intervention. Findings from such studies should, therefore, be interpreted with caution.

The results of this review lead to three recommendations for the development of future physical activity interventions. Firstly, designing interventions in a manner which facilitates the inclusion of significant others may serve to lengthen the beneficial psychological effects gained from an intervention. Secondly, interventions may have a greater impact on veterans with a lower health status. Ensuring that programmes are accessible and inclusive for such individuals will ensure that those likely to benefit most are able to participate. Thirdly, practitioners may benefit from implementing outdoor recreation interventions/programmes when aiming to reduce PTSD symptoms, and yoga or horse-riding interventions/programmes for reducing levels of perceived anxiety and stress.

Corresponding to findings of similar thematic reviews (Greer & Vin-Raviv, 2019; Shirazipour, Tennant, et al., 2019), this review has identified an overall weak methodology in the current literature. In order to increase the quality and understanding of research relating to the effects

of physical activity and veterans, future research may benefit from adopting an RCT design. Such an approach will reduce the bias that may be present within previously published studies and allow the identification and understanding of physical activity's effects. In addition, future research may benefit from standardising the measurement tools used to analyse the various psychological outcomes of physical activity interventions, as the studies which met the inclusion criteria of this review used a wide variety of different, clinically administered and/or self-administered measures (See Table 2.1). In doing so, an accumulation of RCT research with a standardised measure will permit a future meta-analysis to be conducted, further increasing the accuracy of knowledge. Moreover, future research should ensure that multiple, follow-up measures are considered post-intervention. In doing this, longitudinal effects of physical activity will become more apparent, allowing practitioners to adopt physical activity interventions that optimise health-related outcomes.

## **2.6 Summary**

Physical activity encompasses many forms of activities. When implemented as interventions, these activities may have positive psychosocial effects on veterans that are WIS or among those experiencing mental health conditions. The studies synthesised in this review suggest that physical activity interventions can have a positive, post-intervention impact on PTSD, depression, anxiety, stress, QoL, social wellbeing, sleep quality, perceived functional impairment, mindfulness, positive affect, and negative affect, with some of these beneficial effects being complementary and possibly more prominent in veterans with ongoing, frequent health issues. Furthermore, outdoor recreation appeared to be more consistent in reducing PTSD symptoms than other physical activity types post-intervention; whereas, yoga and horse riding were more effective in reducing anxiety and stress. While benefits gained from physical activity are prominent post-intervention, they may decrease over time; however, with the inclusion of a significant other, the beneficial impact of intervention effects may lengthen. The

differences in modality and delivery of physical activity interventions and an overall weak methodology of the current literature in this area makes comparisons difficult. More rigorous, RCT studies are warranted and will be necessary to confirm findings presented within this systematic review.

With the information gained from the systematic review discussed in this chapter, the following chapter reports on a study which aims to understand the specific perceived barriers to, and benefits of physical activity among veterans that are WIS. Chapter Three begins with an overview of the need for the understanding of the perceived barriers to, and benefits of physical activity and leads to the methodology and results of the first part of the research into physical activity behaviour among veterans that are WIS.

## **Chapter 3**

# **Identifying the Perceived Barriers to, and Benefits of Physical Activity Among British Military Veterans that are Physically Wounded, Injured, and/or Sick: A Qualitative Behaviour Change Wheel Perspective**

### **3.1 Introduction**

The previous chapter, and its subsequent publication (Walker, Smith, et al., 2020), showed that physical activity can have a wide range of psychosocial benefits for veterans that are wounded, injured, and/or sick (WIS) or who are experiencing mental health conditions; adding to the evidence base of physical activity's role in increasing wellbeing in veterans (Shirazipour, Tennant, et al., 2019; Greer & Vin-Raviv, 2019; Caddick & Smith, 2014).

Following the establishment of an evidence base and identification of a potentially worthwhile intervention, the United Kingdom Medical Research Council's (UKMRC) complex intervention development and evaluation guidance suggests that a theory of behaviour change should be identified or developed (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008). In this, a rationale should be determined for the changes expected and how these changes should be achieved. As outlined in Chapter One, Section 1.1.3, the Behaviour Change Wheel (BCW) has been selected as a guiding framework for understanding physical activity behaviour among veterans that are WIS and to inform the development of the intervention.

To date, physical activity behaviour, including its barriers and facilitators, have been evaluated among veterans with lower limb loss (Littman et al., 2014, 2017), and post-Iraq/Afghanistan deployment veterans (Buis et al., 2011). However, no research has been conducted with United Kingdom Armed Forces (UKAF) veterans that are WIS. As discussed in previous chapters, this is a notable limitation in the current literature, as many physical activity interventions, such as

those implemented by charities, target veterans that are WIS. Moreover, the behaviour change literature emphasises the development of adequate population-specific behaviour change theory (O'Cathain et al., 2019; Michie et al., 2014; Craig et al., 2013; Michie et al., 2011; Craig et al., 2008). Therefore, the application of research conducted in an American setting on veterans with lower limb loss or who are post-deployment may not be applicable to the more general veteran that is WIS population that resides in the UK.

It is therefore the aim of this study to identify the perceived barriers to, and benefits of physical activity and link these to the BCW and COM-B model. In doing so, a theory of behaviour change can be established, and potential intervention functions identified.

### **3.1.1 Objectives**

This study has three objectives:

- 1) Identify the perceived barriers to, and benefits of physical activity among veterans that are physically WIS using one-to-one, semi-structured interviews;
- 2) Analyse the qualitative data using a thematic analysis and categorise themes using a COM-B analysis; and
- 3) Using the Com-B analysis, make recommendations related to intervention functions that can potentially be used to inform the development of a behaviour change intervention.

## **3.2 Methodology**

### **3.2.1 Philosophical assumptions**

As noted in Chapter One, the basis of research contained within this thesis is based in critical realism. In a qualitative context, this suggests that, while one can compare knowledge, to some



extent, to a likeness of the world, the research process is subjective (Sullivan, 2019). In this manner, although subjective by nature, this study aimed to gather the thoughts, attitudes, and experiences of participants related to the perceived barriers to, and benefits of physical activity in order to build knowledge that may represent similarity to the objective reality of the world.

### **3.2.2 Participants**

Despite the broad nature of the inclusion criteria outlined in Chapter Two, the study reported in this chapter focused on the specific target population of the intervention; that is veterans that are WIS (See Chapter One, Section 1.1.1 for definitions).

Purposive sampling was used, whereby veteran members of local charity-based physical activity and social support groups were recruited. As a veteran himself, the researcher frequently attended these groups as a participant, allowing military veterans that are WIS to be contacted directly and informed about the study. Veterans that attended these various groups were asked to pass on study information to other veterans that met explicit inclusion criteria, in an attempt to broaden the sampling and reach veterans that may be socially isolated. However, this was unsuccessful, and all participants were recruited through face-to-face contact.

The recruitment process was designed to reflect the broad range of backgrounds and conditions that reflect the veteran that is WIS population. This included differences in branch of service, age, injury, physical functioning, years since discharge, and current physical activity levels. However, veterans who had been diagnosed with a mental health condition that caused them to experience psychosis or require high levels of care were excluded from this study. This decision was made as such individuals have shown to experience unique barriers to physical activity engagement, such as the adverse effects of psychiatric medication and a lack of emotional and physical energy during times of mental health relapse (Shor & Shalev, 2016).

Therefore, whilst this area requires investigation in its own right, the researcher believed the inclusion of these individuals in the current study had the potential to bias results. In addition, a physical activity intervention for those with a mental health condition that caused them to experience psychosis or require high levels of care would require specialist support to ensure their safety and wellbeing. The researcher felt that this was beyond the capabilities and scope of the research reported in this thesis. However, veterans that are WIS with mental health conditions, such as post-traumatic stress disorder (PTSD), depression, and/or anxiety, were included, as these conditions are considered likely co-morbidities of military service and subsequent injury (Williamson et al., 2019; Fulton et al., 2015).

The recruitment of nine veterans occurred through a range of veteran support groups within the South Wales region of the United Kingdom; details of which are presented in Table 3.1. The researcher did not enquire directly about mental health, but participants disclosed this information during interviews. All but one participant had received a diagnosis of PTSD. Ages ranged from 28 to 57 years. Two participants were in full-time work, two in part-time, and five not in any form of employment. At the time this study was conducted, levels of physical activity varied, with one participant being a highly trained, competitive handcyclist, two participants being competitive triathletes, four participating in physical activity for personal health reasons, and two describing themselves as infrequently participating in physical activity. Time since discharge from the military was less than 10 years for eight of the participants; however, one participant had been discharged from service in the early 1990s, providing a perspective of a veteran with over 25-years of post-military life experience.

Table 3.1

*Demographic Information of Participants*

<b>Sample</b>	N = 9	
		N
<b>Gender</b>	Male	9
	Female	0
<b>Injury</b>	Spinal injury	3
	Bone fracture(s)	1
	Amputee	2
	Musculoskeletal injury	1
	Arthritis	2
<b>Service branch</b>	Army	6
	Royal Navy	2
	Royal Air Force	1
<b>Current physical activity</b>	Competitive sport	3
	Frequent health/recreation	4
	Infrequent physical activity	2
<b>Employment status</b>	Full-time employment	2
	Part-time employment	2
	Unemployed	5
<b>Years since discharge</b>	0-2	1
	3-4	0
	5-6	4
	7-8	1
	9-10	2
	11+	1
<b>Marital status</b>	Married	6
	Single	3
<b>Other information</b>	Requires caregiver	1
	Wheelchair user	1
	Prosthetic leg user	2

*Note.* This table has been designed so that it ensures the anonymity of participants. While more detailed information could be provided, it would risk compromising the identity of participants.

### 3.2.3 Interview guide

A semi-structured interview guide was developed and used to explore themes relating to the perceived barriers to, and benefits of physical activity. The interview guide served as a tool to ease discussion; however, it allowed for participants to expand and discuss their thoughts and experiences as they wished. Following two initial pilot interviews, it was decided to use the term “exercise” instead of “physical activity”. While the first pilot interviewee had no suggestions for change, the second pilot interviewee deemed the term “exercise” simpler to understand than “physical activity”. Considering his own experiences in the military and as a veteran, the researcher agreed that “exercise” may be a more suitable term and changed the terminology of the interview guide. However, as this may not apply to the wider veteran population, a specific definition was discussed prior to all interviews to ensure there was a mutual understanding of terminology by participants and the researcher. The first set of questions posed by the researcher related to demographic information regarding military service, nature of injuries, and current living situation, before moving on to the topic of perceived barriers to, and then views on benefits of physical activity.

An example of a question related to perceived benefits of physical activity included:

*“Does/did regular exercise participation, either during military service or currently, positively affect any other aspects of your life?”*

In contrast, a question relating to perceived barriers included:

*“What do you feel can stop or discourage you from doing exercise?”*

Because of the difficulties of accessing hard-to-reach individuals, such as veterans that are WIS and socially isolated, the interview schedule included an opportunity for participants to reflect

on their perceptions and opinions of other, more socially isolated veterans that are WIS. This was considered important as higher levels of disability have been linked to lower levels of social support and feelings of community belonging among military veterans (Blackburn, 2017; Ahern et al., 2015; Thompson et al., 2015), resulting in many veterans that are WIS becoming socially isolated. Limiting the analysis to the experiences of veterans that are WIS who were already participating in various initiatives would, therefore, likely provide a one-dimensional perspective. However, recruiting veterans that are WIS who are socially isolated was a significant challenge due to a lack of contact with these individuals, characteristic of social isolation. Arguably, as physical activity initiatives have been shown to improve social wellbeing among veterans (Chapter Two; Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014), understanding the perspective of socially isolated veterans was imperative.

### **3.2.4 Procedure**

Interviews were conducted by the researcher who is a military veteran and was able to connect and build rapport with participants through a shared understanding of previous experiences. Interviews were organised at the convenience of the participant and were audio recorded and transcribed *verbatim* into a Microsoft Word document. Data were saved using password-secure cloud storage that was only accessible by the researcher. Length of interviews ranged from 19 to 79 minutes, with an average length of 39 minutes. All participants appeared relaxed and veteran-to-veteran rapport was quickly established. Following completion of each interview, participants were invited to add any additional comments and were also informed that they could request a copy of their transcript two weeks after the interview, so that they could review and make any changes they felt were necessary.

### **3.2.5 Data analysis**

Transcripts were uploaded and analysed using NVivo qualitative data software, version 12. All transcripts were reviewed a minimum of three times each to ensure content was fully understood. A thematic analysis was adopted to organise perceived barriers to, and benefits of physical activity, as this allowed data to be clearly categorised using a COM-B analysis. To assist with the clarity and consistency of data categorisation, the modified TDF, which has been mapped to the BCW and COM-B model (Cane et al., 2012) (Figure 3.1) was used. Furthermore, a thematic analysis was implemented for this study as it allowed not only participants' experiences to be considered, but also their opinions, attitudes, and perceptions relating to others (Freeman & Sullivan, 2019), which formed an important part of this study's analysis.

Following reflexivity, the researcher considered it important that the impact of his military experiences did not affect data interpretation, negatively impacting reliability. Therefore, reliability was conducted with independent researchers, whereby data were sorted into COM-B categories and any discrepancies were discussed and agreed upon.

### **3.2.6 Ethics**

Ethical approval was gained from Cardiff Metropolitan University's School of Sport Ethics Committee. Project Reference Number: PGR-1300.

General ethical concerns were addressed including data protection, participant consent, and the identification of unlawful or harmful behaviour. Specific to this study, however, the consideration of two unique ethical concerns was required. Firstly, the researcher considered the participants of this study to be potentially vulnerable individuals. Due to this potential vulnerability, the researcher ensured that adequate information related to available support services was provided to all of the participants and time was taken at the end of each interview

to enquire into the wellbeing of each participant. Furthermore, to avoid emotional upset of these potentially vulnerable people, the interview guide was sent to participants prior to any interviews, so that participants were able to feel prepared and less intimidated by the interview. Secondly, as a lone worker, the researcher ensured that interviews, while held at the convenience of the participants, were held in a location safe for both the researcher and participant. For this reason, all interviews were conducted in public spaces. Public spaces consisted entirely of cafés where the researcher and interviewee sat in a quiet corner to help ensure privacy. Food and drink were ordered prior to the interview to minimise potential interruptions. Although some background noise was apparent, the interview recordings were clear and transcribed without difficulties.

### **3.3 Results**

A total of 23 themes related to the perceived barriers to physical activity and 20 themes related to the perceived benefits were identified following review of the interview transcripts. These are presented in Tables 3.2 and 3.3.

Table 3.2

*COM-B Analysis of Perceived Barrier to Physical Activity Engagement Among Veterans that are WIS*

COM-B component		Perceived barriers
Capability	Psychological	<ul style="list-style-type: none"> <li>Poor mental health (P1; P3; P5; P7. n=4)</li> <li>Lack of awareness of physical activities (P5; P9. n=2)</li> <li>Lack of knowledge relating to PA and injury (P5. n=1)</li> </ul>
	Physical	<ul style="list-style-type: none"> <li>Poor physical health (P2; P4; P5; P7; P9. n=5)</li> <li>Lack of energy due to unhealthy behaviours (P7. n=1)</li> </ul>
Opportunity	Physical	<ul style="list-style-type: none"> <li>Location of organised activity (P1; P2; P3; P4; P5; P6; P7. n=7)</li> <li>Financial (P1; P2; P3; P4; P5; P7. n=6)</li> <li>Lack of time (P1; P3; P5; P6. n=4)</li> <li>Accessibility (P2; P5. n=2)</li> <li>Organisational lack of knowledge of personal needs (P2; P3. n=2)</li> <li>Over the top health and safety (P2. n=1)</li> <li>Personal family issues (P7. n=1)</li> <li>Lack of options for caregiver (P2. n=1)</li> <li>Age (P2. n=1)</li> <li>Lack of support from organisations (P6. n=1)</li> </ul>
	Social	<ul style="list-style-type: none"> <li>Others' lack of knowledge about personal injury/condition (P3; P5. n=2)</li> <li>Negative other veterans (P3. n=1)</li> <li>Attitude of other non-disabled members (P2. n=1)</li> </ul>
Motivation	Automatic	<ul style="list-style-type: none"> <li>Lack of interest in organised activities (P6; P3; P9. n=3)</li> <li>Dislike of competitive activities (P6. n=1)</li> <li>Discomfort in new environment (P1. n=1)</li> </ul>
	Reflective	<ul style="list-style-type: none"> <li>Lack of confidence in ability to do physical activity (P2; P3; P4; P6; P8; P9. n=6)</li> <li>Previous negative experience of physical activity (P2; P3; P5; P9. n=4)</li> </ul>



Table 3.3

*COM-B Analysis of Perceived Benefits to Physical Activity Among Veterans that are WIS*

Reflective motivation (Beliefs about consequences)
<ul style="list-style-type: none"> <li>Improved mental health (P1; P2; P4; P5; P6; P7; P8; P9. n=8)</li> <li>Socialise (P1; P4; P5; P6; P7; P8; P9. n=7)</li> <li>Physical fitness (P1; P7; P8; P9. n=4)</li> <li>Sense of purpose (P1; P3; P6; P8. n=4)</li> <li>Be in nature (P6; P7; P9. n=3)</li> <li>Improve general physical health (P6; P8; P9. n=3)</li> <li>Reduced pain caused by injury (P2; P3. n=2)</li> <li>Escapism (P3; P6. n=2)</li> <li>To travel (P5; P8. n=2)</li> <li>To get out of house (P4, P9. n=2)</li> <li>Increased belief in oneself (P6; P9. n=2)</li> <li>Improved sleep. (P7. n=1)</li> <li>Pushing beyond others' expectations (P2. n=1)</li> <li>Develop life skills (P6. n=1)</li> <li>Transition into civilian life (P3. n=1)</li> <li>Feeling valued (P5. n=1)</li> <li>challenging oneself (P9. n=1)</li> <li>Being able to compete with others (P9. n=1)</li> <li>Learning about other veterans' experiences (P5. n=1)</li> <li>Family bonding (P6. n=1)</li> </ul>

*Note.* All perceived benefits have been categorised under *beliefs about consequences* and subsequently reflective motivation, as this was considered the nature of a perceived benefit.

### 3.3.1 Perceived barriers

#### 3.3.1.1 Psychological Capability

Mental health, which was noted as often being poor within many veterans that are WIS, presented a perceived barrier to physical activity participation. Specifically, PTSD was reportedly prominent and fluctuated on a regular basis. When asked how poor mental health may impact on their physical activity participation, one participant replied:

*“In the periods between coming here...if I have had a psychological break-down from the environment which I go into, so big shopping malls...I can take days to recover, because it’s*

*fatiguing...and in amongst that it goes much deeper, 'cause some days I don't feel like getting out of bed at all."* (P7)

This theme was further supported:

*"Some people don't want to go to a loud, crowded area 'cause if they know there is going to be a large group of people there, in the [local] centre, you're not going to attend."* (P3)

In addition, social isolation, resulting in not being aware of the physical activities that are available and usually free of charge for veterans that are WIS, was a barrier to engagement.

*"I think [due to poor mental health] ...they become insular. So, they are not aware of everything that goes around them"* (P1)

Another participant felt that he lacked sufficient knowledge of how to become physically active without exacerbating his current injury, the worry of which outweighed the benefits of physical activity participation.

### **3.3.1.2 Physical Capability**

Several barriers, related to physical capability, were evident. For example, the daily challenges associated with significant physical injury and/or illness, and its effect on physical health, reduced participants' ability to participate in physical activity. As with mental health, physical health of veterans that are WIS appears to fluctuate on a regular basis and this influences engagement with physical activity; for example, some veterans perceived that they were only able to engage in physical activity when sensations of pain were low.

*"Personally, it boils down to how I feel on the actual day. Because daily, you can't tell even from...the morning, the day, and the night...My body breaks down...it will be fine for hours and then all of a sudden it just breaks...and I put on weight and it gets even worse. So, it's a vicious circle"* (P7)

Furthermore, physical injury and/or illness made veterans that are WIS more susceptible to developing other illnesses. For example, participants who used a colostomy bag were prone to infection, which discouraged them from engaging in physical activity. When one participant discussed his absence from physical activity over the previous winter, they explained:

*“[I had] a bacterial infection...which wasn’t good [laughs] ...and then for some reason I had chest infections...I was absolutely hammered over this winter.” (P2)*

Some veterans that are WIS were considered not to engage in physical activity as they lacked the energy; a product of unhealthy behaviours, such as smoking and drinking.

*“...so many [veterans that are WIS] are living off caffeine and chocolate and these bad sugars and fats and that is a massive depressant [and] extracts all the nutrients from [them], and people who are depressed drink and smoke, so you got a massive [physical activity barrier] there...[they’re] fatigued.” (P7)*

### **3.3.1.3 Physical Opportunity**

Perceived lack of physical opportunity was the most frequently cited barrier to participating in physical activity in the data, largely due to the location where physical activity was being organised. Veterans that are WIS are not always able to drive long distances due to their physical limitations or may not be able to afford the financial cost associated with long distance travel.

*“I know there is one gentleman who would like to come down to [the physical activity] more often... but he lives [40 miles outside of activity] and it costs him a fortune to come down and do that.” (P2)*

Being involved in physical activity, specifically adapted sport, was considered to be an expensive pursuit. Most veterans that are WIS relied on either their pension or disability

allowance to support them financially, so their money is often used for other, more essential outgoings. Even though many charities offer adapted sport equipment for veterans that are WIS free of cost, the application process for these pieces of equipment was often deemed to be long and tiresome, with there being a large chance of being rejected, and when mental health is generally low, even a simple task can prove difficult to complete. However, not only is the financial cost associated with the physical activity a barrier, but there is a perception that the opportunity for UK-based veterans that are WIS but wish to engage in physical activity is restricted by the disability allowance policy. Participants explained how, in order to qualify for their government disability allowance, they are required to attend frequent assessments where the amount of money they receive is reviewed and decided based upon their physical functioning. Veterans that are WIS expressed how, if they are seen to be doing physical activity, they fear their allowance will be reduced, as their physical function may be considered to have improved, thus requiring less financial support. Whether or not this perception is accurate, it appears to be a decisive and significant barrier to engagement in physical activity.

*“he is... scared, absolutely scared... he is scared that he won’t get the percentage [allowance] that he is really at... if he’s seen to be being active. So, he’s housebound. So, he’s putting on more weight, being inactive and his mental health is getting even worse... because he’s heard all these stories... He is now worried that if he is seen being active, turning up to any [physical activity] sessions will go against him.” (P2)*

Participants reported that they often struggled to find the time to fit physical activity around their schedules. However, they had difficulty determining whether this was, in reality, an objective observation or merely an excuse.

*“There is quite a bit to [do], you know like painting things and all that type of stuff and that’s generally the excuse that I would use.” (P1)*

Lack of access to physical activity opportunities, related to: 1) facilities not being adapted appropriately for disabled people; and 2) a lack of access to the military run gymnasiums, built with state-of-the-art fitness equipment which veterans that are WIS may have had access to during their military careers, were said to reduce levels of physical activity engagement.

*“At [military station] there is a state of the art gymnasium and a state of the art military rehabilitation centre...When I left [the military], I approached the camp to ask if I could use the gymnasium, and as a veteran, I wasn’t able to be issued with a pass...that gym is just a mile from my house....and I’m not allowed onto the unit. Having served in the military for 34 years, they wouldn’t give me a pass...they just said that they wouldn’t allow civilians to join the gym.” (P5)*

Only one participant mentioned that the lack of consideration for his caregiver during organised physical activity was perceived as a barrier, but this individual was the only participant with a caregiver and, therefore, this may be a significant barrier to physical activity for veterans that are WIS who require caregivers.

*“They always seem very twitchy about a carer turning up...they don’t always seem to know how to handle carers...and carers are always an afterthought... carers needs are always second to everything. Most of the time, I can manage...but regularly there are times when I need support.” (P2)*

Despite organisations spending large amounts of money to adapt facilities, making them accessible to those who use wheelchairs, some participants described how these changes were a positive step forward, but did not fully allow them to engage with physical activity.

*“When I first started turning up, they installed an accessible toilet downstairs...the problem was, that over time, people got used to using it and blocking the hallway to get to it with all sorts of club junk. So, we couldn’t actually get to use the toilet...there was club*

*members...making more space for them to train...putting our [equipment] up against the wall. So...we couldn't get them safely down. But on the flip side, a small step forward, they did go out of their way to put ramps all over the place.” (P2)*

Health and safety guidelines were considered to be “over the top” in some cases and could restrict veterans that are WIS from engaging in the activity, particularly when the individual believes themselves to be capable of performing the activity safely. Furthermore, organisations’ rules surrounding age categories of competition were also considered restrictive and decreased motivation in older veterans that are WIS, as they were unable to participate competitively. In addition, one participant considered personal family issues, such as conflict and responsibilities to family members, a key reason why he was unable to participate in physical activity as frequently as he would like. While another felt that the lack of support in his local area discouraged many veterans that are WIS from engaging with physical activity.

#### ***3.3.1.4 Social Opportunity***

Social factors also provided barriers to physical activity participation. In the United Kingdom, physical activity for veterans that are WIS is often organised through charitable organisations. The behaviour of others who attend group activities, such as this, can impact on an individual’s participation. A lack of understanding by others about personal injury can cause feelings of frustration, particularly among those with less visible injuries and illnesses. The presence of others with a negative attitude can additionally be quite disconcerting to veterans that are WIS, especially as being within a negative environment may impact upon their own mental health.

*“You’ll see down at [Veteran physical activity] there’s some people who are just really negative. You wanna say ‘fu\*\*ing hell. Yeah, you’ve had terrible injuries. We’ve all been to war zones we’ve had that. But fu\*\*ing hell don’t sob in your own sh\*t.’” (P3)*

### **3.3.1.5 Automatic Motivation**

Some types of activities may not appeal to all veterans that are WIS. One high-functioning participant was not interested in using wheelchairs and did not want to engage in adapted physical activity. Moreover, another participant suggested that activities that required large levels of exertion or include a competitive element might not interest older veterans that are WIS.

*“Because sport and physical training, no matter how much you like it when you’re younger, when you get older you start switching off [lose interest]” (P6)*

In addition, fear of a new environment, particularly when combined with increased anxiety from conditions such as PTSD, discouraged one participant from engaging in physical activity programmes.

### **3.3.1.6 Reflective Motivation**

Lack of confidence in ability to do physical activity was a key barrier related to reflective motivation. Often, fitness levels of veterans that are WIS had declined post-injury, and this clearly influenced their own belief in their ability to become involved in physical activity. Particularly surrounding prominent sporting events for veterans that are WIS, which have considerable media coverage, such as the Invictus Games. These events require a high level of capacity or fitness that seems unattainable, which intimidated many veterans that are WIS, preventing them from engaging in physical activity.

*“I think you’ve taken somebody who has had an injury...not as fit as when they started, so they come out with low self-esteem anyway. Their drive is low. They will come out into the big wide world. They see the stories of people at the top end getting the medals at the Invictus Games or Warrior Games or Paralympics. They see all those people, which is fantastic for the lads at*

*the top end of the pyramid, but I'm more interested in the people at the bottom of the pyramid...And actually, if I feel like I felt in my fitness then what is going to give me the motivation to get out of the front door and try to even get on that squad. It isn't going to happen."* (P6)

One participant believed he was not able to do physical activity, as it was too strenuous, despite missing the physical challenges of his military career.

*"I miss the physical side of things, but like I said, I know I can't do it, so I don't put myself through it."* (P4)

Previous negative experiences of physical activity had shaped some participants' perceptions and beliefs related to physical activity. While in the military, it was common for injured soldiers to be segregated from their non-injured colleagues during activities that required physical exertion. Military hierarchy would often use derogatory terms for these injured individuals and stop them from participating in physical activity, which subsequently shaped that individual's belief about their ability to do physical activity.

*"I used to hate it when Sergeant Majors said 'Biffs fall out. Off you go'...Why victimise them?...because they're injured?...yeah, there is people out there who abuse it...But then again, there is a lot who are fully fit who abuse it...You used to see it quite a lot which I thought was wrong. They'd punish the ones who had injuries and say 'oh, you can't do a sport. Go back to work...and you would have to sit, being on the REME [engineer] side, sit in the workshop until sports was over'"* (P3)

Not only may veterans that are WIS have had negative experiences of physical activity during the military, but also following discharge. The suggestion was made that organisations do not always support veterans that are WIS to the standard required or expected, causing feelings of frustration and disdain.



*“They wouldn’t set me up to row on the water, even though I had done capsize drills as an able-bodied person. Capsize drills are always used as an excuse... Despite the fact it was a year later when someone came along who was a C4/C5 [spinal injury] and had partial use of his hands and was out, sorting him out with a capsize drill, and they put him in a double skull. Despite the fact that all they were interested in at the time, they used me... because I was doing the [rowing competition] and they were training me, to get publicity to get other people to come in to go take part in the sport, which is good...for [the governing body] to go get a tick in that box... I then did the advertising for them...which dragged about 5 or 6 people in to start taking part... The other three members, the people who were rowing with me, on the [indoor rowing machines], never got on the water... Despite the fact they were 6 or 7 months down the road... They never got a session on the water.” (P2)*

### **3.3.2 Perceived benefits**

#### ***3.3.2.1 Reflective Motivation***

All perceived benefits identified in this study were associated with the *beliefs about consequences* category of the TDF and, therefore, were categorised as reflective motivation.

Improving mental health was the most widely cited benefit of physical activity for veterans that are WIS who felt they often experienced problems with their mental health, with conditions such as PTSD and depression. Physical activity was believed to reduce the symptoms associated with these conditions, as well as increase the amount one is able to sleep and provide an escape from negative thoughts.

*“The other thing that is noticeable for PTSD sufferers, [is] that you can sit at breakfast with quite a subdued individual and two hours later, after he’s on the golf course, he’s a different*

*man...and I would suggest that of all the therapies, it [physical activity] is one of the best ones.” (P5)*

Similar to improving mental health, participants reported that physical activity helped them to improve their physical health and manage their injuries as a result of weight loss, pain management, and muscle and joint mobility.

*“If I don’t train, I’m in pain...No matter how much pain I’m in, so, like, now, my speech goes, I regularly get headaches, I get spasms in my legs and my back post-training. But it [physical activity] helps me manage a bit better. And over the last [year], I have been off regular pain medication now...due to physical activity: loss of weight; better movement.” (P2)*

Physical activity also provided opportunities to be in a natural environment, spend time with family, and get out of the house or away from the stresses of everyday life and travel overseas.

*“...especially outside, you feel the breeze and elements. So, going for a surf... it’s natural... it’s the waves... and you actually put your feet on natural compounds... sand.” (P7)*

Following discharge from the military, one of the most notable differences between military and civilian life is the lack of camaraderie, leading to a sense of isolation. Physical activity, however, allowed veterans that are WIS to meet other like-minded people and learn about their experiences, build friendships, socialise and spend quality time with their family.

*“It’s the camaraderie of it...you chat, and I suppose the guys reminisce a lot really” (P5)*

*“...you have a laugh with the lads and there’s a good group of people there [organised veteran physical activity], we’ve all communicated with each other...and [the] lads they do send each other texts saying ‘you down this week?’ and stuff” (P7)*

Not being limited by one’s injury, feeling valued, challenging oneself, and being able to compete with others were also noted benefits. In addition, physical activity provided a sense

of purpose, especially for veterans that are WIS who may be lacking a goal or direction in civilian life.

*“I just started cycling from there, I just loved [it]...I was looking forward to the next day thinking ‘Where am I going to go? How far am I going to do?’ I think it is good too because you have to wake up in the morning and do something.” (P8)*

In addition, pushing beyond others’ expectations of what a veteran that is WIS is able to achieve was considered a benefit of physical activity; particularly following such an extreme change in lifestyle, from soldier to disabled civilian, leading to improved self-belief, which may be lacking following injury, discharge and reduced physical functioning.

*“I think the benefits are for yourself, your self-motivation and self-belief.” (P9)*

### **3.4 Discussion**

The findings of this research build upon and add new information to the current knowledge of physical activity behaviour among veterans that are WIS. This section aims to discuss the results and provide recommendations of intervention functions based upon the COM-B model, TDF and BCW, that can be used to inform the design of a behaviour change intervention. For a description of the BCW and its related components, see Chapter One, section 1.1.3.3.

#### **3.4.1 Overview of findings**

Overall, psychological capability, physical capability, physical opportunity, and reflective motivation were prominent COM-B categories of perceived barriers to physical activity engagement, with social opportunity and automatic motivation being less prominent. Following thematic and COM-B analyses, a plethora of perceived benefits were identified from the data and were all categorised under reflective motivation, as these were considered to reflect participants’ beliefs about the consequences of engaging in physical activity. Perceived barriers

to, and benefits of physical activity and their respective categorisations can be seen in Tables 3.2 and 3.3.

Perhaps as one would expect to find in a military veteran population with physical disabilities, physical capability, psychological capability and physical opportunity were perceived to be key barriers to physical activity. The financial cost of the activity, location of activity, and personal physical and mental health would likely be more prominent in a population who may depend on a disability allowance and whose military service history and injury impact their physical and mental health on a daily basis. Indeed, these findings echo many aspects of similar research conducted within other sub-populations of veterans (Littman et al., 2014, 2017; Buis et al., 2011).

An unexpected finding, however, was a fear among several participants that engaging with physical activity, despite beliefs that physical activity could significantly benefit their function and quality of life, may negatively influence their entitlement to disability allowance and income, which may be low to begin with. The BCW highlights the impact that policy and legislation can have on behaviour and, while this can promote positive behaviours, examples, such as this, exist that clearly discourage positive behaviour. Whilst this study represents only a relatively small number of veterans that are WIS who reside in South Wales, this may indicate a wider problem for people with disabilities. This UK-wide policy may discourage many people with disabilities from engaging in physical activity, and revisions of British government policy will be key to reducing this perceived barrier.

As highlighted in the COM-B model, reflective motivation can be affected by opportunity and capability (Michie et al., 2011, 2014). Reflective motivation in the form of lack of confidence in ability to do physical activity provided a significant barrier among participants. Media coverage may have exacerbated this perceived barrier as high-profile physical activity

opportunities for veterans are often portrayed in the context of elite, competitive and high-level sport. In this, participants' low levels of confidence in their ability (reflective motivation) were being negatively impacted by many of the physical activity opportunities that were perceived to require high levels of training and ability (physical opportunity); resulting in a barrier to physical activity. This is particularly poignant given that physical activity may have also been a negative experience in the past, thus, overcoming these evaluative aspects of motivation may be challenging. However, a unique aspect of this research was the evaluation of reflective motivation related to the beliefs about consequences related to physical activity engagement.

Veterans perceived physical activity to increase a belief in oneself and improve physical and mental health and physical fitness; all of which were identified as perceived barriers to physical activity. This would suggest a reciprocal relationship between some physical capability, psychological capability, and reflective motivation barriers and the perceived benefits of physical activity. For example, a perceived barrier, such as lack of confidence in ability to do physical activity, will likely reduce through increased self-belief gained through participation. Increased belief in oneself is a common outcome of physical activity engagement for veterans (Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014). However, a challenge exists in overcoming initial barriers to engagement in order for veterans that are WIS to benefit from this potential reciprocal relationship.

### **3.4.2 Behaviour Change Wheel implications**

The BCW suggests many intervention functions can be utilised to increase engagement in a specific behaviour. As seen in Chapter One, section 1.1.3.3, Figure 1.6, the COM-B matrix of intervention functions shows how one may design or augment an intervention to overcome barriers to participation. Using the perceived benefits identified, education and persuasion functions could be developed and implemented to inform veterans that are WIS of the benefits

of physical activity. For example, providing and effectively communicating information related to how physical activity can improve physical and mental health and how it can be conducted, while overcoming limitations in physical health and function may prove useful. However, if initial engagement is challenging, additional incentivisation could help motivate participants to attend. Particularly as a reciprocal relationship appears to exist between several perceived barriers and benefits, using incentivisation to initially engage and initiate the reciprocal relationship may be an effective method of promoting physical activity.

Environmental restructuring and enablement may also be effective methods of overcoming significant barriers identified in this study. These intervention functions may involve providing financial support to veterans that are WIS, which would enable and encourage them to engage in physical activity in a suitable location that is accessible and has facilities for caregivers. Not only may environmental restructuring overcome many perceived physical opportunity barriers, but may also reduce perceived social opportunity barriers identified in this study, such as the negative attitude of other veterans, others' lack of knowledge about personal injury, and the attitudes of other non-disabled members, through a restructuring of the environment that discourages and prevents these. However, due to limitations of the participant sample used in this study, one should interpret intervention function recommendations with caution. Future research associated with physical activity behaviour among veterans that are WIS is warranted.

### **3.5 Strengths, Limitations and future recommendations**

A primary strength of this study was the use of the BCW in the context of physical activity behaviour among veterans that are WIS. To date, this is the first study of its kind in this area and therefore provides a unique insight. In addition, the inclusion of the perceived benefits of physical activity, which gives a unique perspective into the reflective motivation of veterans that are WIS and can be subsequently used to promote physical activity. In addition, the

interviewer being a military veteran proved to be a unique strength of this study; resulting in a mutual understanding of past experience, a quickly established rapport, and a potentially more direct and honest response from participants.

During the course of this study, two limitations were identified. Firstly, including and contacting socially isolated participants who do not engage with physical activity was a significant challenge. This may have created a biased, one-dimensional perspective consisting only of those non-socially isolated veterans who were engaging in physical activity or support groups to some extent. To overcome this, a thematic analysis was employed to explore the perceptions of veterans that are WIS regarding the barriers to physical activity for other, more socially isolated veterans that are WIS. While this may be viewed as a limitation, this method of data collection revealed key information relating to potential barriers of veterans that are WIS who are more socially isolated. Specifically, information surrounding governmental policy that is perceived to threaten, or reduce income of veterans that are WIS if they are seen to be more functional by participating in physical activity.

Secondly, participants predominantly lived in the South Wales area. This could have implications for the nature of perceived barriers to, and benefits of physical activity, as, in comparison to other parts of the UK, some parts of South Wales are rural. Living within a rural area may impact on perceptions of barriers, such as accessibility, and may explain why location was such a common barrier identified by participants in this study.

To address these limitations, future research may benefit from the development of a questionnaire related to the BCW to explore how the perceived barriers and benefits identified in this study apply to a larger, more diverse population, which, due to the nature of questionnaire-based research, can more easily recruit socially isolated veterans. Furthermore, as the data were derived from qualitative methodology and extracted through thematic analysis,

it is likely that some of these barriers and benefits represent unobserved latent variables. Using a larger sample and a quantitative approach, the barriers and benefits identified can be statistically analysed to further explore and identify hidden constructs.

### **3.6 Summary**

The BCW, TDF, and COM-B model have seen increasingly successful application in the development and evaluation of behaviour change interventions. This study identify the perceived barriers to, and benefits of physical activity among military veterans that are WIS. Physical capability, psychological capability, physical opportunity, and reflective motivation were identified as significant barriers to physical activity engagement, one of which identified perceptions of British governmental policy that served to discourage veterans that are WIS from participating in physical activity. Many of these perceived barriers, however, particularly relating to physical capability, psychological capability, and reflective motivation, were believed to be reduced through physical activity participation. This has important implications for intervention functions and how one designs an intervention to address these perceived barriers. For this reason, based on the findings of this study, incentivisation, education, persuasion, enablement and environmental restructuring are suggested to be potentially beneficial when seeking to increase levels of physical activity among veterans that are WIS living within the United Kingdom.

The following chapter builds upon the information gained in this study and aims to pursue the recommended direction of future research by developing a questionnaire and distributing it to a larger, more diverse sample of veterans that are WIS.



## **Chapter 4**

# **Identifying the Perceived Barrier to, and Benefits of Physical Activity Among British Military Veterans that are Physically Wounded, Injured, and/or Sick: Building upon Qualitative Findings Through Survey-Based Research**

### **4.1 Introduction**

This chapter, and its subsequent publication (Walker, Limbert, et al., 2021), builds upon research findings reported in the previous chapter by further exploring the information gained through qualitative methods. In doing so, the theory of physical activity behaviour change for veterans that are wounded, injured, and/or sick (WIS), a key element in the development of a complex intervention (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008), can be strengthened by addressing the associated limitations of the research reported in Chapter Three. These limitations included the small sample size and lack of inclusion of veterans who are more socially isolated. Addressing such limitations will ensure that a valid theory of behaviour change, for this context, is established.

Not only may further exploration of physical activity behaviour among veterans that are WIS provide a more detailed understanding of the perceived barriers and benefits, but it should provide important information related to intervention development. Michie et al. (2014) suggested that behaviour change interventions should not be all encompassing and attempt to overcome all aspects of behaviour change, but rather focus on a small number of specific, key behaviour change problems. Through qualitative methodology and thematic analysis, the research reported in Chapter Three identified a wide range of perceived barriers and benefits, making identifying key barriers and benefits difficult. Whereas, a quantitative methodology allows data to be statistically analysed and prominent barriers and benefits identified.

Moreover, quantitative methodology permits larger sample recruitment and may encourage veterans who are more socially isolated to participate in the study, as it can be conducted from the safety and comfort of one's home. Thus, through quantitative methods, limitations of the previous chapter can be addressed, whilst key perceived barriers to, and benefits of physical activity can be identified in preparation for the design of a behaviour change intervention. A mixed method approach, such as that reported in the current and previous chapter, have been utilised to explore physical activity barriers among school children (Jaarsma et al., 2015), low income groups (Withall et al., 2011), and veterans with lower limb loss (Littman et al., 2014, 2017).

This research reported in this chapter involved the design and distribution of a questionnaire, based upon the findings reported in Chapter Three, alongside a measure of physical activity to further explore and identify the key perceived barriers to, and benefits of physical activity among veterans that are WIS.

#### **4.1.1 Objectives**

This study had three objectives:

1. To build upon the findings reported in Chapter Three through the design and distribution of a questionnaire to explore perceived barriers and benefits of physical activity among a larger sample of veterans that are WIS;
2. To compare perceived barriers and benefits of physical activity to self-reported levels of physical activity and participant demographics to highlight key barriers and benefits; and
3. To use the BCW and its COM-B analysis to categorise key barriers and benefits of physical activity, leading to the creation of practical recommendations for the design of a behaviour change intervention.

## **4.2 Methodology**

### **4.2.1 Participants**

Inclusion/exclusion criteria for participants echoed that reported in Chapter Three, Section 3.2.2. To ensure that participants met these criteria, screening questions were included prior to data collection. Participants were only included in the sample if they answered the screening questions in a way that met the criteria. These preliminary questions confirmed that any person participating in this study was within the target population.

In total, 105 military veterans that are WIS submitted complete questionnaire responses (See Chapter One, Section 1.1.1 for definitions). A power analysis calculation for this study was conducted using the software G\*Power 3 (Version 3.1; Faul et al., 2007). Based upon a medium effect size, a total sample size of 220 was required to avoid type I or type II statistical errors. However, due to the specificity of the target population, the researcher was not able to recruit a sample of 220 participants.

The age of participants ranged from 27 to 79 years ( $M = 51.88$ ,  $SD = 9.81$ ), with rank at time of discharge from service ranging from the lowest (Private, Able Rate, Aircraftman) to senior officers (Lieutenant Colonel, Commander, Wing Commander). Summary information relating to participants' demographics can be found in Table 4.1.

Table 4.1

*Participant Demographic Information*

<b>Sample</b>	N= 105		
		n	%
<b>Gender</b>	Male	80	76.2
	Female	25	23.8
<b>Godin Leisure-time Category</b>	Active	56	53.3
	Moderately active	17	16.2
	Sedentary	32	30.5
<b>Service</b>	Army	77	73.3
	Royal Navy	11	10.5
	Royal Air Force	17	16.2
<b>Length of Service</b>	< 4 years	5	4.8
	4-8 years	25	23.8
	9-12 years	22	21
	13-16 years	14	13.3
	17-20 years	11	10.5
	21+ years	28	26.7
<b>Rank</b>	Non-commissioned officer/junior rank	93	88.5
	Commissioned officer	12	11.5
<b>Daily impact of injury</b>	Frequently	82	78.1
	Somewhat frequently	19	18.1
	Infrequently	3	2.9
	No response	1	0.9
<b>Require a caregiver</b>	Full-time	15	14.3
	Part-time	11	10.5
	No	78	74.3
	No response	1	0.9
<b>Mental health condition</b>	Yes	85	81
	No	20	19
<b>Mental health conditions Types</b>	Post-traumatic stress disorder	47	44.8
	Depression	60	57.1
	Anxiety	57	54.3
<b>Place of birth</b>	United Kingdom	100	95.2
	Bahrain	1	1

	Germany	2	1.9
	Iraq	1	1
	Ireland	1	1
<b>Country of residence</b>	England	58	55.2
	Wales	31	29.5
	Scotland	11	10.5
	Northern Ireland	3	2.9
	Germany	2	1.9
<b>Highest level of education</b>	Secondary School	34	32.4
	College/sixth form	39	37.1
	University Undergraduate	19	18.1
	University postgraduate	13	12.4
<b>Employment status</b>	Full-time employment/education	41	39
	Part-time employment/education	13	12.4
	Unemployed	24	22.9
	Retired	26	24.8
	No response	1	0.9
<b>Annual income</b>	£0 - £10,000	19	18.1
	£10,000 - £20,000	35	33.3
	£20,000 - £30,000	20	19
	£30,000 - £40,000	9	8.6
	£40,000 - £50,000	13	12.4
	£50,000 - £60,000	3	2.9
	£60,000 - £70,000	1	0.9
	£70,000+	2	1.9
	No response	3	2.9

Participants were recruited using mailing lists that were provided by Help for Heroes, the British national military charity for veterans and military personnel supporting the research reported in this thesis. In addition, a poster advertising the study was placed on the social media pages of several prominent, but independent British military veteran groups.

#### **4.2.2 Measurement tools**

Measurement tools were uploaded online via the survey software Qualtrics (2020; January 2020 version). Measures related to participant demographics, perceived barrier to, and benefits of physical activity, and current levels of physical activity.

##### ***4.2.2.1 Perceived barriers to, and benefits of physical activity questionnaire***

A questionnaire was created and distributed to assess the perceived barriers to, and benefits of physical activity among veterans that are WIS. Questions were designed using the thematic analysis of semi-structured interview data outlined in Chapter Three. The researcher made an informed decision as to which themes previously reported in Chapter Three were included, drawing upon the relevant literature and his experiences with Help for Heroes and the veteran community. However, as questionnaire response fatigue was a likely barrier to participant recruitment, themes were carefully considered, and many minor themes identified in the research reported in Chapter Three excluded. Selected themes that were included in the questionnaire can be seen in Table 4.2. Each theme was included using three related, but differently worded items, so that reliability could be evaluated post-data collection.

Table 4.2

*Selected Perceived Barriers to, and Benefits of Physical Activity Questionnaire Themes*

Selected perceived barrier themes	Selected perceived benefit themes
<ul style="list-style-type: none"> <li>• Lack of interest in organised activities</li> <li>• Lack of awareness of physical activity</li> <li>• Financial circumstances</li> <li>• Location of activities</li> <li>• Discomfort in new environments</li> <li>• Dislike of competitive activities</li> <li>• Lack of time</li> <li>• Previous negative experience of physical activity</li> <li>• Lack of confidence in ability to do physical activity</li> <li>• Poor mental health</li> <li>• Poor physical health</li> </ul>	<ul style="list-style-type: none"> <li>• Improved physical fitness</li> <li>• Increased confidence</li> <li>• Improved mental health</li> <li>• Improved physical health</li> <li>• Opportunity to get out of the house</li> <li>• Opportunity to socialise</li> <li>• Feeling a sense of purpose</li> </ul>

Based on these themes, a series of statements was designed using a 5-point Likert scale which asked participants to consider to what extent they either agreed or disagreed with each statement, with higher scores being associated with greater levels of agreement with the statement (*i.e.* 5 being strongly agree). Although 7, 9, and 10-point Likert scales have been suggested as statistically preferable (Preston & Colman, 2000), a 5-point Likert scale was selected as previous research has considered its implementation increases response quality and decreases frustration levels (Sachdev & Verma, 2004). This was particularly important in the current study as veterans that are WIS may suffer from poor mental health and, therefore, ensuring the questionnaire was as simple to complete as possible was important to maximise response quality and quantity. Five-point Likert scales are widely used instruments for measuring opinions, attitudes, and beliefs that allow for a neutral response (DeVellis, 2017). Allowing a neutral response to questions was considered important, as participants may not have a particular opinion or experience related to a specific barrier or benefit. The inclusion of a midpoint has also shown that it can increase the reliability estimate of an instrument (Adelson & McCoach, 2010).

#### **4.2.2.2 Physical activity assessment questionnaire**

The Godin-Shepard Leisure Time Physical Activity Questionnaire (GSLTPAQ) (Godin, 2011) was used to assess participants' self-reported physical activity levels. The GSLTPAQ was used due to its simplicity and former application in the context of physical activity-related research with military veterans (Goldstein et al., 2018; Littman et al., 2014). Moreover, the GSLTPAQ has been shown to be reliable through comparisons with maximum oxygen consumption and body fat in adults (Godin & Shephard, 1985), and more recently among persons with significant illness, with an ICC of .74, with a 95% confidence interval from .69 to .78 ( $F(1, 533) = 3.74, p = <.001$ ) (Motl et al., 2014). The GSLTPAQ required participants to select the frequency with which they participate in light, moderate, and intense physical activity, giving participants examples for each type of activity. The frequencies were then weighted and a total score of physical activity levels calculated and identified as either sedentary, moderately active, or active.

#### **4.2.3 Data analysis**

Data analyses were completed using IBM SPSS statistics software for Windows, version 24. Cronbach's coefficient alpha was used to ascertain reliability of the questionnaire items. Items were then either included or excluded, depending on their effect on questionnaire reliability. Average values of items comprising each theme were calculated. Newly developed questionnaires are likely to measure constructs that cannot be directly observed, otherwise known as latent variables (DeVellis, 2017). As the questionnaire design was based upon qualitative data, it was considered likely findings would represent unobserved latent variables, or variables that represent the same underlying construct. For this reason, two separate exploratory factor analyses were used to identify latent variables of the perceived barriers to, and the benefits of physical activity.



Following exploratory factor analysis, difference, correlation and regression analyses were conducted on the subsequent factors or themes and demographic information or physical activity levels. As the data consisted entirely of Likert data, nonparametric tests were utilised. Statistical tests for difference included Mann-Whitney U test and Kruskal-Wallis H test; whereas, the associational statistic consisted of Spearman's Rho. Statistical significance was determined as  $p \leq .05$ .

As the sample of this study predominantly consisted of active individuals ( $n = 56$ , 53.33%), according to the GSLTPAQ, additional analyses were conducted involving only insufficiently active participants; that is, those who are categorised as moderately active or sedentary with a GSLTPAQ score of 23 or less ( $n = 49$ , 46.67%). These categories of activity have been shown to reflect whether a person is meeting physical activity guidelines, including American and Canadian guidelines (Amireault & Godin, 2015; Godin, 2011), which largely reflect the current UK guidelines of 150 minutes of moderate physical activity per week (Department of Health and Social Care, 2019). Completing an analysis on just the less active participants ensured that the results were not biased towards those who were already participating in high levels of physical activity.

#### **4.2.4 Ethics**

Ethical approval was gained through Cardiff Metropolitan University's School of Sport Ethics Committee. Project reference number: PGR-1300.

As with the study reported in Chapter Three, all general ethical concerns were considered. However, this study held a unique ethical implication related to identifying a participant's completed questionnaire who wished to withdraw their data during a two week timeframe noted in the participant information sheet. In order to ensure anonymity, information, such as names and addresses, were not required in the questionnaire. To allow participant information to be

identified, whilst ensuring anonymity, a unique identifier was created and asked to be entered into the demographic information section of the questionnaire. The unique identifier consisted of the first four digits of the individual's military number and their six-digit date of birth. This made participant information easily identifiable upon request and held several other benefits. As the researcher has extensive experience in the military, he is able to determine whether a military number is legitimate, and whether the first four digits matched the date of birth. Military numbers follow a certain pattern and are time based; therefore, some dates of birth cannot match certain military numbers, thus, fake military numbers would be obvious to the researcher. Furthermore, a unique identifier allowed multiple entries to be identified and excluded, ensuring the reliability and validity of results.

### **4.3 Results**

#### **4.3.1 Comparisons between demographic variables and physical activity levels**

Comparisons between key demographic variables and physical activity levels revealed two significant differences. Physical activity levels differed between branches of service (Army, Royal Navy, Royal Air Force) ( $H(2) = 9.07, p = .011$ ). In addition, participants who reported experiencing greater daily impact from their injury or illness participated in less physical activity ( $H(2) = 7.15, p = .028$ ). However, physical activity levels did not differ between gender, length of service, country of residence, caregiver requirement, education, rank, employment, self-reported PTSD, depression and frequent anxiety. Mean ( $\pm$ SD) levels of physical activity among demographic variables can be seen in Table 4.3.

Table 4.3

*Differences in Mean ( $\pm$ SD) Values of Godin-Shepard Leisure Time Physical Activity Questionnaire Total Scores and Demographic Information*

		Physical activity levels M( $\pm$ SD)
<b>Gender</b>	Male	34.69 (32.69)
	Female	36.92 (34.97)
<b>Branch of service</b>	Army	40.01 (34.6) *
	Royal Navy	18.27 (17.4)
	Royal Air Force	22.29 (27.52)
<b>Length of service</b>	< 4 years	34 (16.97)
	4-8 years	40.72 (41.07)
	9-12 years	33.82 (29.56)
	13-16 years	24.79 (17.6)
	17-20 years	37.45 (33.21)
	21+ years	35.56 (37.11)
<b>Rank</b>	Officer	24.34 (14.75)
	Non-Commissioned Officer	36.62 (34.56)
<b>Daily impact of injury</b>	Frequently	31.43 (31.93)*
	Somewhat frequently	49.42 (37.26)
	Infrequently	45 (13.53)
<b>Require a caregiver</b>	Full-time	37.8 (27.36)
	Part-time	31.73 (31.95)
	No	35.06 (34.66)
<b>Mental health condition</b>	None	27.55 (26.15)
	Post-traumatic stress disorder	40.47 (33.16)
	Depression	35.63 (34.4)
	Anxiety	40.05 (35.56)
<b>Country of residence</b>	Wales	37.33 (37.23)
	England	37.42 (34.16)
	Scotland	23.64 (20.77)
	Northern Ireland	29 (19.29)
	Germany	17.5 (20.51)
<b>Highest level of education</b>	Secondary School	33.06 (31.4)
	College/sixth form	37.31 (34.91)
	University Undergraduate	31.67 (32.19)

	University postgraduate	37.42 (38.78)
<b>Employment status</b>	Full-time employment/education	43.65 (36.51)
	Part-time employment/education	26.69 (16.98)
	Unemployed	34.39 (38.36)
	Retired	27.46 (27.78)
<b>Annual income</b>	£0 - £10,000	28.21 (32.22)
	£10,000 - £20,000	35.06 (34.13)
	£20,000 - £30,000	42.05 (29.91)
	£30,000 - £40,000	30.45 (28.22)
	£40,000 - £50,000	38.38 (47.19)
	£50,000 - £60,000	38 (28.21)
	£60,000 - £70,000	25 (0)
	£70,000+	41 (11.31)

*Note.* 0-13 = sedentary. 14-23 = moderately active. 24+ = active. \* denotes difference ( $p \leq .05$ ) compared to other categories.

#### 4.3.2 Perceived Barriers

Adequate reliability was determined for nine of 11 barriers included in the questionnaire (Cronbach's  $\alpha \geq .7$ ). Both 'financial' and 'lack of interested in physical activity' barriers were identified as having low reliability, .66 and .51 respectively. One of the three items constituting the financial barrier theme was removed to improve its reliability from .66 to .81. However, all items were retained in the lack of interest in physical activity barrier theme, as their removal did not improve reliability.

A principal axis factor analysis was conducted on the 11 themes related to the perceived barriers with oblique rotation (direct oblimin). The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for the analysis,  $KMO = .73$  ("middling" according to Hutcheson & Sofroniou, 1999), and all KMO values for individual items were above .6, which is above the acceptable limit (Field, 2018). An initial analysis was run to obtain eigenvalues over Kaiser's criterion of 1. Four factors had eigenvalues of over 1 and in combination explained 66.83% of the variance. The scree plot also supported the extraction of four factors and Table 4.4 illustrates factor loadings after rotation. A factor loading criterion of .512 was used, as this is recommended for this study's sample size (Stevens, 2002). Factor three was

discarded from further analysis as only one variable adequately loaded onto the factor ( $\geq .512$ ).

The themes that clustered on the same factor suggest that factor 1 is poor mental health, factor 2 is negative beliefs about physical activity, and factor 4 is beliefs about physical capability.

Factors 1 and 4 were considered reliable ( $\alpha = \geq .71$ ). However, factor 2 held low reliability ( $\alpha = .51$ ).

Table 4.4

*Factor Loadings of Perceived Barriers to Physical Activity Engagement*

Variable	Factor			
	Poor mental health	Negative beliefs about physical activity	Factor 3	Beliefs about physical capability
Dislike of new environment	.795			
Poor mental health	.751			
Location	.572			
Not interested in physical activity		.786		
Dislike of competition		.516		
Lack of awareness			-.929	
Lack of confidence in ability to do physical activity				.745
Poor physical health				.726
Financial				
Previous negative experience				
Time				
<b>Eigenvalues</b>	3.51	1.49	1.17	1.09
% of variance	31.93	13.51	10.6	9.9
Cronbach's $\alpha$	.74	.51	N/A	.71

*Note.* Only factor loadings higher than .512 are displayed. Unable to calculate Cronbach's  $\alpha$  values for factor 3 due to single variable loading.

Comparing scores of the three factors, poor mental health, negative beliefs about physical activity, and beliefs about physical capability, revealed that female participants reported feeling more physically capable ( $U = 3960$ ,  $p = .04$ ,  $r = .21$ ). Insufficiently active participants reported beliefs that they were less physically capable of engaging in physical activity ( $U = 2257$ ,  $p = <$

.001,  $r = .45$ ) and held greater negative beliefs about physical activity ( $U = 2554$ ,  $p = .008$ ,  $r = .26$ ).

Spearman's Rho was used to assess relationships between physical activity levels and the three factors. In the total sample ( $N = 105$ ) and insufficiently active sample ( $n = 49$ , 46.67%), beliefs about physical capability were negatively correlated with physical activity levels. Negative beliefs about physical activity were positively correlated with physical activity in the total sample; whereas, poor mental health positively correlated with physical activity levels in the active sample ( $n = 56$ , 53.33%). A correlation matrix can be seen in Table 4.5.

Table 4.5

*Spearman's Rho Correlation Matrix of Factors and Physical Activity Levels*

		Poor mental health	Negative beliefs about physical activity	Beliefs about physical capability
Physical activity levels	Total sample	.13	.24*	-.51**
	Active sample	.28*	.06	-.26
	Insufficiently active sample	.14	-.18	-.32*

Note. \*\* = significance  $\leq .01$ . \* = significance  $\leq .05$ .

Multiple regression revealed an unreliable model, with confidence intervals crossing zero, therefore, analyses are based upon correlation statistics.

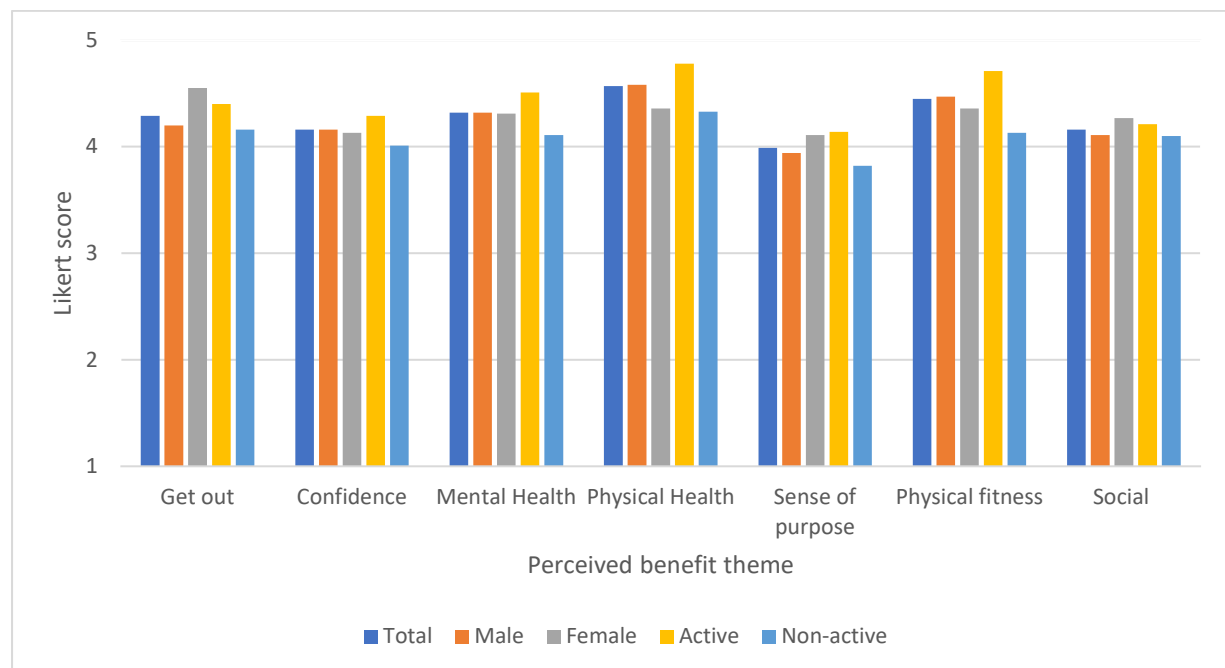
### 4.3.3 Perceived Benefits

Mean scores of the perceived benefits relating to the total sample ( $n = 105$ ), as well as values for male ( $n = 80$ , 76.19%), female ( $n = 25$ , 23.81%), active ( $n = 56$ , 53.33%), and insufficiently active ( $n = 49$ , 46.67%) sub-groups are illustrated in Figure 4.1. Cronbach's  $\alpha$  for all themes

was  $\geq .71$ , suggesting adequate reliability. A principle axis factor analysis was conducted on the seven themes with oblique rotation (direct oblimin). However, no factors with eigenvalues over 1 were identified. This suggested that the themes did not measure the underlying constructs. Therefore, subsequent analyses employed mean theme scores.

Figure 4.1

*Mean Values of Perceived Benefits of Physical Activity for the Total Sample, Male, Female, Active, and Insufficiently Active Participants*



*Note.* Higher scores represent higher reporting of each benefit.

Perceived benefit scores did not differ significantly between male ( $n = 80$ , 76.19%) and female ( $n = 25$ , 23.81%) participants. However, active participants ( $n = 56$ , 53.33%) reported significantly higher beliefs that physical activity can improve confidence ( $U = 1065$ ,  $p = .04$ ,  $r = .2$ ), improve mental health ( $U = 975$ ,  $p = .01$ ,  $r = .26$ ), improve physical health ( $U = 810.5$ ,  $p = < .001$ ,  $r = .38$ ), give a sense of purpose ( $U = 1049$ ,  $p = .04$ ,  $r = .2$ ), and improve physical fitness ( $U = 696.5$ ,  $p = < .001$ ,  $r = .43$ ), than insufficiently active participants ( $n = 49$ , 46.67%).

Themes of increasing mental health, increasing physical health, sense of purpose, and increasing physical fitness held significant positive relationships with physical activity levels in the total sample. However, as reported in Table 4.6, no significant relationships were identified among the insufficiently active or active sub-groups.

Table 4.6

*Spearman's Rho Correlation Matrix of Perceived Benefits and Physical Activity Levels*

		Opportunities to get out	Increasing confidence	Increasing mental health	Increasing physical health	Sense of purpose	Increasing physical fitness	Opportunity to socialise
Physical activity levels	Total sample	.18	.18	.27**	.37**	.25*	.41**	.07
	Active sample	.24	-.01	.13	.15	.16	.14	.05
	Insufficiently active sample	.2	.08	.07	.02	.14	.05	.07

*Note.* \* = significance  $\leq .05$ . \*\* = significance  $\leq .01$ .

The four themes identified as significant among the total sample in the correlation matrix were further analysed using multiple regression. However, the 95% bootstrapped CIs for three of the four themes crossed zero, suggesting an unreliable model. Consequently, this model has not been reported, thus inferences are based solely upon the correlation matrix.

## 4.4 Discussion

The findings from this study build upon previous research reported in Chapter Three related to physical activity behaviour among veterans that are WIS. Initially, the key perceived barriers to, and benefits of physical activity that were identified will be discussed. Following this, findings will be linked to the BCW and practical recommendations offered relating to the application of intervention functions and their potential use in the design of future behavioural



intervention (See Chapter One, Section 1.1.3.3 for a description of the BCW and its related components).

#### **4.4.1 Perceived barriers to physical activity**

As hypothesised, unobserved, latent variables were identified from the questionnaire data, with four factors being extracted from the perceived barrier themes. However, only three of these factors were identifiable within the current study. A qualitative thematic analysis reported in Chapter Three identified the theme poor physical health, that was subsequently categorised as part of BCW COM-B category physical capability, as participants reported that their physical health often reduced their ability to participate in physical activity. However, the factor analysis of the current study revealed that the themes poor physical health and lack of confidence in ability to do physical activity represented the same construct. This suggests that rather than an objective rating of physical health, this construct is more likely to represent beliefs surrounding physical health and its effect on perceived personal capability.

Only beliefs about physical capability differed between males and females with respect to perceived barriers to, and benefits of physical activity. However, the low effect size of this statistic would suggest that differences, if any, were minor. This finding provides important information as the exclusion of women from research linked to physical activity in veterans has resulted in a knowledge gap within existing literature (Shirazipour, Tennant, et al., 2019).

Separating the sample between active participants, those with a GSLTPAQ score of 24 or more, and insufficiently active participants, those with a GSLTPAQ score of 23 or less, identified a number of significant differences. Insufficiently active participants had significantly lower beliefs in their physical capability. Moreover, beliefs about physical capability and physical activity levels held the strongest correlations among both the total sample and insufficiently active sub-group. This suggests that beliefs about physical capability represent a key barrier to

physical activity engagement within the current study and that veterans that are WIS, with lower current levels of physical activity, experience this barrier to a greater extent.

#### **4.4.2 Beliefs about physical capability and physical activity**

Beliefs about capability are often labelled as ‘self-efficacy’ within the psychological literature (Schunk & DiBenedetto, 2020; Bandura, 1997). A central component of Social Cognitive Theory, one of the major theories of motivation, Self-Efficacy Theory posits that those who feel efficacious are more likely to engage in cognitive and behavioural activities that improve their learning (Schunk & DiBenedetto, 2020). Physical activity self-efficacy has consistently been shown to correlate with physical activity levels (Bauman et al., 2012; McAuley & Blissmer, 2000), including among people with disabilities (Jaarsma & Smith, 2018). Self-efficacy has also been shown to facilitate leisure time physical activity among people with disabilities (Martin Ginis et al., 2016), and has been used in the promotion of physical activity behaviour among older veterans with PTSD (Hall et al., 2020).

According to qualitative research, low self-efficacy is a barrier to physical activity participation among veterans with lower limb loss (Littman et al., 2017). The findings of the current study build upon these previous qualitative findings. To the knowledge of the researcher, it provides the first quantitative association between physical activity levels and self-efficacy among veterans that are WIS.

#### **4.4.3 Perceived benefits of physical activity**

Likely due to the small sample size of the active and insufficiently active sub-groups, perceived benefits only correlated with physical activity levels of the total sample. These included increasing physical fitness, increasing physical health, increasing mental health, and providing a sense of purpose; active participants expressed stronger belief in these benefits.

The belief that physical activity can have a positive impact on mental and physical health and provide a sense of purpose has been identified through qualitative methodology among veterans that are WIS (see Chapter Three) and veterans with a lower limb loss (Littman et al., 2017). However, in the current study, the strongest association identified with physical activity levels was increasing physical fitness. Whilst this was identified as a theme in the qualitative research reported in Chapter Three, to the researcher's knowledge, this is the first study that has identified a relationship between beliefs that physical activity can increase fitness and reported levels of physical activity amongst veterans that are WIS.

Outcome expectations of a behaviour, such as the perceived benefits within the current study, is a determinant of the behaviour according to both the BCW (Michie et al., 2014) and Social Cognitive Theory (Schunk & DiBenedetto, 2020; Bandura, 1997). Outcome expectations have been identified as a contributory factor to leisure time physical activity among people with disabilities (Martin Ginis et al., 2016). However, in their systematic review of reviews, Choi, Lee, Lee, Kang, and Choi (2017) suggested that self-efficacy, was a stronger and clearer correlate of physical activity than outcome expectations. This mirrored the findings of the current study, that observed beliefs about physical capability as a stronger correlate of physical activity than all of the outcome expectations (*i.e.* perceived benefits). Therefore, whilst interventions targeting the outcome expectancies may be beneficial, researchers and practitioners may find targeting self-efficacy more effective in encouraging physical activity behaviour change among veterans that are WIS.

#### **4.4.4 Behaviour Change Wheel Implications**

##### **4.4.4.1 COM-B analysis**

The qualitative research reported in Chapter Three on which the current study was based, was the first COM-B analysis to be performed with veterans that are WIS. However, due to the

factor analysis reported above identifying latent variables within the themes outlined in Chapter Three, a new COM-B analysis was appropriate.

Findings had significant implications in terms of a COM-B analysis. Reflective motivation and psychological capability categorised the three constructs of barriers to physical activity in the current study. Specifically, the reduction of the original 11 perceived barrier themes into three factors identified the prominence of reflective motivation barriers among veterans that are WIS. This leads to important considerations in terms of designing behavioural interventions. For example, research reported in Chapter Three suggested that physical capability (*i.e.* poor physical health) was a predominant barrier to physical activity. To overcome this barrier, practitioners may provide adaptive equipment and suitable training to ensure its safe and correct use (Michie et al., 2014, 2011). However, as identified in the current study, poor physical health represented the same factor as lack of confidence in ability to do physical activity, hence this is likely to describe perception/beliefs surrounding poor health, rather than an objective reality, and its impact on perceived capability. Thus, providing equipment may not be an appropriate strategy to overcome barriers related to perceptions/beliefs. Table 4.7 presents a COM-B analysis of the factors identified in the current study.

Table 4.7

*COM-B Analysis of the Perceived Barriers to Physical Activity Engagement Among Veterans that are WIS*

COM-B component		Perceived barriers
<b>Capability</b>	<b>Psychological</b>	<ul style="list-style-type: none"> <li>Poor mental health</li> </ul>
	<b>Physical</b>	
<b>Opportunity</b>	<b>Physical</b>	
	<b>Social</b>	
<b>Motivation</b>	<b>Automatic</b>	
	<b>Reflective</b>	<ul style="list-style-type: none"> <li>Beliefs about physical capability</li> <li>Negative beliefs about physical activity</li> </ul>

Due to the nature of perceived benefits, all were categorised as the *beliefs about consequences* TDF domain that has been mapped to the BCW (Cane et al., 2012). Consequently, all perceived benefits were categorised as reflective motivation.

#### **4.4.4.2 Intervention functions**

As discussed in Chapter One, Section 1.1.3.3, the BCW provides a number of intervention functions that, following a COM-B analysis, can be used to facilitate behaviour change (Michie et al., 2014, 2011). Based upon the results of the current study, future intervention design may benefit from targeting reflective motivation among veterans that are WIS, as these appear to be most associated with physical activity levels. Michie et al. (2014, 2011) suggested that intervention functions that target reflective motivation barriers may include education, persuasion, incentivisation and coercion (see Figure 1.6). Although coercion in the form of a loss-framed financial incentive has shown to improve daily step count amongst people with ischemic heart disease (Chokshi et al., 2018), coercion was not considered appropriate for veterans that are WIS due to their potential physical and mental vulnerability. Thus, education, persuasion, and incentivisation will be discussed.

##### **4.4.4.2.1 Education**

Greater levels of knowledge have been associated with greater levels of physical activity (Fredriksson et al., 2018), and education has been identified as playing an important role in leisure time physical activity among people with disabilities (Martin Ginis et al., 2016). Practitioners often use educational materials as a component of physical activity interventions (Krebs et al., 2020; Selzler et al., 2020; Cavallo, et al., 2012), including those targeted at veterans (Townsend et al., 2018; Harrold et al., 2018; Ewert, 2014). A modelling-based video education intervention has been shown to increase exercise self-efficacy among a sample with chronic obstructive pulmonary disease (Selzler et al., 2020). However, the application of

education in interventions often exists amongst several other interventional components, such as modelling, making it difficult to determine the extent to which education contributed to the success of each intervention. Nevertheless, education is considered an important facilitator of physical activity behaviour among people with disabilities and can be used as an intervention function to overcome both psychological capability and reflective motivation (Michie et al., 2014, 2011). Both of which were identified as barriers to physical activity among veterans that are WIS in the current study.

#### **4.4.4.2.2 Persuasion**

Persuasion utilises communication to induce positive or negative feelings or stimulate actions and can be used to overcome reflective motivation barriers (Michie et al., 2014, 2011). Persuasive technologies are commonly used with electronic devices, such as mobile applications, and have been shown to have a positive impact on physical activity behaviour (Matthews et al., 2016). Persuasive technologies allow the self-monitoring of physical activity behaviour and can provide automated messages and feedback to prompt behaviour change (Matthews et al., 2016). For example, ‘Fitbit’ (Fitbit, n.d.) is a popular persuasive technology that targets physical activity behaviour. In a technologically developing world, this form of persuasion may be a particularly useful intervention modality. In a veteran context, however, an RCT of a persuasive mobile application intervention observed a decline in physical activity levels and participant retention among participants at a 12-month follow up (Damschroder et al., 2020). Similarly, another recent RCT testing the feasibility of an intervention using persuasive technology did not identify increases in physical activity behaviour (Christiansen et al., 2020), although, participant retention in the latter study remained high, and a lack of statistical significance could be explained by the small sample size of that feasibility study. Therefore, the application of persuasive technologies for veterans may warrant further investigation.

Motivational Interviewing, a directive, client-centered counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence (Miller & Rollnick, 2012), may also represent an effective method of persuasion. A recent systematic review identified that the application of Motivational Interviewing positively impacted levels of motivation for physical activity (Nuss et al., 2020). Whilst the application of Motivational Interviewing may involve more logistical considerations compared to the automated persuasive technologies of mobile applications, practitioners may find benefit in its application to overcome the reflective motivational barriers of veterans that are WIS.

#### **4.4.4.2.3 Incentivisation**

Incentivisation involves creating an expectation that an extrinsic reward will follow the desired behaviour and can be used for overcoming reflective motivational barriers (Michie et al., 2014, 2011). Incentives are useful to initiate behaviour until the behaviour, itself, becomes an intrinsically rewarding incentive. This may be particularly important in the promotion of physical activity behaviour among veterans that are WIS, as incentives may help overcome physical activity self-efficacy related barriers. Subsequently, according to Self-Efficacy Theory, this barrier will subsequently reduce through the individual acquiring performance accomplishments (Schunk & DiBenedetto, 2020; Bandura, 1997), thus, resulting in increased levels of physical activity.

Incentivisation has seen application in the promotion of physical activity, showing signs of its positive impact on physical activity behaviour (Ball et al., 2017; Finkelstein et al., 2016; Norman et al., 2016). In a veteran context, outdoor, nature-based physical activity interventions are often used for veterans with physical and mental health conditions (see Chapter Two; Shirazipour, Tennant, et al., 2019; Greer & Vin-Raviv, 2019). Such interventions provided by charitable organisations are usually free of charge and may provide an opportunity to conduct

expensive outdoor activities that participants would otherwise be unable to financially afford. For example, physical activity interventions in the form of fly-fishing (Bennett et al., 2017), horse riding (Gehrke et al., 2018), and outdoor recreation-based health and wellness programs (Townsend et al., 2018), may, as activities in themselves, provide incentives to participate. Practitioners may find the use of such activity-based incentives beneficial in the promotion of physical activity among veterans that are WIS.

#### **4.5 Strengths, limitations, and future research**

A key strength of this study lies in its design in relation to the BCW and COM-B model. The development of quantitative methods used were based upon findings of a previous, qualitative study, but the findings of the current study highlighted the importance of using larger, quantitative studies to explore the results of COM-B analyses stemming from qualitative data. The COM-B analysis reported in Chapter Three identified physical capability, psychological capability, physical opportunity, and reflective motivation as prominent categories of barriers. However, factor analysis made it possible to identify that these barriers represented latent variables that constituted a mixture of psychological capability and reflective motivational barriers; the latter of which significantly related to physical activity levels, which had subsequent implications for intervention design. For example, an intervention design based upon the COM-B analysis reported in Chapter Three may have resulted in a waste of resources, such as designing an intervention to overcome barriers that may not exist. This finding does not only apply in the field of physical activity behaviour change, but suggests that the wider application of the BCW and COM-B related research may benefit from using quantitative methodologies, where possible, to confirm and further investigate the results of qualitative data.

A second strength of this study lies in the number of female participants that were included. Almost a quarter (23.8%) of the sample included in this study was female, a proportion that



reflects the male dominated gender ratio of UK military veterans, which is 12.5% female (Ministry of Defence, 2019). This is particularly important as Shirazipour, Tennant, et al. (2019) identified a lack of inclusion of women as a limitation in the existing literature.

Limitations of the study included the sample size, which was not able to meet the recommended sample size of 220 participants based upon a medium effect. Despite the aid of a prominent military charity, recruiting larger numbers of such a specific group of participants proved challenging. Limitations related to statistical power have been noted in previous research surrounding veterans with health conditions and physical activity (Shirazipour, Aiken, et al., 2019; Johnston et al., 2015). Although such research may lack statistical power, vulnerable sub-populations are, by definition, small, and the avoidance of such research may create significant health disparities (Etz & Arroyo, 2015). Moreover, data from the current study identified predominantly small effect sizes, suggesting a sample larger than 220 may be required. Some statisticians advise a sample size of at least 300 for conducting exploratory factor analysis (Field, 2018). Despite this, the results of KMO testing suggested that, although this sample was relatively small, it was adequate for the factor analyses conducted (Stevens, 2002). However, the high number of active participants in this study may have biased results, thus, limiting their generalisability. Due to the small size of this sub-group, factor analysis was not conducted with insufficiently active participant data. Identifying a larger sample of insufficiently active veterans may be a useful direction for future research.

Another limitation may relate to the relatively few variables that loaded onto the three factors extracted. Although recommended that a minimum of three variables should load onto a factor (Raubenheimer, 2004), questionnaires have previously been developed using two variable-loaded factors; for example, the Big-Five Personality Domains Scale (Gosling et al., 2003). Within the current study, the research team considered that, despite the two factor loadings, there was sufficient evidence to support the two variable loaded factors. Negative beliefs about

physical activity have also been cited in the veteran physical activity literature, taking the form of lack of interest (Littman et al., 2014) and perceived hassle of activity (Littman et al., 2017). Similarly, beliefs about capability exist as barriers to physical activity among veterans (Littman et al., 2017). Therefore, loading factors 2 and 4 using two variables is justifiable.

Some may view the low reliability of the negative beliefs about physical activity factor as a limitation. However, despite low reliability, this factor was retained in subsequent analyses as it may be indicative of a useful direction for future research. Many statisticians recommend interpreting reliability scores within the context of the research area, and low Cronbach's  $\alpha$  may be appropriate in new areas of research (Field, 2018), particularly as Cronbach's  $\alpha$  values are positively related to the number of items on a scale (Cortina, 1993). Therefore, within the novel methodology of the current study, retaining this factor is justifiable, although further research is needed, and this finding should be interpreted with caution.

A further limitation involved the limited number of BCW and COM-B model elements that were included in the questionnaire. Due to potential participant response fatigue, the number of themes was limited to those prominent in the findings reported in Chapter Three. However, in order to develop a reliable, valid, and reusable questionnaire related to the perceived barriers and benefits of physical activity among veterans that are WIS, the exploration of additional aspects of the BCW and COM-B model is required.

Self-reported levels of physical activity may be another limitation of this study. Despite the use and application of GSLTPAQ in similar research in this field (Goldstein et al., 2018; Littman et al., 2014), the self-report questionnaire may result in an inaccurate representation of participants' actual physical activity levels. Despite the GSLTPAQ being found reliable with maximum oxygen uptake and body fat in adults (Godin & Shephard, 1985), recent research has identified longitudinal differences and weak associations between self-reported measures of

physical activity, device measured physical activity, and sedentary behaviour (Lines et al., 2020). Therefore, the application of device measured physical activity may provide a more accurate representation of participant physical activity levels. However, using devices to measure physical activity behaviour, while desirable, was not feasible within the current study, nor would it be practical for some wheeled/adapted forms of physical activity.

Future research may benefit from expanding upon the questionnaire themes to identify a broader picture of physical activity behaviour using a larger sample of veterans that are WIS. Despite its limitations, the current study and findings of other contemporary research in this area (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2019, 2018; Shirazipour et al., 2017) provide an initial understanding of physical activity behaviour among veterans. This theoretical basis can be used to inform the development of a complex intervention, as recommended in the United Kingdom Medical Research Council's (UKMRC) guidance (O'Cathain, et al., 2019). In doing so, future research may also benefit from adopting longitudinal randomised controlled trial design in order to overcome the limitations of contemporary physical activity interventional research as reported in Chapter Two.

#### **4.6 Summary**

The BCW is a framework of behaviour change that has seen successful application in physical activity (Seppälä et al., 2018; Munir et al., 2018; Taylor, Lawton, & Conner, 2013), and research reported in Chapter Three. Using the BCW and a quantitative methodology, the current study built upon the findings of the research reported in Chapter Three. Factor analysis revealed reflective motivation and psychological capability as COM-B categories of perceived barriers to physical activity among veterans that are WIS. Among these, however, reflective motivation barriers were more common, with low beliefs about physical capability, or physical activity self-efficacy, being highlighted as a key barrier. Perceived benefits of physical activity,

however, did not represent any latent variables but four correlated with physical activity levels. These were: improving mental health, improving physical health, providing a sense of purpose, and increasing physical fitness. Interventions which reduce prominent barriers to, whilst facilitating key benefits of physical activity may prove effective in promoting physical activity among veterans that are WIS. Not only are findings from this study relevant to veterans that are WIS but suggest that COM-B analyses stemming from qualitative data benefitted from subsequent quantitative analysis; helping to avoid the potential misinterpretation and waste of valuable time and resources. However, the relatively small sample of the current study is a prominent limitation and findings should therefore be interpreted with caution.

This chapter finalises the establishment of behaviour change theory element of the development of complex interventions (See Figure 1.7) (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008). The following chapter aims to outline the final stages of the development of a community-based physical activity intervention by synthesising the findings of Chapters Two, Three, and Four.

## **Chapter 5**

### **The Development of a Walking Group Intervention for British Military**

#### **Veterans that are Wounded, Injured, and/or Sick**

##### **5.1 Introduction**

The previous chapters have furthered the understanding of physical activity and veterans that are wounded, injured, and/or sick (WIS). Chapter Two reported on a systematic review that identified a wide range of positive psychosocial effects of physical activity, while Chapters Three and Four reported on studies that identified the perceived barriers to, and benefits of physical activity. These findings provide key information that can inform the design and development of a physical activity behaviour change intervention (O'Cathain et al., 2019; Michie et al., 2014; Craig et al., 2013; Craig et al., 2008). With the establishment of this information, it is now appropriate to consolidate knowledge to design the physical activity intervention (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008). During this stage of intervention development, the United Kingdom Medical Research Council (UKMRC) suggested that modelling the process and outcomes should be conducted to provide clarity in its design (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008). Therefore, this chapter outlines the design of a pilot physical activity intervention for veterans that are WIS and desk-based causal modelling related to its design and evaluation.

##### **5.1.1 Objectives**

- 1) Design and outline a physical activity intervention for veterans that are WIS based upon the research findings reported in this thesis and related fields.
- 2) Conduct desk-based causal modelling of the intervention to provide information and clarity related to its design and evaluation.

## **5.2 Methodology**

### **5.2.1 Intervention design**

As noted in previous chapters, the Behaviour Change Wheel (BCW) has been selected as a guiding theoretical framework to informed design and evaluation of the pilot physical activity intervention that will be designed as part of the research reported in this thesis (See Chapter One, Section 1.1.3 for a discussion). During the design of a behaviour change intervention, Michie et al. (2014) suggested that the APEASE criteria should be considered in the evaluation of interventions or intervention ideas. APEASE is an acronym which stands for:

A – Affordability; the intervention is within the budget of those delivering and participating in the intervention.

P – Practicality; the extent to which the intervention can be delivered as designed through the means intended to the target population.

E - Effectiveness and cost-effectiveness; ensuring that the effect size of the intervention justifies the cost.

A – Acceptability; the extent to which the intervention is judged to be appropriate by relevant stakeholders.

S- Side effects/safety; the intervention causes no unintended negative side effects or harm.

E – Equity; the extent to which an intervention may reduce or increase disparities of standards of living, wellbeing, or health within different social sectors.

The APEASE criteria was considered to be important within the current intervention design process, as the aim is to implement the intervention in a “real life” context. Thus, ensuring that the intervention is not only effective, but also pragmatic, is imperative.

Following the COM-B analysis of data reported in Chapter Four, reflective motivation, specifically self-efficacy, was identified as a key perceived barrier to physical activity. Rather than attempting to overcome all potential barriers, Michie et al., (2014) recommended focusing interventions on fewer of the main barriers. Overcoming reflective motivation barriers is, therefore, the primary focus of the intervention; however, consideration is also given to psychological capability, *i.e.* poor mental health, as this was identified as a perceived barrier to physical activity in the research reported in Chapters Three and Four, and is considered common among veteran populations (Williamson et al., 2019; Fulton et al., 2015).

In order to maximise the chance of success of a behaviour change intervention, O'Cathain et al. (2019) suggested that reviewing relevant research, incorporating and drawing from existing theories, and ensuring that that an intervention is acceptable and engaging are important aspects of an intervention's design. Although the BCW provides many intervention functions and behaviour change techniques that can elicit behaviour change, it does not provide detailed information related to the specific aspects of intervention design. This is particularly important to consider as the systematic review reported in Chapter Two identified many different forms of physical activity interventions for veterans that are WIS. Whilst it is important to promote physical activity behaviour change, ensuring quality experiences of physical activity is important in the promotion of long-term participation among persons with disabilities (Evans et al., 2018; Martin Ginis et al., 2017), including amongst veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2018, 2019; Shirazipour et al., 2017). It is therefore important that quality physical activity experiences were promoted

within the behaviour change intervention. To achieve this, the researcher drew on Shirazipour and her colleagues' work surrounding quality physical activity for veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2018, 2019; Shirazipour et al., 2017). Specifically, to foster quality physical activity experiences, Shirazipour et al. (2018) recommended four implementation strategies. These included: 1) foster social connections; 2) challenge participants; 3) tailor programme outcomes to match participant needs; and 4) include knowledgeable coaches/instructors. In doing so, quality elements of group cohesion, challenge, having a role, and independence and choice can be facilitated (Shirazipour et al., 2017).

### **5.2.2 Meeting with key stakeholders associated with the intervention**

Not only is it important that the physical activity intervention was guided by research evidence, but that key stakeholders considered the intervention to be acceptable, feasible, and effective (Michie et al., 2014; O'Cathain et al., 2019), so that it was pragmatic and could impact veterans that are WIS in a long-term and sustainable way. Following the initial design of an intervention based upon the research reported throughout this thesis and the wider literature, the researcher approached Help for Heroes, the charitable organisation supporting the research reported in this thesis, to organise a meeting between the researcher, his academic supervisors, Help for Heroes' community support workers, and veterans that are WIS. By doing so, the researcher was able to gain an understanding of stakeholders' opinion and feedback related to the researcher's initial design.

This meeting with key stakeholders was led by the researcher and took the shape of an informal focus group. Informality was judged to be vital for allowing the veterans who attended the meeting to feel comfortable. Achievement of which would encourage these participants to




share their true thoughts and opinions in the presence of Help for Heroes support workers and academics that could, potentially, be perceived as intimidating (Krueger & Casey, 2009).

The researcher began the meeting by asking attendees to introduce themselves. Once attendees were introduced and appeared to be feeling comfortable, the researcher presented his initial design of the intervention to the group. Following a quick opportunity for questions to be asked related to the presentation, participants of the meeting were split into sub-groups of three where they were asked to answer questions and provide feedback about the intervention design by writing their answers on a sheet provided (See Figure 5.1). As recommended by Krueger and Casey (2009) these sub-group were determined based on the characteristics of the individual. For example, academic faculty members, veterans that are WIS, and veteran charity employees and support workers, characterised the sub-groups. This avoided the potential for any discomfort or conflict that participants may face when asked to share their thoughts and opinions to their sub-group participant peers who may have very different opinions of the subject matter (Krueger & Casey, 2009). The researcher then opened up discussion to the group by addressing each of the group's answers to the questions in turn. This provided everyone with the opportunity to discuss thoughts, opinions, and feelings from a participant, community support worker, and academic perspective. Findings of the meeting were then collected and stored in secure cloud storage.

Figure 5.1

*Intervention Stakeholder Meeting Activity Sheet*

KESS2: Design and Development of a Community-Based Intervention	
<div> <div>Your thoughts on the walking group idea?</div> </div>	<div> <div>Anything that you would change?</div> </div>
<div>  </div>	
<div> <div>Where may we locate the intervention?</div> </div>	<div> <div>Is there potential for collaboration?</div> </div>
<div> <div>Any other comments?</div> </div>	

### 5.2.3 Methodology of causal modelling of intervention

As suggested in the UKMRC's guidance (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008), conducting desk-based causal modelling of the intervention provides important information in relation to its design and evaluation and aids clarity. Provided as a case-study example in the UKMRC guidance, Hardeman et al. (2005) outlines their causal modelling process. As Hardeman et al. (2005) provided causal modelling for the development of a physical activity intervention targeted at a population with health issues, it is used in this chapter as a guiding process. The methodology of causal modelling can be seen below in Table 5.1.

Table 5.1

*Methods Used in the Development of the Intervention*

<b>General methods</b>	<b>Specific methods</b>
Defining the health outcome and its importance	Review of psychosocial effects of physical activity reported in Chapter Two.
Defining target population	Definitions can be found in Chapter One, Section 1.1.1
Identifying target behaviour	<p>Definition can be found in Chapter One, Section 1.1.2</p> <p>Review of physical activity types reported in Chapter Two, with consideration of perceived barriers and benefits identified in Chapters Three and Four.</p> <p>Meeting with key stakeholders</p> <p>Review of quality experience of physical activity among veterans with physical disability (Shirazipour &amp; Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2018, 2019; Shirazipour et al., 2017)</p>
Specifying intervention points	<p>Research reported in Chapters Three and Four</p> <p>Meeting with key stakeholders</p> <p>Review of quality experience of physical activity among veterans with physical disability (Shirazipour &amp; Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2018, 2019; Shirazipour et al., 2017)</p>
Specifying behaviour change techniques	<p>Research reported in Chapters Three and Four</p> <p>Application of the BCW (Michie et al., 2014)</p> <p>Meeting with key stakeholders</p>

Developing measures to assess change in behavioural determinants	Review of available measures, with consideration of using similar measures as previous research as suggested in Chapter Two.
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### **5.3 The intervention: An outdoor walking group for veterans that are WIS and their significant others**

#### **5.3.1 Intervention overview**

The physical activity intervention was conceptualised as a walking group. The BCW describes this as *service provision* (Michie et al., 2014), a common intervention strategy among veteran populations (see Chapter Two; Shirazipour, Tennant, et al., 2019; Greer & Vin-Raviv, 2019; Caddick & Smith, 2014). Based upon the findings of the research reported in this thesis, service provision would have many benefits. These include: 1) providing an environment where physical activity self-efficacy can be developed and its related barriers overcome; 2) reducing other environmental opportunity barriers identified in the study reported in Chapter Three; 3) providing social opportunities for participants; 4) allowing participants to be outdoors and in nature and; 5) providing an environment where significant others can participate.

Described as a central defining characteristic of being human (O'Mara, 2019), walking has been shown to have many positive effects on physical and psychological health (Hanson & Jones, 2015). A meta-analysis revealed that outdoor, group-based walking had a positive impact on blood pressure, resting heart rate, body fat, body mass index, cholesterol, perceived physical functioning and self-reported depression (Hanson & Jones, 2015). In fact, Public Health England estimated that if one in ten adults aged between 40–60 years achieved 10-mins of brisk walking per day, it would prevent 251 deaths per year, achieve an economic saving of £310 million annually, and reduce mild to moderate depression and anxiety through improved mood

(Brannan et al., 2017). In the context of veterans that are WIS, walking is an activity that would not limit participants based upon their physical conditions, an important aspect of quality physical activity for veterans with disabilities (Shirazipour et al., 2017). Regardless of physical limitations, whether one requires a wheelchair or other mobility equipment, a walking group would allow the vast majority to be able participate to the extent of their capability, permitting inclusivity.

The research reported in Chapters Three and Four highlighted the important role of beliefs about physical capability in influencing the physical activity behaviour of veterans that are WIS. This belief about physical capability was conceptualised as physical activity self-efficacy. Self-efficacy is a critical aspect of determining behaviour, according to Social Cognitive Theory, and reflects the individual's belief that they can successfully perform a behaviour (Schunk & DiBenedetto, 2020; Bandura, 1997; see Chapter One, Section 1.1.3.1.1, for descriptions and associated definitions of Social Cognitive Theory and Self-Efficacy Theory)

To overcome the barrier of low physical activity self-efficacy, a finding that emerged from the research reported in Chapter Four, walking was selected as the physical activity. Walking, in comparison to other physical activities, requires a lower amount of physical activity self-efficacy than other activities, such as competitive sport or exercise. The walking group would be used as an environment where physical activity self-efficacy can be developed through performance accomplishments, vicarious experiences, and social persuasion. Shirazipour, Aiken, et al. (2018) recommended that quality physical activity for veterans with disabilities should be challenging whilst tailored to the ability and needs of the individual. Moreover, to increase self-efficacy, activities must be perceived as challenging (Schunk & DiBenedetto, 2020; Bandura, 1997). Despite the low-intensity and less challenging nature of walking compared to other activities, such as outdoor adventure recreation, in the context of veterans

that are WIS, the research reported in Chapter Four revealed that those with lower levels of physical activity self-efficacy were less likely to participate in physical activity. It was therefore important that the physical activity intervention created challenge, but not so much that it is beyond potential participants' levels of perceived capability. Walking is an activity that can be both challenging and adaptable for veterans that are WIS with low physical activity self-efficacy and would provide an environment where physical activity self-efficacy can be developed. In addition, as highlighted in the research reported in Chapter Three, some veterans felt that the image of physical activity opportunities for veterans that are WIS was too focused upon high level competitive sports, such as the Invictus Games, which can have a negative impact and provide a perceived barrier to physical activity participation. The walking group intervention's design challenged this perception and aimed to take the focus away from this highly demanding and competitive image.

Not only may veterans that are WIS who participate in a walking group experience improvement in their physiological and psychological health, and physical activity self-efficacy, but also in their social wellbeing (Brannan et al., 2017). People with disabilities living in the UK have reported feeling socially isolated (Activity Alliance, 2020). Veterans that are WIS may be at an increased risk of social isolation due to difficulties with integrating and transitioning back into the civilian world (Blackburn, 2017; Ahern et al., 2015; MacLean et al., 2014). Developing social relationships has been found to play an important role for people with disabilities in improving their mental and physical wellbeing (Tough et al., 2017). The results of the systematic review reported in Chapter Two also identified the positive benefit that physical activity can have on social wellbeing. Not only may social wellbeing increase other aspects of wellbeing, but research has suggested that increased social support is critical for participation in adapted sport (Javorina et al., 2020; Martin Ginis et al., 2016) and is recommended as a strategy for delivering quality physical activity and enjoyment for military

veterans with disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, & et al., 2018). These findings echo those reported in Chapter Three that identified social opportunities as a benefit of physical activity participation. Therefore, facilitating social interaction and developing social wellbeing were considered key components of the intervention.

To facilitate and maximise social interaction, conducting the physical activity intervention in a group environment was pertinent. Group walking would allow opportunities to socialise during the physical activity where participants would be able to talk with their fellow participants as they conduct the walk.

Walking has also been shown to increase levels of physical activity following participation (Meads & Exley, 2018). While Meads and Exley (2018) did not hypothesise why this may be, increased physical activity levels following participation in a walking group might be explained through increases in physical activity self-efficacy gained through performance accomplishments, vicarious experiences, and social persuasion (Schunk & DiBenedetto, 2020; Bandura, 1997).

Walking outdoors may also benefit from the therapeutic qualities of being in nature, highlighted as of particular importance in promoting psychosocial wellbeing among veterans (Greer & Vin-Raviv, 2019; Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014). Moreover, as discussed in Chapter Two, outdoor recreation may be more effective in reducing PTSD symptoms among veterans that are WIS or who suffer from poor mental health, both of whom may be at greater risk of developing PTSD due to their military service history (Williamson et al., 2019). Outdoor physical activity was also linked to mental healing (Shirazipour & Latimer-Cheung, 2020). For these reasons an outdoor recreation-based intervention, in the form of a walking group, was designed.

### **5.3.2 Location**

The intervention was located at Bryngarw Country Park, with the support of the Park's Rangers. This location provided a safe and secluded area where participants could have autonomy and choose the length and duration of their walk, while a function room adjacent to a café was available to use as a place for veterans to socialise. Autonomy and group cohesion are important aspects of quality physical activity for veterans with physical disabilities and Bryngarw Country Park was able to facilitate these (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017). The country park also offers beautiful scenery, allowing participants to be immersed in nature and engage in meaningful and supplementary activities.

### **5.3.3 Duration and frequency**

The systematic review reported in Chapter Two identified a wide range of physical activity interventions that ranged from two days to 12 weeks in duration, with frequencies of sessions ranging from every day to once per week. For the walking group intervention, eight weeks, with one session per week, was selected as the intervention duration and frequency. Eight weeks of weekly walking sessions was selected for four reasons: 1) the eight week interventions identified in the systematic review reported in Chapter Two consistently identified intervention effects, suggesting that this length of time is sufficient to observe the effects of the walking group intervention; 2) stakeholders suggested that this timeframe was adequate, feasible, and acceptable; 3) funding related to implementing the pilot intervention was limited and a longer duration was not financially feasible; and 4) this timeframe allowed an adequate period for the pilot intervention to be implemented and evaluated that did not risk extending this research project beyond the agreed length of funding.



### **5.3.4 Activities**

During the sessions, optional activities were selected, which would be organised and/or led by participants. In the first week, with the support of Help for Heroes staff and the Park Rangers, the walk leader would discuss ideas with participants to plan what kind of activities they would be interested in engaging in over the eight sessions. However, it was important that these would remain flexible and activities adaptable throughout the eight weeks. Suggestions for activities would be made available and included:

- 1) Knowledge associated with photography: “digital photography 101”;
- 2) Weekly photo projects associated with different walking routes;
- 3) Weekly flora and fauna searches within Bryngarw Country Park; and
- 4) Orienteering – taking the form of an informal “treasure hunt”.

Enjoyment of physical activity has been identified as an important aspect of quality physical activity among veterans with a physical disability (Shirazipour & Latimer-Cheung, 2020). Optional activities would have the potential to increase enjoyment while also taking the focus away from the physical activity, which may also help overcome barriers related to physical activity self-efficacy.

### **5.3.5 Intervention aims**

This intervention and its associated research had five aims:

- 1) Assess the feasibility of a pilot walking group intervention for veterans that are WIS using a qualitative methodology;
- 2) Increase self-reported levels of physical activity during and beyond the end of the eight week intervention;

- 3) Reduce self-reported symptoms of depression, anxiety, and stress;
- 4) Increase self-reported social, environmental, physical, and psychological dimensions of quality of life; and
- 5) Increase self-reported physical activity self-efficacy.

### **5.3.6 Intervention functions and Behaviour Change Techniques**

The BCW offers many intervention functions which can be used as part of an intervention to promote behaviour change (Michie et al., 2014) (See Chapter One, Section 1.1.3.3, Figure 1.6). As physical activity self-efficacy was identified in the research reported in Chapter Four as the key barrier to physical activity participation among veterans that are WIS, the BCW intervention functions primarily focused upon overcoming reflective motivational barriers. As seen in Figure 1.6, a matrix of intervention functions that can overcome specific behavioural barriers suggest that education, persuasion, incentivisation, and coercion are effective intervention functions for overcoming reflective motivational barriers. Noted in Chapter Four, although coercion has shown to improve daily step count among people with ischemic heart disease (Chokshi et al., 2018), coercion was not considered appropriate for veterans that are WIS due to their potential physical and mental vulnerability. Although not correlating with physical activity levels, the impact of poor mental health on physical activity behaviour has been a recurring finding within the research reported in this thesis. As a result, it was important that this potential barrier to physical activity be considered. As reported in Chapter Four, poor mental health constitutes a psychological capability barrier, and education, training, and enablement are useful intervention functions that can overcome these barriers (See Figure 1.6). Thus, to overcome reflective motivation and psychological capability, incentivisation, education, training, enablement, and persuasion intervention functions can be utilised within an intervention's design.

Following the identification of intervention functions, behaviour change techniques (BCTs) provide the active components of a behaviour change intervention that are observable, replicable, and irreducible (Michie et al. 2014). The BCT Taxonomy v1 outlines 93 BCTs that can be used to elicit behaviour change (Michie et al., 2014). Not only does the BCT Taxonomy v1 provide a comprehensive list of BCTs and their relationship with intervention functions but it provides a common language to describe and characterise interventions (Michie et al., 2014). This is particularly important, as many behaviour change interventions lack sufficient information and descriptions within their published reports (Lorencatto et al., 2013); making understanding the mechanisms by which the intervention was successful or unsuccessful and accurately replicating the intervention extremely challenging. It was therefore vital that intervention components are described accurately and sufficiently.

The BCT Taxonomy v1 provides a coding system with detailed descriptions and examples of each BCT. For example, setting goals related to behavioural outcomes is code *1.1 Goal Setting (Behaviour)* in the BCT Taxonomy. Its related description is to “Set or agree a goal defined in terms of the behaviour to be achieved” (Michie et al., 2014, pp. 259). Whilst the BCT Taxonomy is listed in full in Michie et al. (2014), a free online copy can be accessed via the BCT Taxonomy training website (n.d.). Thus, using these codes, a shared language can be developed. With this shared language, those reading the published report can understand and replicate intervention contents, overcoming the associated limitations within the current literature. The BCT Taxonomy v1 coding will be used throughout to describe BCTs reported in this chapter.

Using the APEASE criteria, the researcher selected intervention functions and BCTs that could be effectively and pragmatically incorporated into the walking group intervention. This resulted in the use of four intervention functions and seven BCTs. These can be seen in Table 5.2.

Table 5.2

*Intervention Functions and Their Related BCTs That Have Been Incorporated Within the Intervention*

<b>Intervention function</b>	<b>BCT</b>
Incentivisation	10.1 Material incentive (behaviour)
Persuasion	13.2 Framing/reframing 15.1 Verbal persuasion about capability
Enablement	1.2 Problem solving 3.2 Social Support (Practical) 3.3 Social Support (emotional)
Modelling	Role modelling (No code in BCT Taxonomy v1)

### **5.3.6.1 Incentivisation**

A key aspect of this intervention was incentivisation (10.1 Material incentive (behaviour)). Due to the large number of veterans experiencing social isolation, methods for encouraging initial engagement in the intervention were considered important by members of the stakeholder meeting. Such an approach has seen successful implementation in many different areas of physical activity intervention research (Losina et al., 2017; Ball et al., 2017; Norman et al., 2016; Finkelstein et al., 2016). While incentives may provide initial motivation to participate, the research reported in this thesis suggested that following initial participation, predominant barriers to engagement will naturally reduce, through means such as increasing one's self-belief that was perceived as a benefit of physical activity in the research reported in Chapters Three and Four and the performance accomplishments source of self-efficacy (Schunk & DiBenedetto, 2020; Bandura, 1997). Moreover, incentives are useful to incentivise initially until the behaviour, in itself, becomes a rewarding incentive (West, 2019). It was, therefore, the aim of the incentive to motivate veterans to become initially involved in the intervention so that barriers to engagement can reduce and motivation increase through ongoing participation.

The incentives for this intervention included a free meal, drink, and parking for all attending the intervention following each of the eight walks, which would be funded through this project's KESS scholarship. Bryngarw Country Park boasts a fully licensed, independent café that had agreed to prepare meals for the participants.

#### **5.3.6.2 Persuasion**

Motivational interviewing was selected as the method of persuasion. Motivational Interviewing is a directive, client-centred counselling style for eliciting behaviour change by helping clients to explore and resolve ambivalence (Miller & Rollnick, 2012). A recent systematic review identified that the application of Motivational Interviewing increased motivation for physical activity (Nuss et al., 2020). The format of the walking group intervention provided an ideal environment for short, informal motivational conversations during the walks around Bryngarw Park. In this manner, the researcher would be able to discuss participants' potential ambivalence towards physical activity in a natural, conversational manner through a client-centred approach. Motivational Interviewing would help participants to adopt a new perspective on the behaviour (13.2 Framing/reframing), *e.g.* their perceived physical capability, and provide verbal persuasion about their physical capability (15.1 verbal persuasion about capability), *e.g.* convincing a person they can perform a behaviour. To achieve this, prior to the date the intervention was scheduled to begin, the researcher completed Motivational Interviewing training so that he had the required skills and techniques.

The researcher considered the application of persuasive technologies, such as 'Fitbits' and/or a mobile application that allows participants to monitor physical activity. However, two recent interventional studies observed that utilising persuasive technologies decreased physical activity behaviour among veterans over time (Christiansen et al., 2020; Damschroder et al., 2020). This may be due to the absence of social interaction within these interventions, which

has been closely linked to quality physical activity among veterans with a physical disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017). In addition, the researcher decided that the current evidence surrounding physical activity persuasive technologies for veterans did not warrant their financial cost, a key aspect of the APEASE criteria.

### ***5.3.6.3 Enablement***

Enablement describes increasing means or reducing barriers to increase capability (beyond education or training) or opportunity (beyond environmental restructuring) (Michie et al., 2014). Providing participants with the means to overcome perceived barriers related to their situation or mental/physical medical conditions and physical activity was considered important to achieve meaningful future engagement. In the research reported in Chapter Four, beliefs about physical capabilities were identified as a key perceived barrier to physical activity among veterans that are WIS. Therefore, prompting participants to identify strategies that can overcome barriers related to their physical/mental conditions and disabilities (1.2 Problem solving) was considered to be an important aspect of increasing levels of physical activity in this population. Although this was likely to occur partly as a consequence of social learning through the connections of the walking group (Shirazipour & Latimer-Cheung, 2020), as this intervention is supported by Help for Heroes, a representative from the charity was planning to participate in each of the walks to offer tailored support and advice in relation to how an individual participant could be more active despite their physical limitations and what opportunities are available to them. This support worker has expert knowledge in physical activities for veterans that are WIS that they would share with participants.

In addition to the Help for Heroes employee, support workers from other charities planned to participate in the intervention. These individuals planned to provide information and signposting to organisations which could provide participants with financial, psychological,

emotional, and vocational support (3.2 Social Support (Practical)). In addition, the Ranger staff at Bryngarw Park offered their support by assisting with the organisation of activities and providing information related to the ecology of Bryngarw Park (3.2 Social Support (Practical)). To maximise future engagement in physical activity, it was considered important that participants were made aware of the opportunities for support and physical activity that are available to them. While this can also be developed through the social network of the walking group (Shirazipour & Latimer-Cheung, 2020), making a support worker available at each of the walks would help to further increase awareness.

The inclusion of a significant other, such as a partner, close family/friend or support worker (3.3 Social Support (emotional)), was noted by participants of the meeting with key stakeholders as a frequently debated topic among Help for Heroes support workers and the veteran community. The lack of consideration for the caregivers that some veterans that are WIS require was noted as a perceived barrier in the study reported in Chapter Three; while the systematic review reported in Chapter Two highlighted that interventions which included a significant other observed a lengthened positive effect. Contemporary research has identified that family integration is positively related to physical activity self-efficacy among veterans with a physical disability (Shirazipour, Aiken, et al., 2019), a key aim of the walking group intervention, and has suggested that family is an important aspect of the social environment that allowed the family and veteran to heal together (Shirazipour & Latimer-Cheung, 2020). Including significant others would, therefore, likely provide several benefits in terms of the walking group intervention.

However, some concerns surrounding the inclusion of family was noted in Shirazipour and Latimer-Cheung (2020). These included complex programming considerations and that family members may be overprotective of the veteran and hamper attempts to promote independence.

Nevertheless, these were considered to be less relevant in the context of the walking group intervention. The walking group intervention targeted veterans that are WIS with low physical activity self-efficacy and aimed to provide an environment where this can be developed to encourage participants to re-engage with physical activity. Therefore, the support received from a significant other, while potentially hindering independence, may be key to the initial engagement of veterans that are WIS with low physical activity self-efficacy in physical activity interventions. Moreover, complex programming concerns are not relevant to an inclusive physical activity such as walking. Following discussion with members of the stakeholder meeting, it was agreed that including significant others would likely be beneficial.

#### **5.3.6.4 Modelling**

Although, the intervention function of *modelling* is not recommended as a means of overcoming reflective motivation barriers in the BCW (Michie et al., 2014, 2011), modelling, otherwise known as *social comparison*, is a source of vicarious self-efficacy (*i.e.* reflective motivation), according to Self-Efficacy Theory (Schunk & DiBenedetto, 2020). It was, therefore, included in the intervention as it is noted as one of the most reliable sources of self-efficacy (Schunk & DiBenedetto, 2020).

Several veterans that are WIS who have overcome the limitations, difficulties, and challenges of their physical conditions and have accomplished inspirational achievements would be invited to visit the walking group. Inspirational veterans would be contacted through the researcher's past military colleagues and veterans that he had met whilst working with Help for Heroes and participating in veteran support groups. These individuals would be encouraged to discuss or present their personal experiences and advice related to how they have overcome their various challenges to the participants of the walking group intervention. This will likely increase the performance accomplishments source of self-efficacy through social comparison



(Schunk & DiBenedetto, 2020; Bandura, 1997). It is important, however, to ensure that there is a high level of perceived similarity between the individual and the role model (Schunk & DiBenedetto, 2020). For this reason, veterans that are WIS, who therefore likely share similar experiences as participants of the intervention, were chosen as potential role models.

### **5.3.7 Outcome of stakeholder meeting and APEASE criteria assessment**

Following the presentation of the walking group intervention, the participants of the stakeholder meeting provided feedback and were unanimously in favour of the walking group intervention. Based upon the APEASE criteria, assessments of the researcher and stakeholders can be seen in Table 5.3.

Table 5.3

*APEASE Criteria Assessment of the Walking Group Intervention*

Affordability	The intervention was a low cost activity that requires minimal cost to the participants and organisation providing the activity. Although the incentive-elements of the intervention would add additional costs, these were considered as affordable.
Practicality	The intervention was practical and could easily be delivered as planned. Although Motivational Interviewing and modelling elements require specialist experience/training, participants of the stakeholder meeting expressed Help for Heroes and the researcher would be able to provide these.
Effectiveness/cost-effectiveness	The cost of the intervention in relation to its likely effect was considered acceptable.
Acceptability	The intervention was deemed acceptable among participants of the stakeholder meeting.
Side effects/safety	The low intensity of walking was unlikely to cause harm to participants. However, to ensure this risk to participants was minimalised, a detailed risk assessment would be conducted.
Equity	The intervention was very unlikely to cause health disparities or standards of living among social sectors, but rather increase the wellbeing of veterans that are WIS, that are considered a vulnerable population.

## 5.4 Planned evaluation of the pilot walking group intervention

### 5.4.1 Evaluation methodology

The evaluation methodology for this pilot intervention intended to address four of the six knowledge gaps identified by Shirazipour, Tennant, et al. (2019). Namely, the lack of longitudinal research, lack of understanding of diverse types of physical activity, lack of consideration for the systemic influences of the injury/illness and physical activity experience,

lack of consideration of programme implementation, and lack of understanding of female service personnel and veterans' knowledge gaps.

#### ***5.4.1.1 Target population of intervention***

Veterans that are WIS were the target population for this study (See Chapter One, Section 1.1.1 for definitions). As in previous chapters, veterans who had mental health conditions that cause them to experience psychosis or that require high levels of care were excluded from this study (See Section 3.2.2 for a discussion).

#### ***5.4.1.2 Recruitment***

Recruitment took place through Help for Heroes and face-to-face advertising in local veteran support groups. Similar to advertising of other physical activity programmes for veterans that are WIS, Help for Heroes contacted potential participants through their private mailing list and social media pages with information related to the walking group intervention. This information included a clickable hyperlink that directed potential participants to a short pre-screening survey. This screening survey included contact information, sex, age, physical injury/illness type, and self-reported physical activity levels, measured via the Godin-Shepard Leisure Time Physical Activity Questionnaire (GSLTPAQ) (Godin, 2011), and aimed to ensure that participants met the inclusion/exclusion criteria for this study. This would allow the researcher to select a study sample that had low current physical activity levels, as recruiting a sample of veterans who are already very physically active would have contradicted the aim of the intervention that seeks to increase physical activity among inactive veterans that are WIS. For this reason, the 30 volunteers with the lowest reported physical activity levels were to be invited to participate in the study. The intervention pilot study also aimed to recruit a sample representative of the 12.5% female veteran population (Ministry of Defence, 2019), overcoming the associated knowledge gap of the contemporary literature (Shirazipour,

Tennant, et al., 2019). In addition, veterans that are WIS who were not affiliated to Help for Heroes were recruited as the Help for Heroes' recruitment process produced insufficient numbers. These additional participants were recruited through several support groups which the researcher had frequently attended over the previous 18-months. The researcher provided attendees of these support groups with information related to the walking group intervention and related study and asked if information could be passed on to those veterans that met the inclusion criteria who did not attend the support groups and who may be more socially isolated. A poster advertising the study was developed (Figure 5.2). Copies of this poster were used alongside electronic advertisements and social media posts and physical copies were placed in various places where veteran support groups were located. The recruitment process resulted in 24 veterans that are WIS signing up to participate in the walking group.

Figure 5.2

*Walking Group Study Recruitment Poster*



The poster is titled "Walking Group: Getting Active, Enjoying Life..." and features a row of nine small images at the top showing various outdoor scenes and people walking. The main text is on a green background with white and yellow text. It includes a list of key information, a map of the location, and a list of incentives. The poster is supported by Help for Heroes and Cardiff Metropolitan University.

**Walking Group: Getting Active, Enjoying Life...**

**Key information:**

- CardiffMetUni research study!
- Bryngawr Country Park!
- For military veterans with a physical injury!
- Free lunch and parking for veterans!
- All abilities welcome!
- Interact with like-minded individuals!
- 8 weekly self-paced, social, and fun walks starting April 9th!
- Partners, friends and pets welcome!!

**Map:** A map showing the location of the walking group at Bryngawr Country Park, near the postcode CF32 8UU. The map includes labels for Coytrahen, Bryngawr Country Park, Tondur, Bryncethin, Sarn, McArthurGlen Designer Outlet Bridgend, Pen-y-fai, and Coity. The M4 motorway is also shown.

**Incentives include:**

- Free lunch - Cedars Tea Room;
- Enrichment activities; and
- Free fitness evaluation

**PROUDLY SUPPORTING**  
**HELP for HEROES**

**Interested...? Please contact Robert Walker for information**  
 email: [rwalker@cardiffmet.ac.uk](mailto:rwalker@cardiffmet.ac.uk) \* LIMITED SPACES AVAILABLE \*

**Cardiff Metropolitan University**  
**Prifysgol Metropolitan Caerdydd**

## **5.4.2 Quantitative methodology**

### ***5.4.2.1 Participants***

Twenty-four veterans that are WIS were recruited and randomised using stratified randomisation into experimental and control groups. Stratified randomisation includes grouping participants according to features which may impact on results. Where possible, the groups for this study were grouped according to their current physical activity levels, impairments, and gender, so that both groups had similar characteristics; information of which was gained through the screening survey. The experimental group would participate in a walking group intervention, whilst the control group consisted of a waitlist control that would participate in the intervention following the 6-month data collection time-point, providing that the intervention had shown to have a positive effect among participants of the experimental group.

A priori sample size calculation based upon a medium effect size suggested that a sample size of 210 participants are required to identify significance for the planned statistical tests. However, the UKMRC guidance states that sample size should be determined through piloting the intervention in order to estimate effect sizes and assess implementation issues, such as retention and feasibility (Craig et al., 2013). Thus, this pilot intervention study aimed to achieve a sample size of 30 participants, with 15 in both the experimental and control group. This number was considered adequate to accommodate for some participant drop-out without adversely influencing proposed statistical analyses and the associated data interpretation. However, recruitment was challenging and only 24 were able to be recruited. Nevertheless, this was not considered a large concern, as statistical power is a relatively small part of the planned study, as it primarily aimed to pilot test the walking group intervention.

#### **5.4.2.2 Measurements tools**

##### **5.4.2.2.1 Psychological measures**

Questionnaires related to the psychological evaluation included:

- Godin-Shepard Leisure Time Physical Activity Questionnaire (GSLTPAQ) (Godin, 2011) would be used as a measure of physical activity levels. This self-report questionnaire related to the frequency and intensity of physical activity levels and was completed as part of the pre-screening survey. This questionnaire has been applied in the research reported in Chapter Four, as well as other related research in this area (Goldstein et al., 2018; Littman et al., 2014), and has shown to be reliable through comparisons with maximum oxygen consumption (VO<sub>2</sub>max) and body fat in adults (Godin & Shephard, 1985) and among those with significant illness (Motl et al., 2014).
- The Depression, Anxiety, and Stress Scale - 21 (DASS-21) (Henry & Crawford, 2005) would be used to collect data related to participants' symptoms of depression, anxiety, and stress. This measure was selected as military service may increase the risk of these mental health conditions (Williamson et al., 2019). Research reported in Chapter Two identified that physical activity has been shown to have a positive effect on depression, anxiety, and stress among veterans that are WIS. It is therefore important to understand the impact of the intervention on these mental health conditions. The DASS-21 has been consistently applied with veterans that are WIS as part of physical activity research (Townsend et al., 2018; Romaniuk et al., 2018; McCarthy et al., 2017), and has been shown to be reliable in large, non-clinical samples (Osman et al., 2012).

- The World Health Organisation Quality of Life – Brief (WHOQOL-BREF) (WHO, 1996) questionnaire employed to collect data related to participant wellbeing; one of the key outcomes of this intervention. This measure has been shown to be valid and reliable (WHO, 1996), and measures physical, psychological, social, and environmental quality of life. It has also been applied in other veteran related research (Goldstein et al., 2018; Lundberg et al., 2011).
- Bandura’s Exercise Self-Efficacy Scale (Bandura, 1997), which has been found to be reliable and valid on participants with health-related issues (Everett et al., 2009), used to collect data related to participant physical activity self-efficacy. Research reported in Chapter Four suggested that physical activity self-efficacy was a key barrier to physical activity among veterans that are WIS. This measure was included to evaluate the impact of the intervention on participant physical activity self-efficacy.
- Alongside psychological measures, a demographic questionnaire was designed to be distributed to both the intervention and control groups pre-intervention, in order to understand the characteristics of the sample included in this study. The responses to the demographic questionnaires would be added to the information gained from the pre-screening questionnaire, which when combined, can provide full demographic information for the participant.

#### **5.4.2.2.2 Physiological measures**

The following measures were chosen as understanding participant physiology is vital to understanding the physical health implications of the walking group intervention. Ensuring that these measures were non-invasive and not perceived as intimidating by the participants, who will likely have low levels of motivation and self-efficacy for physical activity, was considered a priority in recruiting and retaining participants for this intervention. The following measures

were selected as they can provide objective complementary data related to stress, wellbeing, and physical health, all of which were planned to be explored in a subjective, self-reported manner in the psychological surveys. The measurements include:

- Circulating concentrations of blood cortisol and interleukin-6 (IL-6) measured using fingertip capillary blood samples and standard, ELISA techniques. Capillary blood samples were to be collected through a hyperaemic fingertip, which was to be achieved using a bowl of warm water. Blood samples, obtained from a fingertip, will be collected in 200  $\mu$ L, heparinized microvettes collection tubes. Blood samples would then be fractionated by centrifugation (10 min, 3000g), with the resulting plasma separated and stored at  $-80^{\circ}\text{C}$  until batch analysis can occur. Circulating concentrations of cortisol and IL-6 will then to be quantified using enzyme-linked immunosorbent assays;
- Small drops of capillary blood from the same fingertip would additionally be used for the purpose of lipid profile using an automated Reflotron system. Specifically, concentrations of circulating triglycerides, as well as total cholesterol and sub-fractions (HDL and LDL) of cholesterol will be measured;
- Following 10-min of seated rest, each participant's blood pressure would then be measured using an automated system;
- Resting heart rate (HR) will be measured for each participant. Walking has been shown to reduce resting HR (Hanson & Jones, 2015), which has important health implications as elevated resting HR is associated with increased risk of cardiovascular disease (Menown et al., 2013). In the current study, resting HR was planned to be taken from participants using a wearable heart rate monitor.



### **5.4.2.3 Procedure**

#### **5.4.2.3.1 Psychological measures**

Psychological measures would be distributed via the online survey software Qualtrics (2020; April 2020 version) to both the intervention group and control group participants at baseline, immediately post-intervention (eight weeks), three months post-intervention, and six months post-intervention. This was to ensure that longitudinal data can be gained to address the lack of longitudinal research knowledge gap identified by Shirazipour, Tennant, et al. (2019).

#### **5.4.2.3.2 Physiological measures**

Physiological measures would be conducted at Bryngarw Park, the planned location of the walking group, or at a location convenient to the participant at baseline, immediately post-intervention (8-weeks), 3-months post-intervention, and 6 months post-intervention.

### **5.4.2.4 Methods of analysis**

#### **5.4.2.4.1 Analysis of psychological data**

Data will be downloaded into IBM SPSS statistics software for Windows, version 24. Analysis of variance (ANOVA) and analysis of covariance (ANCOVA) would be conducted in conjunction with Cohen's d (effect size) to explore the difference between scores of the intervention and control group at each of the time points while allowing for the control of variables which may impact results. The covariates selected for the ANCOVA would be participant baseline physical activity levels, depression, anxiety, stress, PTSD, QoL, and physical activity self-efficacy, as each of these would likely impact the effects of the intervention. These calculations will give an understanding of the differences between the control and experimental group. However, as this planned pilot intervention study would

consist of a small sample of veterans that are WIS, the results may not be significant, but would be indicative of a direction of effect of the intervention.

#### **5.4.2.4.2 Analysis of physiological data**

Similarly to the psychological measures, data will be inputted into SPSS and an ANOVA/ANCOVA conducted to analyse the differences between groups, with Cohen's  $d$  used to determine effect size.

### **5.4.3 Qualitative methodology**

As one of the objectives of the planned study is to determine the feasibility of the walking group, understanding the detailed experiences related to participation would be vital to achieve this. In addition, these experiences would add information to the systemic influences of the injury/illness and physical activity experience and consider implementation issues of the walking group; both of which were identified as knowledge gaps in the contemporary literature (Shirazipour, Tennant, et al., 2019).

#### **5.4.3.1 Sample**

The evaluation of the intervention was designed to collect qualitative data from participants of the intervention group.

#### **5.4.3.2 Procedure**

Following completion of the eight week intervention, two focus groups would be conducted with those who attended and completed the intervention. This would be led by the researcher, but a Help for Heroes support worker also planned to be present to provide support to participants if needed. The focus groups would be conducted in a function room made available at Bryngarw Park and aimed to understand the group members' experiences related to the

perception of changes in their health, physical activity self-efficacy and social wellbeing, as well as to obtain feedback on the intervention's design and implementation.

As drop out from the intervention is a possibility, a researcher independent of the delivery of the intervention would attempt to organise a short phone interview (15 minutes) with any participants who withdrew from the study and did not complete the entire intervention. Feedback from those who did not complete the intervention was considered to be an important aspect of understanding perceptions of the intervention. The phone interviews would be semi-structured and ensure the participants' well-being while exploring reasons for dropping out of the walking group.

#### ***5.4.3.3 Analytical techniques***

Focus groups and phone interviews would be transcribed verbatim and coded using the Nvivo qualitative research software, version 12. Qualitative data would be analysed through thematic analysis, as questions may not always relate to the self, but also to other veteran associates that are WIS, making thematic analysis appropriate (Freeman & Sullivan, 2019).

#### **5.4.4 Ethics**

This study gained ethical approval from Cardiff Metropolitan University's School of Health Sciences Ethics Committee. Project reference number: PGR-2595.

As with the previous ethical considerations outlined in Chapters Three and Four, the pilot intervention study held unique ethical concerns. In terms of the walking group intervention, the health and safety of participants was paramount. This was achieved through the following points:

- All support workers and park wardens were trained to administer emergency first aid;

- An individual with knowledge of how to use an automated electrical device (*i.e.*, a defibrillator) was always present;
- A risk assessment associated with personal health issues would be conducted prior to all walks,
- Participants would be encouraged to maintain adequate nutrition and hydration, before and during the walks;
- During weeks of poor weather conditions, the risk of weather-related injuries may exist. During these weeks, participants would only engage in the indoor social aspects of the intervention.

Unique research-related ethical concerns included ensuring the safety of participants during the capillary blood testing. To overcome this, the researcher was trained in the correct and safe method of conducting phlebotomy, including the treatment, analysis and immediate (safe) disposal of any blood sample – there was no intention to store blood samples, nor to transport them away from Bryngarw Country Park.

#### **5.4.5 Processes of change**

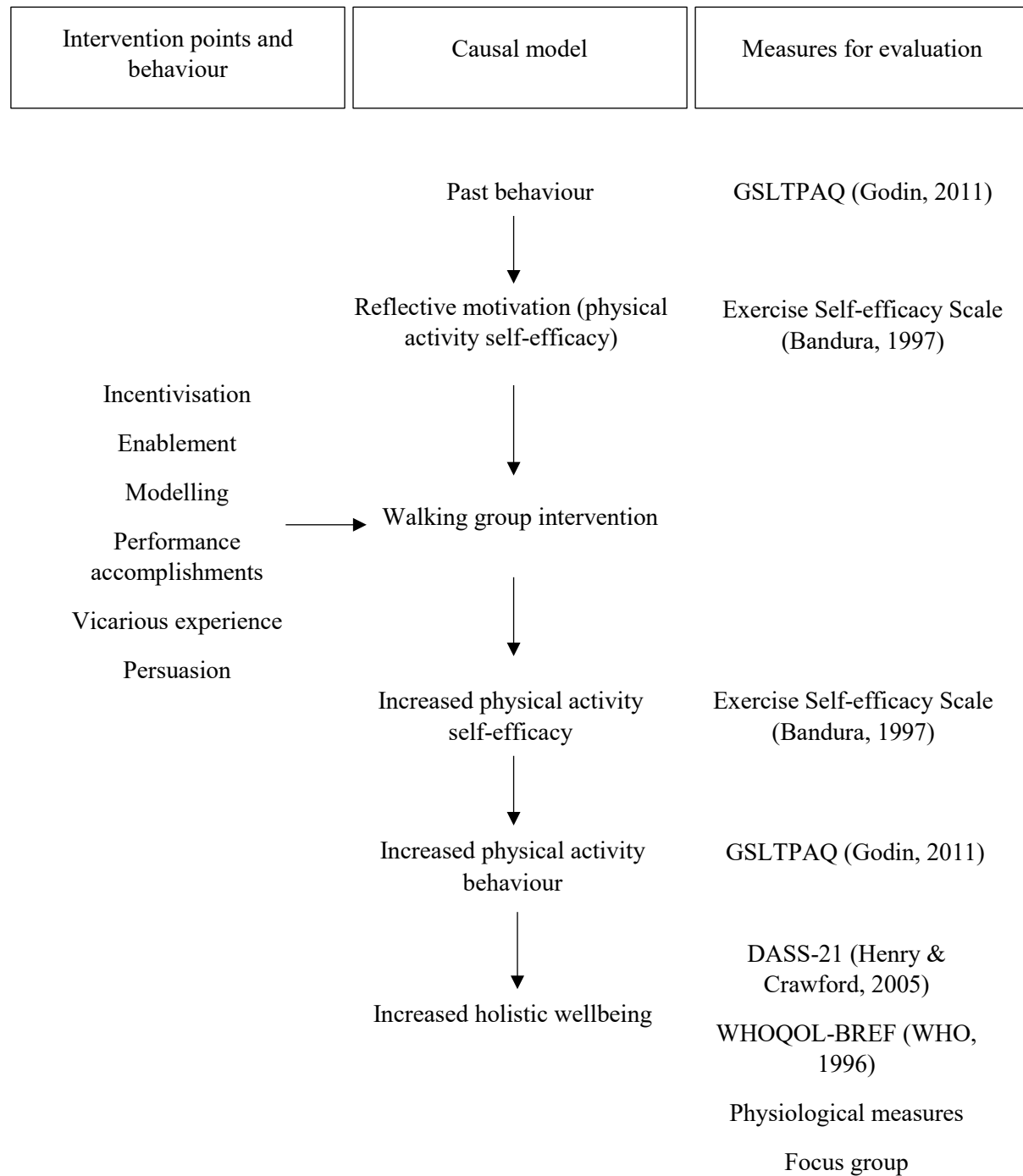
Ensuring that physical activities are adaptable to suit the needs of a wide range of physical health conditions has been noted as an important aspect of quality physical activity for veterans with disabilities (Shirazipour et al., 2017). Although the outline of the intervention given above describes the planned implementation of the walking group intervention, it was imperative that the walking group would remain adaptable to accommodate the potentially varied physical and mental health conditions of participants. To achieve this, characteristics of the intervention and weekly walks, such as length of walks, route of walks, and activities that would be conducted during the walks, would remain optional and flexible and can be changed to suit the group's ability and needs.

#### **5.4.6 walking group intervention causal model**

As suggested by the UKMRC (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008), causal modelling has been conducted to provide information related to the intervention design and evaluation. This can be seen in Figure 5.4.

Figure 5.3

*Causal Modelling of Walking Group Intervention for Veterans that are WIS*



#### **5.4.7 Implications of the 2019/20 Coronavirus (COVID-19) public health pandemic**

The pilot intervention study was planned, ethically approved, associated research consumables ordered, and recruitment completed. However, just a week before its scheduled start, strict University and Government policy was implemented in response to the Coronavirus (COVID-19) pandemic. This unfortunately resulted in the cancelation of the implementation of the pilot intervention.

Despite the researcher's careful planning of this intervention, due to circumstances that were unimaginable at the beginning of the year 2020, the COVID-19 pandemic resulted in strict social distancing policies within the whole of the UK and beyond. During the months of March and April, the researcher was left with a significant challenge associated with this project. The researcher considered three solutions to overcome the issues and ensure that the needs of Cardiff Metropolitan University, Help for Heroes, Knowledge Economy Skills Scholarships (KESS) 2 (the funding body for this PhD), and the researcher were all met.

The first option was to postpone the intervention and implement it once the COVID-19 pandemic was over. However, the researcher decided against this option, as the funding for this project was limited to three years. The intervention study would take a minimum of eight months to complete from baseline to final longitudinal measures. While this suited the timeline planned for this project, the need to wait for the pandemic to be over, in what was a very uncertain situation. During the early stages of the pandemic, little was known about the long-term impact of the disease and the time frame in which social distancing policies would be in place. This meant that it was likely that this would have extended this project beyond the three years funding.

The second option was to transfer the intervention into an online format. While this would likely have some benefit among those who participated, the online nature of the intervention significantly reduced the opportunity for social interaction among participants, a key aspect of quality physical activity for veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017). Such telehealth interventions have been shown to be ineffective among veterans that are WIS (Christiansen et al., 2020; Damschroder et al., 2020), potentially due to their lack of face to face social interaction. Moreover, as one of the key outcomes of the intervention was to reduce social isolation and improve social wellbeing, the researcher decided against this option.

The third option involved exploring the acceptability and feasibility of the walking group and another, existing physical activity intervention. The BCW and UKMRC recommended that acceptability should be evaluated before intervention implementation and that the implementation of an intervention can also inform future development (O'Cathain et al., 2019; Michie et al., 2014). Using the experiences of implementing a separate physical activity intervention and the perceived acceptability and feasibility of the proposed walking group intervention, recommendations can be made for the optimisation of the walking group intervention and general recommendations for future practice. Using both of these perspectives, the researcher decided to prospectively evaluate the acceptability and feasibility of the walking group intervention, and retrospectively conduct the same analysis on a pre-existing Help for Heroes led intervention that comprised of weekly group-based exercise classes for veterans that are WIS. The group-based exercise intervention had been in place for over two years and the researcher had participated in this intervention over a period of 18-months. Whilst this represents a very different research direction, the overall aim of the project of understanding physical activity behaviour among veterans that are WIS, and provide practical recommendations by which it can be increased, will be achieved. Moreover, not only is this



new option potentially more reliable, as it includes an evaluation of two separate interventions, but Help for Heroes will likely benefit more from these recommendations, as they include feedback specific to an intervention developed and implemented by Help for Heroes, rather than one designed by the researcher. For these reasons, following consultation with the supervisory team and colleagues at Help for Heroes, the researcher opted for this final option, fully embracing its related, but new direction of research.

## **5.5 Summary**

Based on the findings reported in the previous chapters, a pilot walking group intervention was developed, planned, and ready to be implemented. This walking group intervention was to take place at a local country park and aimed to overcome and increase participants low physical activity self-efficacy. However, despite best efforts in planning, the unforeseeable circumstances linked to the COVID-19 global health crisis resulted in the cancelation of the pilot intervention. In order to overcome the challenges of social distancing while meeting the needs of those associated with this project, a new direction of research was developed.

The next chapter reports the results of this new research direction which explored the acceptability and feasibility of the walking group intervention that was planned among those who had signed up to participate in the walking group. This will be complemented by a similar analysis of a separate Help for Heroes led group-based exercise class intervention that had been in place for over 18-months.

## **Chapter 6**

# **Evaluating the Acceptability and Feasibility of Two Physical Activity Interventions for British Military Veterans that are Physically Wounded, Injured, or Sick**

### **6.1 Introduction**

In the midst of the coronavirus pandemic, strict Government and University policies relating to social distancing and public health limited the researcher's ability to pilot test the walking group intervention outlined in the previous chapter. However, in order to meet the needs and aims of the stakeholders associated with this PhD project, an alternative study was designed to evaluate the acceptability and feasibility of two separate physical activity interventions for veterans that are wounded, injured and/or sick (WIS).

Acceptability is a key aspect of intervention development that refers to the extent to which an intervention is judged appropriate by relevant stakeholders (O'Cathain et al., 2019; Michie et al., 2014). Regardless of an intervention's potential effectiveness, if it is not appropriate in the setting in which it will be implemented, it is unlikely to achieve its aims (Michie et al., 2014). Although acceptability, as part of the APEASE criteria, was considered during the walking group intervention's development, constraints related to time and funding limited acceptability evaluations to an informal focus group comprising of academics, community support workers, and veterans that are WIS. Whilst the walking group intervention was considered acceptable among the participants of the stakeholder meeting, the environment where the meeting took place may have limited the extent to participants were able to share their thoughts and opinions. For example, the focus group format of the meeting may have limited the richness and detail of findings related participants' perceptions of the walking group intervention. Therefore, further exploration of acceptability in a one-to-one forum will likely lead to richer data that can

be used to explore perceptions in depth, leading to a more detailed understanding of the walking group intervention's design.

In their expansion of the 2013 guidance for complex intervention development, the United Kingdom Medical Research Council (UKMRC) highlighted the importance of refining the design of an intervention before any piloting takes place (O'Cathain et al., 2019). In order to optimise the intervention, assessment of feasibility and acceptability, such as unintended consequences and harm of the intervention, is recommended. An example of acceptability and feasibility related issues in a veteran physical activity intervention context includes a report by Damschroder et al. (2020), who observed low adherence to their mobile intervention that significantly impacted on the follow-up data of their randomised controlled trial. It was suggested that this could have been due to complications and difficulties relating to participants syncing and recording the data from their mobile devices and wearable technologies. Whilst the reason for this is difficult to determine from the information available, it is probable that a small feasibility or acceptability study prior to the intervention implementation would have identified such problems before longitudinal data was collected; avoiding what resulted in a large amount of missing data.

Whilst exploring the acceptability of the walking group intervention will likely result in rich data that can be used to optimise the intervention, Help for Heroes, the organisation providing funding and support, may not find these results relevant to their current community-based interventions. Thus, to ensure that the needs of Help for Heroes were met in this alternative study, a separate Help for Heroes led intervention was evaluated. This intervention constituted weekly group-based exercise classes for veterans that are WIS. The researcher had first-hand experience of participating in this intervention, as a veteran, during the first 18-months of this PhD project. With this evaluation, Help for Heroes can apply the findings to their current practice.

A central aim of the research reported in this thesis was to provide information relating to the knowledge gaps of the contemporary physical activity veteran literature identified by Shirazipour, Tennant, et al. (2019). The pilot intervention study outlined in Chapter Five aimed to address the *lack of longitudinal research, lack of understanding of diverse types of physical activity, lack of consideration of the systemic influences of injury/illness, and lack of consideration of programme implementation* by piloting the walking group intervention and evaluating its effects through a mixed methodology. Although, a *lack of longitudinal research* cannot be overcome in this alternative study, it can still provide useful information related to the other knowledge gaps. For example, acceptability and feasibility research can increase knowledge related to the systemic influences of an injury, program implementation, and information related to diverse types of physical activity.

While a prospective evaluation of acceptability and feasibility may hold certain limitations, discussed later in this chapter, Rushton et al. (2020) reported success in the adoption of a prospective approach as part of an evaluation of a telephone-based healthcare intervention. In their study, data was analysed using the Theoretical Domains Framework (TDF), which has been mapped to the Behaviour Change Wheel (BCW) (Cane et al., 2012), the underpinning framework of the research reported in this thesis. By doing such a prospective evaluation, intervention acceptability and feasibility issues can be identified and resolved prior to pilot intervention implementation (O'Cathain et al., 2019). It is in such a prospective manner as that reported by Rushton et al. (2020) that this study aimed to assess the acceptability and feasibility of the planned walking group intervention that will be combined with an almost identical retrospective evaluation of a pre-existing group-based exercise class intervention for veterans that are WIS.

This chapter is comprised of two parts. The first part outlines findings associated with the prospective evaluation of the planned walking group intervention, whilst the second part relates

to the evaluation of the group-based exercise class intervention. Separate interview guides, employed for the evaluation of both interventions, were designed to mirror one another; however, the wording of some questions varied slightly to ensure they were appropriate to the relevant physical activity intervention. This made it possible to identify common themes and develop more reliable and valid recommendations in the context of the design and implementation of future physical activity interventions.

### **6.1.1 Objectives**

The research reported in this chapter had three objectives:

- 1) Evaluate the acceptability and feasibility of the proposed walking group and an existing Help for Heroes exercise intervention using one-to-one telephone-based semi-structured interviews;
- 2) Following analysis of data, compare findings and, where appropriate, identify common themes between the walking group and Help for Heroes group-based exercise intervention; and
- 3) Identify specific recommendations for the optimisation of the planned walking group intervention's design and pilot implementation.

## **6.2 Part One – The evaluation of the acceptability and the feasibility of a planned walking group intervention among veterans that are WIS.**

### **6.2.1 Methodology**

#### ***6.2.1.1 Philosophical assumptions***

As noted in previous chapters, the research outlined in this thesis is based in critical realism. This suggests that while subjective, the knowledge and information gained through qualitative research can be compared to the likeness of the real world (Sullivan, 2019). The aim of the researcher is to elicit views that, while subjective, can then be used to evaluate the acceptability and feasibility of the walking group intervention that represents similarity with an objective reality and can therefore be applied to other similar fields of research.

#### ***6.2.1.2 Participants***

Participants within the evaluation of the acceptability and feasibility of the walking group intervention consisted of veterans that are WIS (See Chapter One, Section 1.1.1 for definitions) who had planned to participate in the walking group. These individuals had volunteered to participate in the walking group before the unforeseen COVID-19 pandemic resulted in its cancellation.

The researcher approached participants using contact details that were provided during the sign-up process of the walking group. To advertise and recruit participants to this study, the researcher sent an initial email, followed by a text message two weeks later. As an added incentive to participate, veterans were offered a £15 amazon gift voucher.

The researcher contacted 24 veterans who had volunteered to participate in the walking group intervention with detailed information about the study. Of these, 10 volunteered to participate in the study. Participants' age ranged from 33 to 74 years, with a mean ( $\pm$ SD) average home to

activity distance of 19.4 (16.05) miles. The sample consisted of only male participants and the mean average number of years since discharge from the military was 18.1 (14.02) years. While the 24 veterans who had signed up for the walking group consisted of three females, none of these individuals expressed interest in participating in this study. Details of the participant demographics are included in Table 6.1.

Table 6.1

*Demographic Information of Participants of Part One*

<b>Sample</b>	N = 10	
		n
<b>Gender</b>	Male	10
	Female	0
<b>Age</b>	18-25	0
	26-30	0
	31-35	1
	36 – 40	0
	41-45	0
	46-50	1
	51-55	3
	56-60	4
	60+	1
<b>Distance from home to walking group (miles)</b>	0-5	2
	6-10	2
	11-15	1
	16-20	0
	21-25	3
	26-30	0
	31+	2
<b>Service branch</b>	Army	8
	Royal Navy	1
	Royal Air Force	1
<b>Years since discharge</b>	0-5	2
	6-10	1
	11-15	2
	16-20	2
	21-25	2
	25+	1
<b>Other information</b>	Wheelchair user	1
	Mobility stick user	1



### ***6.2.1.3 The walking group intervention***

Detailed information regarding the design of the walking group intervention can be found in Chapter Five, Section 5.3. To provide a brief summary however, the walking group intervention consisted of the following:

- A weekly walking group for veterans that are WIS and their significant other at Bryngarw Country Park in South Wales;
- Free lunches, drinks, and parking were to be offered as incentives to participate;
- In order to take focus away from the physical activity and promote enjoyment, the researcher had also planned optional activities, including nature foraging and photography projects;
- Charity representatives were invited to attend the walking group with a view to providing participants with information about different facilities and support that charities could offer; and
- Help for Heroes staff were also invited to provide support to participants.

### ***6.2.1.4 Interview guide***

Interview questions were developed to explore the acceptability and feasibility of the intervention. Questions were designed to identify participants' reasons for participating, believed consequences of participation, opinions of the intervention's content, and anticipated implementation problems. A question was also added to discuss participants' thoughts surrounding low physical activity self-efficacy among veterans that are WIS, its impact on physical activity participation, and methods of overcoming this barrier. A complete interview guide consisting of 24 items was sent to participants prior to any interviews being conducted. An example item relating to the inclusion of significant others included:

*“How did you feel about the prospect of your family/friends/caregivers being included in the walking group?”*

In likeness to the qualitative research reported in Chapter Three, investigating participants’ perceptions of other, non-participating veterans was considered vital to gain an insight into the potential acceptability towards more isolated veterans. Questions designed in this manner included:

*“The focus of the walking group was on the social side, rather than the physical activity/fitness side, what do you think of this when trying to get veterans that are WIS more active?”*

Further questions evaluated participants’ ideal activity and recommendations they could make to improve the proposed walking group and reasons why the recommendations would improve the walking group were sought. For example:

*“Are there any changes you could make to the walking group to encourage more veterans to participate?”*

Questions relating to the feasibility of the intervention were also included. For example, questions were asked relating to the location of the intervention. Specifically, questions related to potential obstacles to their participation, or that of others were included. For example:

*“Could you see any problems related to the walking group that you may experience during the walks?”*

Considering the findings reported in Chapter Four that identified physical activity self-efficacy as a key barrier to physical activity, the interventions relation with self-efficacy was considered an important aspect of acceptability. However, similar to the qualitative research reported in Chapter Three, a pilot interview identified the term “self-efficacy” as too complex that many participants would be unfamiliar with. For this reason, the term “self-confidence” was used

instead. The researcher considered this to be a more familiar term, despite its nuance with the meaning of “self-efficacy”. However, to ensure understanding of the terms used, the researcher discussed and defined all terms with participants prior to each interview.

#### **6.2.1.5 Procedure**

To ensure social distancing policy was maintained, telephone-based interviews were arranged at the convenience of each participant. The researcher conducted semi-structured interviews that were audio recorded and subsequently transcribed, *verbatim*. The duration of interviews ranged from 17 to 50 minutes, with an average length of 31.7 minutes. Abiding by University and general GDPR policies, all data were anonymised, coded and stored using a password-protected cloud storage facility. The researcher informed participants that they could request copies of their audio recording or transcript up to two weeks following participation, but no such requests were made.

#### **6.2.1.6 Data analysis**

Transcripts were uploaded and analysed using NVivo qualitative data software, version 12. All transcripts were read a minimum of three times, to ensure accurate comprehension of the content. The researcher employed a thematic analysis to group themes around specific topics that were explored as part of the interview guide. As participants had not participated in the walking group, but merely planned to, the researcher deemed the use of a thematic analysis to be an appropriate method of analysis as it allows for documenting of participants’ perspectives as well as their opinions, attitudes, and perceptions relating to others (Freeman & Sullivan, 2019), which also formed part of this study’s analysis.

Following reflexivity, it was important that the impact of the researcher’s military experiences did not affect data interpretation that may negatively impact reliability. Therefore, the reliability of the themes was assessed with the help of two independent researchers who worked

together to sort a subset of the data into themes after which any discrepancies were discussed and agreed upon.

#### **6.2.1.7 Ethics**

Having submitted a detailed ethics application, approval was granted by Cardiff Metropolitan University's School of Health Sciences Research Ethics Committee and was allocated a Project Reference Number: PGR-2595.

In light of the COVID-19 public health crisis, this study had several unique ethical considerations. Mental health, which may be poor among those with a military service history (Williamson et al., 2019), was a predominant ethical consideration. The COVID-19 public health crisis may exacerbate pre-existing mental health conditions and cause significant harm to participants. To ensure the wellbeing and safety of participants, the researcher ensured that he asked questions relating to the individual's wellbeing in lockdown and provided contact details of several veteran support services. Due to the nature of the COVID-19 public health crisis, interviews could not be conducted face-to-face due to the increased risk of the spread of the Coronavirus. To overcome this, the researcher conducted all interviews over the telephone.

### **6.2.2 Results**

Following thematic analysis, 12 overarching categories of themes were identified in the data.

#### **6.2.2.1 Awareness of the walking group**

Participants reported becoming aware of the walking group in a range of different ways. Offline modes of advertisement and communication were prominent, including face-to-face advertisement of the walking group intervention at veteran support group meetings and through friends or acquaintances informing them of the intervention. A significant portion of the participants who signed-up to this study had seen an online advertisement posted on social

media platforms (e.g. veteran related Facebook groups). Many of the participants, however, expressed that an online advertisement may not suit all veterans and that face-to-face, or word of mouth communication was more effective.

*“I think face to face is the better way, or word of mouth. Even word of mouth, where you tell me and I mention it to somebody else, who mentions it to somebody else... I’ll give you an example. The [local veteran support group], they put a lot of information onto the internet through Facebook. But because I never go onto Facebook... so I very often don’t see any of it. Unless one of them gives me a tinkle [phone call] or whatever” (P6)*

#### **6.2.2.2 Motives for participating in the walking group (Beliefs about outcomes)**

Several participants noted that socialising with other veterans was one of their main motives for planning to participate in the walking group. A mistrust of civilians, who may lack understanding of a veteran’s circumstances and experiences and perceived to have a “...different mind-set...”, was noted as a significant challenge faced by participants in their daily lives. Therefore, the walking group was viewed as an opportunity for veterans that are WIS to meet and interact with like-minded people.

*“I think the interesting thing is veterans, or wounded veterans... their transition from military to civvy street [becoming a civilian] is different... I think the transition, the mind-set, how you do things are totally different. And I think I do like doing things with veterans and I do like the idea of having the same sort of mind-set with people. And I’m not saying we’re special, but if you ask me, it’s simply we’re just a different breed of human beings and just see things differently. And we get over our issues differently... I do like the idea of walking with fellow veterans because there are no agendas, there are no hidden agendas” (P5)*

Even among similar walking groups for non-military/veteran civilians with disabilities, one participant explained how, while that group was a good intervention, the non-military/veteran

participants tended to ask too many questions and lacked an understanding of his personal experiences and circumstances.

*“Every Wednesday these [non-military/veteran civilian walking group for people with disabilities] are walking. I only went walking there twice, but when I went there it was seriously brilliant. And they’re not military people, so I didn’t try to go as often, so I only went twice. So, I said if there is a group for [veterans] then I’d be more in my comfort zone about my walking, so there’s an association for people like me. So, they’re a bit not like-minded like me. When you go out with veterans everybody knows, we know each other properly. We know what we are suffering with, and if, for example, if you go with the civilians, they keep asking questions”*  
(P3)

The second most noted motive for planning to participate in the walking group intervention was to improve poor mental health. Participants believed that group walking could provide a significant benefit to their mental health. Mental health conditions, namely, post-traumatic stress disorder (PTSD), depression, and anxiety had reportedly caused some participants to become insular and socially withdrawn. Walking as part of a group could provide participants the opportunity to leave their house and overcome their social isolation. When asked about his motive for participating in the walking group, one participant explained:

*“Well, because for years I haven’t been out of the house. Since I got injured in the army I’ve not been out of the house, just only inside. And I’ve been suffering through post-traumatic stress disorder and isolation...”* (P3)

Another participant answered:

*“As much as anything, to give me an excuse to get out of the house”* (P4)

Increasing current levels of physical activity and improving current levels of fitness in an environment that will not likely exacerbate their current physical health conditions and could

provide a sense of routine and purpose were among other motives noted for participating in the walking group.

### ***6.2.2.3 Group walking as an activity for veterans that are WIS***

Participants felt that walking, as an activity, offered many positive benefits for veterans that are WIS. Group walking, particularly when compared to other physical activities, such as sport and gym-based group exercise classes, facilitated and encouraged social interaction during the physical activity. This may be beneficial, not only for those who aimed to participate in the walking group intervention for social purposes but could also serve as a distraction from the physical exertion and potential discomfort of walking.

*“I think it’s brilliant. It’s one of the best forms of exercise, and it’s one of those types of things that if you are with a group of people and you’re all nattering and having a laugh and a joke, you forget how far you’ve actually gone, or if you’re climbing a bit of a hill. Whereas if you look at a hill on your own, you’re thinking ‘no, I don’t really want to go up there’. You’re thinking to turn around and go back.” (P3)*

Veterans viewed walking as a form of low-intensity physical activity that could accommodate veterans with a wide range of injuries and illnesses. Even wheelchair or mobility stick users could participate and experience benefits.

*“Even if you are in a wheelchair or something like that, you can still be included. Not physically walking, yourself, but you’re being pushed. You can still chat to people either side of you” (P6)*

Some participants firmly believed that walking outdoors as part of a group in a natural environment would help with their mental health problems and relieve stress.

*“If you are walking then this is a way of relieving all your stress... you feel the breeze, [it]*

*brings back memories. So that's, like I said, a way of getting frustrations out, and it helps really if you have a mental problem also, then it relieves you"* (P3)

Veterans considered walking as an activity to suit all abilities that could be self-paced and was neither aggressive nor competitive. It could potentially allow participants to enjoy the activity and the peace that a walk with a like-minded group can bring, rather than focusing on the outcome.

*"Other sports like rugby, football, things like that, it's more aggressive and more strain on your body, I believe... with walking, you could go at your own pace. If you don't feel like going far, you haven't got to do it too far. You can go as fast or as slow as you like. You can have a break... And it's not competitive. It's up to you how you do it. I enjoy it. And getting together, a walk, it's not strenuous, it's not aggressive. It's just plodding along. Going from A to B. The goal is to get somewhere to have a sit-down and a chat. That's the thing, it's more peaceful..."*  
(P10)

One participant did warn, however, that continuous walking of the same route over an extended period might create feelings of boredom that may decrease motivation.

When asked if they would have participated in the group if it had been a sport or group-based fitness class intervention, most participants replied that they would not, citing that they were not capable due to their injuries or illnesses. However, many expressed that they would be interested in other physical activities providing that it was self-paced, and that the activity would not exacerbate their injuries or illnesses.

*"It depends on what it would be, whether I could participate in that... I love sport, I love physical activities, but I don't want to do things that I can't do positively, for want of a better term. It's got to have a positive impact on me as well."* (P9)



#### **6.2.2.4 Emphasising the social aspects of walking**

Placing the focus of the walking group intervention on the social aspects, rather than the physical challenge, was considered important in the context of encouraging participation of more socially isolated veterans that are WIS. For these individuals, providing social opportunities could encourage them to break their self-imposed social isolation, likely leading to improvements in their social and psychological wellbeing. When asked about the effect of emphasising the social aspects of the walking group instead of physical fitness, one participant answered:

*“...there are a lot of veterans who are self-isolating, and I’m not talking about because of the virus, but they are self-isolating regardless, because they don’t want to be out in society... there are quite a lot of them with psychological problems, so they’re going to really want to perhaps be in a group... so they’ll feel safer and more confident, and amongst their own...” (P1)*

Moreover, upon leaving the military, not all veterans may be interested in maintaining their previous levels of fitness and would much rather participate in activities revolving around social interaction.

*“I would definitely focus on the social side of it, especially for veterans. Most veterans were physical whilst in the military... so it’s not every veteran wants to still be working out... They’d probably rather a chat and a beer than a run being beasted [made to do challenging physical activity]” (P1)*

#### **6.2.2.5 Inclusion of significant others**

All participants felt that including significant others would have a positive impact on the walking group intervention. Primarily, a significant other could provide support to veterans that are WIS; especially among those with poor mental health, such as frequent anxiety caused

by PTSD, who may be struggle in new environments. Support in this manner may encourage such veterans that are WIS to participate in the waking group intervention.

*“...like me, some of us suffer from post-traumatic stress disorder, and some of them have anxiety problems. So, if there is someone like a close family member who they know already, then they can settle them down, and it is relaxing for them [the veteran that is WIS] and they will then enjoy the activity more...” (P3)*

When asked directly about this matter, this participant suggested that the inclusion of a significant other would encourage more veterans that are WIS to participate in groups such as the walking group.

Including a significant other was also considered to promote and facilitate social interaction among participants. Both dogs and significant others could help create conversation among the group, leading to a relaxing and enjoyable environment.

*“If I go with my other half, she’s got a mouth on her like the Mersey Tunnel. She’ll talk to anyone about anything. And that brings me out of my shell, then. I then start coming back into my old self of going on about all the terminologies and bits and pieces like that.... I think that’s what we need, it’s that people don’t feel as though they’ve got to go there, do the walk, and then jump back in the car and go straight home or whatever. That it’s an enjoyable thing...” (P8)*

When asked about dogs, one participant replied:

*“I think a dog, specifically, is a good icebreaker as well because any animal, people love them, don’t they... ‘Oh, he’s lovely, she’s lovely and oh, can I have a stroke?’ ‘What’s its name?’ ... It’s a talking point. To me, any animal is a good idea” (P6)*

Other participants suggested that, by having significant others involved, it would be easier for veterans with caregivers to participate. Some participants, however, did note that the issue of including significant others should be given careful consideration as there was a potential for significant others to become dominant within the waking group, which may shift the focus away from veterans that are WIS and undermine the original aim of the walking group.

*“I’ve seen where it does go pear shaped at various [groups for veterans that are WIS] where the families tend to start taking over a bit and influencing too much. It’s about the military personnel I think...” (P9)*

#### **6.2.2.6 Incentives**

Overall, participants felt that incentives, in general, were positive and could encourage more veterans that are WIS to engage in interventions such as the planned walking group.

*“Everybody likes a freebie, don’t they? I think, at the end of the day, it’s a very good idea. I think it possibly would attract... Maybe certain kinds of people ... Me personally, if you’d have mentioned it to me, I’d have probably gone anyway.” (P6).*

However, many considered the provision of a free lunch to be unnecessary or inappropriate. Veterans identified group t-shirts as a more effective incentive, as these could make participants feel included and a part of the group; similar to that of a military uniform.

*“[T-shirts] make you feel important. It makes you feel part of the group, so people like that. I know a lot of older men they like receiving little goodies and they wear them. It makes them feel included. It makes them just feel part of something again. Yes, I think that would be an incentive for people...” (P2)*

It was clear that the provision of incentives should not simply be viewed as “freebies”. Some participants shared their experience of certain veterans who are WIS that they had met that

attended support or physical activity groups only to gain the incentives and had no interest of participating in the activities. Some participants noted that these individuals would likely abuse such incentive systems for their own personal gain. To avoid this, creating a reward system may decrease the risk of incentives becoming abused, whilst encouraging participants to feel as though they have earned the incentive.

*“I think [incentives] are very good but I think they should be in there as some sort of [reward]. You don’t get a free t-shirt until you’ve been there about five times. You don’t get a Fitbit, I’ll use that as an example, until you’ve been there ten times... a rewards system... you earn it. It’s like everything else in the military. You don’t get it for free, you’ve got to earn it.” (P7)*

#### **6.2.2.7 Activities**

Participants welcomed the idea of complementary activities, such as photography projects, nature foraging and wildlife spotting.

*“A bit of fun. A bit of enjoyment. Let’s do it. Everyone’s got cameras on their phones now... I think it could be quite amusing. I think everyone would be quite keen for that...” (P10)*

Creating activities that can be conducted during the walks could help take the focus away from physical activity, promote group cohesion, introduce some friendly competition and provide some mental as well as physical stimulation.

*“I think it’s fantastic... the reason why I think it’s fantastic [is] because it takes you away from focussing on what you’re doing. And it gives you a passive slight bit of competition, so you’re looking for things, and it’s not all about speed... So, you are doing a physical activity but you’re actually using your mind and your physical body to do an activity.” (P5)*

In addition to the activities originally planned for the walking group, participants suggested walking routes could be taken that explored the history of the area, with map reading or

orienteering, quizzes, survival training, camping, stretching and litter picking in local areas as other potential activities.

#### **6.2.2.8 Inter-charity collaboration**

All participants felt that including other veterans that are WIS, who may not be beneficiaries of the same military or veteran charity, would not be a problem and made no objections. Rather than considering the charity a veteran chooses to donate to, give their time to, or ask for support from, participants felt that being a military veteran was more important and expressed a strong feeling of camaraderie and bonds with fellow veterans regardless of their organisation(s) affiliation(s). Moreover, some believed that including a wide range of veterans that were involved in other charities and organisations would help to increase the knowledge of what can be offered by other charities and organisations among participants of the walking group intervention; potentially leading to further opportunities for its members. When asked about the prospect of including veterans who may not be part of the same charities or organisations as him, one participant replied:

*“I have no issues with it because again, it’s another group of people, different views... different outlook on life... finding out other things and obviously, having people from different [charities and organisations] as well, by walking along, chit chatting to them, you can find out exactly what’s going. You’ve got time to find out what’s going on in their area... It might just suit you... I think it’s a good idea. In fact, I think it would be better to have people come in from different [charities and organisations]” (P6)*

Inviting representatives of other charities and organisations to informally discuss with participants what support or opportunities their organisation can provide was also considered very positive. Participants explained that, in their own experiences, the vast number and subtle nuances between military and/or veteran charities can often be confusing and overwhelming.

Having a representative that participants can direct questions to and ask for advice would help more veterans that are WIS engage with these support services.

*“Because there’s a lot of charitable help out there, but you don’t get to hear about it. If you don’t do social media or know where to look, you can go round and round in circles. But sometimes coming down, having a chat [you think] ‘I could do that. They can help me’. Or, I just need a bit of advice. So, people coming out I think is great. And sometimes if you do find it on the Internet or reading about it, it’s not the same as someone face-to-face talking about it. You can ask a question... If you don’t understand it, you’re going to ask. Sometimes you read something in a leaflet, and you don’t understand, and you can’t ask anyone. It’s like going into a bank and you’re face-to-face, talking to someone, as opposed to trying to do it online.”*

(P10)

Veterans identified the importance of including less well-known, local support groups and charities. Veterans that are WIS may not be aware of some of the smaller, local organisations and charities who may provide links to local opportunities that larger organisations cannot.

One participant, however, warned that some veterans that are WIS might have had significant negative experiences with certain charities or organisations, which could cause negative feelings and be quite off-putting.

#### **6.2.2.9 Overcoming low physical activity self-efficacy in veterans that are WIS**

Participants felt that low levels of physical activity self-efficacy among veterans that are WIS following their injury or illness was common. Nearly all participants shared their personal experiences of low levels of self-efficacy, something that was not always limited to the domain of physical activity or exercise. In one participant’s case, low levels of physical activity self-efficacy led to an avoidance of physical activity to prevent feelings of embarrassment because

they were no longer able to achieve the same level of fitness and capability as their pre-injured self.

*“From personal experience... I felt that a month ago. I was almost bedbound. When I got injured, I was wounded a couple of times in my service, and it’s caught up with me... I couldn’t do the things that I used to be able to do. It had quite an effect on me, where I didn’t want to go and do anything then, because I almost felt embarrassed” (P9)*

Participants had several suggestions for ways in which physical activity interventions, such as the walking group intervention, could help potential participants overcome the barrier of low physical activity self-efficacy and engage in physical activity programmes. An important consideration was to ensure that physical activity interventions allow participants to conduct activities at their own pace and the researcher should make potential participants fully aware of this at the outset. However, in activities such as group walking, interventions should be designed so that those with lower levels of capability were not made to feel excluded or undervalued. In this manner, activities should allow participants to start at a low-level and gradually build up intensity over different sessions at a pace that is comfortable for them. When asked how they felt physical activities could overcome physical activity self-efficacy barriers in the context of the walking group, one participant replied:

*“... you could break it down... you could say ‘one member of the group will take you for a 0.5-mile walk. And then, after that, if you want to stay there, a member will stay with you. And then, if you want to do a mile, somebody will stay with you at the mile point’. So, instead of people thinking ‘okay, it’s a five-mile walk or a three-mile walk, and I can barely walk 200 yards’, give them the option to walk 200 yards and enjoy the countryside, and sit down, and have a chat. Because ultimately at the end of the day, it’s good for their mental wellbeing” (P1)*

Participants reported that being in a group, with like-minded people who have shared the same experiences of military service, injury and/or illness, represented an environment that would likely increase physical activity self-efficacy. Participants felt that doing physical activity as part of a like-minded group could provide a source of confidence, encouragement and motivation.

*“I don’t think, as individuals, we’re good at encouraging ourselves... Better from a group and specifically, a group of likeminded people, I think, who understand what you’re going through, that can help you to build more confidence and even motivate you... You get the confidence and then, with the confidence, you can get the motivation. After you’ve done it, you probably then pretty much can then do it yourself” (P6)*

Other suggestions included using incentives, including significant others, taking the focus away from the physical activity, building participants’ self-esteem, having volunteers from the group collect participants from their homes, providing emotional support to participants, and making the sessions regular. Veterans identified these factors as ways in which the design of physical activity interventions might help veterans develop greater levels of physical activity self-efficacy.

#### **6.2.2.10 Feasibility**

Participants felt that the walking group was a feasible intervention and was unlikely to lead to regular problems that may have resulted in harm to the participants or them not wanting to or being unable to participate. One consideration, however, related to the route selection of the walks. Particularly among veterans that are WIS who either use a wheelchair, mobility sticks or are otherwise limited in their mobility, it was felt that some walking routes may be unsuitable, especially if a route was wet or muddy due to poor weather. Prospective participants suggested that the researcher could manage this situation effectively, either by having a



secondary route planned, or by allowing affected participants to engage with the indoor social aspect of the walking group intervention.

*“Well for myself, being in a wheelchair, I guess the actual park has some hilly moments on it, so for me it wouldn’t be ideal if the weather was bad, not so bad if the weather was good... Terrain and weather are the only issues to cope with, with a walking group... as long as you’ve got a good back-up, a secondary location, as you did at that park... we could go inside and have a drink, a couple of nibbles, there was a room there to talk...” (P2)*

Some participants also suggested that it would be good to ensure that appropriate medical facilities were available at the intervention location for anyone who may experience any physical or psychological health problems.

*“Making sure that if people do have an event, an episode, or whatever, that either, A, we can cope with it with the people around or, B, there’s access wherever we are for an ambulance...” (P9)*

Another consideration included the presence of “*Walts*”, a term derived from the fictional character Walter Mitty that is used to describe people who pretend to have served in the military. Participants felt that *Walts* joining in with the walking group would cause significant animosity within the group, leading to veterans that are WIS not wanting to engage in the intervention. However, the difficulty in balancing making the walking group easy to join, which is important for those who may be suffering from social isolation and poor mental health, and screening participants for proof of their military service was noted.

*“... [another] possible issue that might happen is if you get a “Walt” involved... Because that can go down like a lead balloon, and that can really cause a lot of problems. [It] would cause an awful lot of animosity. It’s difficult. If you go down the route of saying you want proof that we’ve served or whatever... Because we’re trying to get veterans who aren’t leaving their*

*house to come. So, it's a difficult balance between what documentation should we require, versus making it easy for them to come into the group."* (P4)

Other feasibility considerations included being aware that the ability to walk will greatly differ among participants and so to ensure that the design of the walking group intervention accommodates this. Another consideration was to be aware of any events that might draw large crowds to the walking group intervention location as some veterans that are WIS may find large crowds difficult to cope with due to poor mental health.

#### ***6.2.2.11 Other suggestions for changes to the walking group intervention***

Participants shared their thoughts on the current format of the walking group and any changes they could suggest that would encourage more veterans that are WIS to participate or improve the intervention. A predominant suggestion for change to the planned walking group was to vary the location of the walks. This would avoid participants becoming bored or disinterested in walking the same route.

Others suggested that a positive development would be to create a walking group that was self-sustaining, allowing it to continue beyond the planned eight weeks of the research study. This would allow participants who wished to maintain their weekly walks to continue in the same format as the previous eight-weeks and potentially expand the group over time.

*"... you might find, within that eight weeks, people are saying well, this is really good. After the eight weeks, let's do it, we'll just get together, on our own. You need somebody who's going to stand up above the parapet and take charge and just organise... just where you're going to meet, what time. It could be as easy as that. They don't have to organise [the incentives] or stuff like that. We're going to go here, at this sort of time. This is the postcode of the carpark or something like that"* (P6)

Other changes to the walking group included organising a car share, the partnering-up of individuals to provide mutual support, and adding a monthly social evening.

#### **6.2.2.12 Participants' ideal activity**

Prospective participants identified a range of preferred activities. such as doing some light-to-moderate outdoor physical activity that included a social element. When asked what his ideal activity would include, one participant replied:

*“Exactly what you’re proposing. A walking group. You can walk at your own speed. Take your camera with you. Look for wildlife, look for birds. Then have a social... I think that’s a good foundation to build on. Once you’ve got it going, see where it goes from there” (P7)*

All except one participant, who did not give details of the type of their ideal physical activity, mentioned an outdoor-based activity as their ideal physical activity. This included a range of activities such as walking, orienteering, and scuba diving. It is important to note that none of the participants mentioned that sport, in any form, would be their ideal activity. One participant was not particular about the type of activity but suggested that his ideal activity would have a social element that could involve significant others.

*“I think my ideal activity would look like where there’s been socialising either before, or during, or at the end of it. And it’s an activity where you can bring in extended family, partners, friends, or whatever. My self-esteem went many years ago at one point. It’s coming back now” (P8)*

## **6.3 Part Two - The evaluation of the acceptability and feasibility of a Help for Heroes led group-based exercise class intervention for veterans that are WIS.**

### **6.3.1 Methodology**

#### ***6.3.1.1 Philosophical assumptions***

The philosophical assumptions of this part were identical to those reported in Part One, Section 6.2.1.1.

#### ***6.3.1.2 The group-based exercise class intervention***

This intervention, organised by Help for Heroes, consisted of a weekly event at a private leisure centre located in a large town in central South Wales, where a qualified civilian fitness instructor led group-based exercise classes. The researcher regularly attended the majority of sessions held from September 2018 to March 2020. Classes would take place at 12.30 and run for approximately one hour. Typically, the instructor would split the hour into two different classes, both of which could be varied from week-to-week. The first class largely depended on the ability of the group, with swimming for those who would benefit from the low impact of the water and weight training for those who regularly pursued more competitive sport in their free time. The second class would normally consist of stretching or Pilates that aimed to increase the mobility of participants. However, the number of veterans that are WIS who attended this intervention remained small throughout the 18-months, averaging around three participants per class, not including the researcher and a Help for Heroes representative who also regularly attended the classes. Once per month, the session would include a social gathering prior to the class where Help for Heroes provided free tea and coffee for all attendees. At this time, Help for Heroes support workers were present to provide support and advice to those who sought it. These monthly coffee mornings were largely attended by around 10-15

veterans who are WIS. However, those that attended the social gatherings did not tend to participate in the exercise classes and the exercise class participants generally remained the same, with only two new regular participants starting over the 18-months the researcher was present.

### ***6.3.1.3 Participants***

Using the definitions as those reported in Chapter One, Section 1.1.1, veterans that are WIS and who had participated in the Help for Heroes intervention over an 18-month period were contacted and invited to participate in the study. As in Part One, a £15 amazon gift voucher was offered to participants as an incentive. Of these eight veterans that are WIS and regularly attended the intervention, five consented to participate in the study.

The participants' age ranged from 45 to 66 years, with a mean ( $\pm$ SD) average home to activity distance of 14.6 (9.48) miles. Time since discharge from the military averaged 14.6 (13.75) years, however, four out of the five participants had been discharged from the military for less than 14 years. Three participants had special requirements, two of whom required full-time caregivers, one being a wheelchair user, and another requiring a back brace to exercise. Detailed demographic information can be found in Table 6.2.

Table 6.2

*Demographic Information of Participants of Part Two*

<b>Sample</b>	N = 5	
		n
<b>Gender</b>	Male	5
	Female	0
<b>Age</b>	18-25	0
	26-30	0
	31-35	0
	36 – 40	0
	41-45	1
	46-50	1
	51-55	1
	56-60	1
	60+	1
<b>Distance from home to activity (miles)</b>	0-5	1
	6-10	1
	11-15	1
	16-20	0
	21-25	2
	26-30	0
	31+	0
<b>Service branch</b>	Army	4
	Royal Navy	1
	Royal Air Force	0
<b>Years since discharge</b>	0-5	1
	6-10	2
	11-15	1
	16-20	0
	21-25	0
	25+	1
<b>Other information</b>	Wheelchair user	1
	Back brace user	1
	Has a full-time caregiver	2

#### **6.3.1.4 Interview guide**

The interview guide was designed using a similar method to that of Part One and largely mirrored the questions asked. In comparison, however, the questions of the interview guide were framed retrospectively, relating more to participants' experiences, or thoughts regarding the Help for Heroes group-based exercise class intervention. For example, an item related to the inclusion of significant others in the exercise classes included:

*“Would you have liked it if your family/friends/caregivers were able to join in with the classes too?”*

The participants' perceptions of other veterans that are WIS were similarly included in this part. For example:

*“Do you think allowing your family/friends/caregivers to join in with the exercise classes influence the number of veterans attending?”*

Other questions relating to the feasibility of the group-based exercise class intervention were included. For example:

*“Did you experience any problems during the exercise classes over your time involved with them?”*

As in Part One of this chapter, the researcher used the term “self-confidence” as an alternative to describe “self-efficacy”, and terminology was discussed before each telephone-based interview.

#### **6.3.1.5 Procedure**

The procedure for Part Two was identical to that of Part One (Section 6.2.1.5). The researcher ensured that the date and time of each telephone-based interview was convenient for each

participant and the interview followed a semi-structured format. The interviews were audio recorded and transcribed *verbatim*. Interviews ranged from 21 to 62 minutes, with an average length of 39.2 minutes. The data were anonymously coded and stored in password-secure cloud storage, abiding by University and GDPR policy. Participants were able to request a copy of the audio recording and/or transcripts up to two weeks following participation; however, no participants requested copies of their transcript or recording.

#### **6.3.1.6 Data analysis**

Data analysis for Part Two was identical to Part One, please refer to Section 6.2.1.6.

#### **6.3.1.7 Ethics**

Ethical approval was granted by the research ethics committee of the School of Health Sciences, Cardiff Metropolitan University. Project Reference Number: PGR-2595.

Specific ethical considerations were identical to Part One. These are discussed in Section 6.2.1.7.

### **6.3.2 Results**

Twelve overarching categories of themes were identified following thematic analysis.

#### **6.3.2.1 Awareness of the group-based exercise class intervention**

Participants became aware of the exercise class intervention predominantly through offline means. Word of mouth, home visits by charity support workers, and attending a Help for Heroes coffee morning were all cited as means by which participants learned about the intervention, leading to participation.

*“Help for Heroes came ‘round my house... and they told me about it. You know, when they come and interview you the first time to make sure you’re a legit veteran...” (P1)*



One participant, however, mentioned that a mixture of offline and online sources directed him towards information related to the intervention.

#### ***6.3.2.2 Motives for participating in the exercise class intervention (Beliefs about outcomes)***

Giving an opportunity to socialise with other, like-minded veterans was a predominant motive for participants becoming involved in the group-based exercise intervention, even among those who were already involved in similar civilian sport/exercise groups.

*“I’d started socialising with other people... in a sporting environment, [so] I thought it’d be good to do it in a [similar] environment with other veterans. I’d seen the benefit of doing that through Invictus [Games]... I thought it would then be a good idea to go and do it on a more regular basis with local veterans” (P4)*

Improving fitness in an attempt to regain some of the fitness that participants may have lost due to their injury or recent inactivity or maintaining fitness they had previously developed were issues identified as common motives for participating in the group-based exercise intervention.

*“So, I wanted to get back to being fit or fit-ish as best I could be” (P5)*

*“[group exercise intervention] plugged a gap for me... I was going through an 18-month rut after finishing with [civilian sport activity]... Even if I was doing some stuff locally here [the group exercise intervention] gave me that focus until I got back into doing [competitive sport]” (P4)*

Other reasons for participation included the desire to improve physical health, the convenient location of the intervention, and being inspired by a fellow veteran that was WIS.

### **6.3.2.3 Group-based exercise classes as an activity for veterans that are WIS**

Participants expressed that they enjoyed the group-exercise intervention and praised its adaptability to accommodate a wide variety of physical injuries and conditions that can greatly differ depending on who attends the session. This was particularly important, considering the wide range of conditions of the veteran that is WIS population. Even on the occasion when group-exercise sessions did not suit an individual, participants felt that they were able to adapt or skip a certain activity or exercise and decide the pace of the session for themselves.

*“...it’s only as physical as you want it to be. It’s not something that is forced upon you in any way or form, it’s something that’s entirely what you need. If you don’t want to do it, you can sit there and wave your arms around and that’s exercise. It will suit any sort of body or mind... there’s no hard and fast rules” (P3)*

*“...it’s at my level and if it got too much for me, I knew which ones I could and couldn’t do...what I’m capable of and what I’m not capable of” (P1)*

Exercising within a veteran group was supportive and allowed participants to let their guard down and feel relaxed.

*“the whole point of this is to get people together and voice your opinions in your day-to-day activities, what you’ve been through. It’s [the] camaraderie. It’s not the same as working... when you’ve got somebody beside you who knows you and you know they are armed forces they know how you tick” (P3)*

Group-based activity helped to motivate participants through self-created competition with their peers. However, some participants felt this sometimes resulted in them forgetting to pace themselves which often led to exacerbating current injuries or illnesses.

*“...when I did the group exercises, I was pushed further and then I was injured for weeks from*

*my own accord... it did motivate me, and I felt really good. For three days, I didn't even need to exercise after those group sessions because they did make them tough... I think the only part of it is the self-pacing. I'm not honest with my injuries, it's more of an ego thing, when I'm working out with others I like to keep as part of the group."* (P2)

While the intervention provided a safe and structured exercise session, some participants suggested that a lack of variety in the content of the sessions might have discouraged participation. Group exercise can encompass many forms and can be conducted using different formats, such as circuit training, body pump, and Pilates. However, the exercise sessions conducted in the six to nine months prior to the interviews had remained very similar.

*"Over the last six to nine months... we've got stuck in that rut of doing this very similar session all the time and it might be that that's put [other veterans that are WIS] off."* (P4)

#### **6.3.2.4 Effects of intervention on current levels of physical activity**

The group exercise intervention increased the self-reported levels of physical activity among all participants. For two participants, it provided a weekly exercise session that comprised their main form of regular physical activity. Among the other three participants, however, it provided a clear pathway to more frequent and intense physical activity. Examples included high-level competitive sport or highly physical hobbies; something they suggested they would not have been able to do without having first attended the Help for Heroes intervention.

*"...[the group exercise class] allowed me to find out other things, like I was invited to go sailing, I didn't know anything, I'd never been on a vessel before with a sail... I didn't know anything about it, and it was a bit of a challenge, but I overcame that challenge and I thought this is the way I'd like to go."* (P3)

### **6.3.2.5 Inclusion of significant others**

Participants unanimously considered involving significant others as a positive development to the group-based exercise classes. Involving partners, family, and friends, who may often act as a caregiver, may help alleviate some transport issues that could otherwise create a significant barrier to participation.

*“90% of spouses or 90% of the other half are [veterans that are WIS’s] caregiver and providers, and of course, they also are their transport. That can be a big, big thing with the fact that a lot of these veterans can’t go because the wife needs the car for the day. It’s all these transport issues... About 18-months or so ago, not necessarily on our sessions, but they allowed the caregiver to get invited to the facilities there for a couple of weeks. And the partners/carers, they enjoyed doing that.” (P3)*

The inclusion of significant others may also encourage veterans that are WIS to participate by providing a source of encouragement and confidence when attending an activity that is likely to be in an unfamiliar environment.

*“I think they get confidence from their partners... I think a lot of [the reason why some may not attend the exercise classes] is confidence. So, if they’ve got a partner there, that they’ve been with for life, I think they’d get a bit of confidence from them and take part more” (P5)*

Despite the overall positivity surrounding the inclusion of significant others, some participants expressed that there may be a small number who would feel uncomfortable including those with no-military experience, as it would prevent veteran participants from being able to relax and limit what they felt they were able to discuss. One participant gave his experience of including significant others in a local support group for veterans:

*“We had this discussion on the Facebook page for [A local veteran social group]. About allowing significant others, your wife, partner to come along to those sessions in addition to the veteran. The majority of us actually turned round and said, yes that would be fine. But there was a significant minority they would [be] uncomfortable with the idea. They said it would stop them from being able to relax and talk about the things that they would like to talk about.” (P4)*

It may also undermine the personal time in which couples can spend time apart from one another, something that is not often possible when one is a full-time caregiver or greatly depends on their significant other.

*“I think when some people do these activities it’s a break for them... it’s their escape and their time on their own. It’s almost a good and a bad thing. That’s down to the individual to coordinate. If they need a break from their Mrs or vice versa then it’s up to them. It’s good, I think. It’s more good than bad, but it’s up to them to deal with that.” (P2)*

Nevertheless, participants felt that including significant others would encourage more veterans that are WIS to engage in the intervention. One participant explained that this had shown to be successful in a previous physical activity event for veterans:

*“...the veteran [went] along with their family members, the kids and everybody else, and they were really quite successful... it was like getting them doing football-based activities and other things that are interactive. They were definitely enjoyed...” (P4)*

#### **6.3.2.6 Incentives**

Some veterans viewed the provision of a free lunch as a positive addition. However, among the participants of the current study, it would neither encourage them nor discourage them from engaging in the intervention, but some suggested that it might encourage others.

*“...as an individual, it’s little things like that that don’t give me an incentive. I either want to*

*go or I don't. Other people, they might. I know some people it would and overall it probably would.” (P2)*

A free lunch may not appeal to everyone, however. For example, some may not want to eat large amounts after physical activity or exercise, but may feel obliged to eat it, even if there was a possibility of opting out of the free lunch. A smaller incentive, such as a hot drink and cake, was suggested to be more appropriate.

*“Sometimes when stuff's provided you feel obliged to eat it, it's awkward. To be honest with you, after exercising... I always crave something sugary. So, a cup of coffee and a biscuit or a bar of chocolate does me” (P1)*

Rather than a food-based incentive, providing exercise or rehabilitation equipment, such as resistance bands, might be more appealing to veterans that are WIS. Not only does this provide an incentive but may allow the individual to conduct rehabilitation or further exercise or physical activity outside of the intervention.

*“everyone's got injuries, so maybe sports equipment like simple cheap stuff like the stretchy bands...Heat packs or something” (P2)*

While the provision of incentives was considered a positive thing, participants expressed concern that such an incentive system may be abused by certain individuals; something that would not only have a negative impact on the organisation funding the intervention but create resentment among the participants towards those they felt were abusing the incentive system. To avoid this situation, participants recommended that, rather than incentives being given simply for attending one session, creating a rewards system, whereby, participants gain incentives for continued participation, as an effective method to encourage adherence in the group-based exercise class intervention. This would not only avoid the incentive system being abused but might also provide participants with a sense of achievement, knowing they have

earned incentives or rewards.

*“there could be an incentive given whereby... You’ve been four times and you get a t-shirt... instead of saying we give you all the kit, let them work for it. Because at the end of the day if they have worked for it, they’re obviously doing something good for themselves and then they get hooked... you have earned it...” (P3)*

#### **6.3.2.7 Inter-charity collaboration**

All participants expressed that they would not have a problem with veterans that are WIS who may not be a beneficiary of Help for Heroes, or any other charity, participating in the intervention. Ensuring individuals have a military background was considered more important than what charity they were affiliated to. Moreover, the inclusion of more veterans that are WIS would help spread information related to the intervention through word of mouth.

*“I’d be quite happy with [involving veterans that are WIS who are not affiliated to the same charity] to be honest, because it can only broaden the horizons... So, you’re meeting people again, word of mouth, then they’ll go, oh, [the group exercise class] is cracking. So, I personally think it could only benefit.” (P5)*

Inviting other charities to attend a session and discuss what their organisations can offer participants was also considered very positive.

*“Yes, I think [involving other charities] is good. It’s a good thing. It can’t be anything but good. It helps. It also lets people who are not so knowledgeable about other charities what they can do to help, it gives them that knowledge... [those with poor mental health] aren’t motivated that much really and they become a bit secluded...” (P2)*

However, some participants warned that this required a considered approach that was not forced on participants, undermine the charity organising the intervention, and that the charities

invited did not offer false promises to participants.

#### ***6.3.2.8 Overcoming low physical activity self-efficacy in veterans that are WIS***

Participants felt that low physical activity self-efficacy was a significant challenge that veterans that are WIS face following their injury or illness. Ensuring that physical activity interventions provided an opportunity to start at a low level and build progressively was identified as a method that may help overcome self-efficacy related barriers.

*“Confidence only comes by practice... at the end of the day. It’s little steppingstones, nobody will get any confidence unless they’ve done it a lot of times. I use my [personal experience] ... Now I’m confident... I practice, practice, practice. It will give you confidence.” (P3)*

Reducing potential participants’ fears or concerns by ensuring that they are aware the activity is self-paced and supportive would also help less confident veterans to overcome barriers related to physical activity self-efficacy. Providing less strenuous activities may also encourage those with low physical activity self-efficacy to engage with the intervention.

*“But maybe on a [group exercise session] instead of just doing the gym, perhaps you could go outside maybe and do something, things like badminton and things like that. It’s not such a hard [activity], it’s a gentler sport. And perhaps it’ll give different people a bit more confidence.” (P4)*

Other suggestions that may help overcome low physical activity self-efficacy barriers included allowing a significant other to participate in the intervention, providing an incentive for participation, using an inspiring veteran that is WIS as a role model for participants, and planning a one to one session as an introductory session for participants with low physical activity self-efficacy.



### **6.3.2.9 Thoughts surrounding the lack of new participants over the last 18-months**

Over the previous 18-months that most participants had been involved in the intervention, the number of regular participants only increased by two members. Many veterans that are WIS expressing interest in the intervention, observing a session, but this rarely resulted in progression to participating in the intervention. When participants were asked why they think this may be, they expressed that, due to the diverse nature of veterans that are WIS, it was difficult to generalise. However, participants suggested reasons could include financial issues, low physical activity self-efficacy, or issues in the individual's personal life. One participant shared his experience of talking with a potential participant of the group-based exercise class who was experiencing ambivalence towards participation:

*"I think it's just self-confidence. You need to bully yourself up... 'I'm going to do it. I'm going to do it'... But then once you get away and really think about [participating] again you're like ['maybe I shouldn't participate']... It's self-confidence, I think. [There was a potential participant for the exercise class], he was a bit overweight and I think he was quite self-conscious about how he looked during [physical activity]. It's just building that confidence up in that person. And I said to him, look, I was in the position as you a year ago. And just off the cuff I went and did [selection for national veteran that is WIS sport team] and was lucky enough to get it. So, and you can only do what you can do, just try your best and do the best for what you want to get what you want I suppose. So, I think it's building people's confidence..." (P5)*

### **6.3.2.10 Feasibility**

Participants did not identify any issues associated with feasibility. The group exercise session ran consistently, well, and remained adaptable to suit the needs of the group. One participant noted that, on a rare occasion, a lack of communication had led him to travel to the intervention

without knowing the instructor had cancelled the exercise class for that week. When asked about issues surrounding the organisation of the exercise classes, this individual replied:

*“I’ve turned up to most of them for over almost three years. There’s not many I’ve missed, and I would say, a rare occasional miscommunication that the session has had to be cancelled at short notice” (P4)*

Situated in a central area relative to the surrounding towns and cities, the location of the group exercise classes was suitable for all participants. However, many suggested that attending the intervention might prove challenging for those who are not local and do not have a car or the finances to support their travel costs.

*“For me it’s okay, it’s 30 minutes away. Obviously, I’d prefer somewhere closer but obviously you’ve got to have something which is central to everybody because like [a veteran that is WIS who] travels from [West Wales] area. There’s a couple of other lads who come from [West Wales]. [Another veteran that is WIS] comes from [East Wales]. So, it’s quite central...” (P5)*

*“For anybody living within a 15-mile radius, it’s brilliant. [Anything over] 15 miles and you’re talking motorway travelling [which many do not want to do]” (P3)*

The timing of the exercise classes was similarly noted as convenient, however, a recent change in timings required some individuals to drive at times when local roads were at their busiest. One individual suggested this change in time was the cause of a recent lack of attendance in the group-based exercise class intervention; stressing the importance of this in engaging veterans that are WIS.

*“Traffic is a big one, so [at around] 15:30, 16:00, and especially coming from there to [large city] you’re hitting then the teatime traffic and you’re talking a lot of problems. What’s going on now is I see a lack of veterans turning up in our last three sessions due to the fact that...we’ve gone from a 13:00 [start] to 14:00 [start]” (P3)*

### ***6.3.2.11 Other suggestions for changes to the group-based exercise intervention***

Participants identified three other suggestions for change. With social opportunities being a predominant reason for participation, improving opportunities to socialise was a possible means of encouraging more veterans that are WIS to participate. Participants suggested that organisers could make time available for participants to socialise either during or after a group-based session.

*“Offering maybe a cup of tea after and a little chat to encourage people to do the fitness. Because I think a lot of people just go for the social, meeting likeminded people with similar stories that they can relate to. So, maybe say fitness first if you want to do it and then do the cup of tea after... the social bit after” (P5)*

The second change related to making the activity more fun. Participants felt that, providing that the location and time were as convenient as the group-exercise classes, making sessions more fun and interesting would encourage more veterans that are WIS to participate. For example, getting outdoors and changing the activities regularly.

*“I know there are veterans that go and do coastal walking and stuff like that. They will get together with other veterans who used to go to [the group exercise class] and go and do coastal walking. There is an interest there amongst veterans to go and do just a casual walk where they can take the dogs along, other people can go along because [there is] more flexibility on how you run the session” (P4)*

The last suggestion for change was to include activities designed to improve mental health as well as physical health, by potentially including some kind of meditation as part of the group exercise classes.

*“I think there could be a meditation or wellbeing brought into it... physical wellbeing and the*

*exercise side of it is good... but there's obviously a wellbeing side of it which is mental" (P3)*

#### **6.3.2.12 Participants' ideal activities**

Participants identified a range of preferred or ideal activities. Participants were keen to pursue outdoor activities that were not structured sport or exercise but included social opportunities and were self-paced. An example of this included one participant's description of his ideal activity:

*"[Surfing] is something I enjoy. Everyone can bring something to the party, so to speak. I just always felt at ease in the water, there's no pressure on the body..." (P2)*

### **6.4 Discussion**

Findings reported in this chapter add to the existing understanding of acceptability and feasibility of community-based physical activity interventions for veterans that are WIS. This section combines the findings of parts one and two in order to identify common themes and their implications for the design of physical activity interventions for veterans that are WIS.

#### **6.4.1 Evaluation of intervention acceptability and feasibility**

Overall, both physical activity interventions appeared to be acceptable and feasible. In addition to their acceptability and feasibility, the interventions aligned with many aspects of quality physical activity experience for veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2019, 2018; Shirazipour et al., 2017), suggesting both interventions would promote quality physical activity experiences. Namely, both interventions were considered to be inclusive, include challenging but adaptable activities, allow participants to feel autonomous, and facilitate group cohesion among like-minded individuals.

Ensuring that physical activity is inclusive has been identified as an important aspect of quality physical activity experience (Shirazipour et al., 2018). Both the proposed walking group intervention and group-based exercise class interventions were frequently praised for the adaptability and inclusivity of their design. The current study adds to the findings of Shirazipour et al. (2018) and suggests that due to the wide range of physical conditions and disabilities of the veteran that is WIS population, intervention design would benefit from the consideration and facilitation of participants with lower levels of capability. In doing so, participants with low levels of perceived capability may feel more encouraged to participate, knowing that their perceived physical limitations can be catered for during the intervention; particularly important considering the prominence of the physical activity self-efficacy barrier discussed in Chapter Four.

In comparison to the walking group, the group-based exercise class may be perceived as a more intense physical activity. This could have important implications related to the physical activity self-efficacy barrier reported in Chapter Four. Many participants of the walking group evaluation stated that they would not be interested in sport or exercise-based activities; citing a lack of personal physical capability. This finding adds strength to the design of the walking group intervention and suggests its implementation would meet one of its aims of encouraging those with lower physical activity self-efficacy to participate in physical activity.

The intense nature of the group-based exercise classes may also lead to the exacerbation of existing physical injuries or conditions through a lack of self-pacing due to participants' competitive nature. Challenge has been identified as a key aspect of quality participation for veterans that are WIS (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2018, 2017). While competition with fellow participants during the exercise class may fulfil this quality element, the current study highlights the fragile balance between engaging in sufficiently challenging physical activity and injury among those with physical health conditions.

Challenge, however, is very subjective and what constitutes challenge will vary among individuals. As discussed in Chapter Five, the walking group intervention specifically targeted veterans that are WIS with lower levels of physical activity self-efficacy. Among such individuals, the self-paced walks of the walking group intervention may be considered challenging. Whereas, participants of the group-based exercise class, who exercise regularly, may require greater physical intensity in order to feel challenged. Despite the differences in perceived challenge, it is important that interventions facilitate challenge in a safe manner.

Enjoyment of physical activity has been cited as an important component of quality physical activity experience (Shirazipour & Latimer-Cheung, 2020). Both interventions evaluated in the current study suggested that a lack of variety in the format of physical activities may be perceived as repetitive and boring and result in lower levels of uptake or adherence. Researchers have suggested that varying modes of activity can lead to greater levels of perceived enjoyment among participants (Hoekstra et al., 2017). This was echoed in the current study where participants felt that physical activities should remain varied, fun and engaging over time. To promote enjoyment, and therefore quality physical activity experience, ensuring that physical activities are modified periodically may help keep participants engaged in the physical activity intervention.

Socialising in a group of like-minded veterans was the most cited motive for participating or planning to participate, in relation to both physical activity interventions. Social connections are a key aspect of quality physical activity experience for veterans with a disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2018, 2017). Findings reported in Chapters Three and Four also support the perceived benefit that physical activity can provide social opportunities. A recent scoping review indicated that physical activity interventions constituting military/veteran peers are most beneficial for veterans with disabilities and allow them to re-engage with a military-like environment (Shirazipour, Tennant, et al., 2019). Being

among like-minded individuals has also been linked to quality physical activity experience among veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020). The findings outlined in the current study support this notion. Participants expressed the importance of the social aspects of the physical activity interventions, with socialising with like-minded military veterans who share similar experiences as a prominent motive for participation. Moreover, this may explain why more veterans attended monthly social elements of the group-based exercise class intervention, rather than the weekly physical activity elements. This lack of participation between the social and physical activities could be due to a lack of integration between the two activities, as the social activity was conducted separately to the physical activity. In the interest of prompting physical activity, it may therefore be beneficial to design physical activity interventions that integrate and maximise social opportunities as a part of the physical activity. For example, the walking group intervention may achieve this by creating an environment where participants can socialise whilst walking and being physically active. This may encourage more veterans that are WIS to engage in the physical activity intervention.

Significant others were included in the planned walking group as the systematic review reported in Chapter Two identified that associated benefits are longer lasting when significant others are included in physical activity interventions. Family integration has also been linked to self-efficacy among veterans with physical disabilities (Shirazipour, Tennant, et al., 2019), may create optimal physical activity experience by allowing the veteran and family to heal together (Shirazipour & Latimer-Cheung, 2020), and may provide opportunities for caregivers who are full-time carers for their partners, as discussed in Chapter Three. Participants in both parts of the current study suggested that the inclusion of significant others would have many positive effects, particularly in their providing support to participants and easing social interactions. However, there may exist a small number of veterans that are WIS who feel uncomfortable participating with a significant other. The inclusion of a significant other may

also remove or compromise an opportunity for a much-needed break from their partner. While none of the participants in this study expressed this feeling directly, participants noted the views of veterans beyond the sample of this research. In the design of future interventions, it may be beneficial to include significant others, but it should be expressed that this is optional and that an individual would be welcome to attend without their significant other.

Incentives were included in the design of the planned walking group intervention in order to encourage veterans that are WIS to overcome their reflective motivational barriers (Michie et al., 2014, 2011). Veterans held mixed attitudes towards incentives in both parts of the research reported in this chapter. Incentives, in the form a free lunch following the activity, were suggested to perhaps not be an appropriate incentive for enticing veterans to participate in physical activity. For the proposed walking group intervention, prospective participants suggested that clothing, in the form of a group t-shirt may be a more effective incentive. Group t-shirts would help provide members with a distinct identity and a kind of uniform that makes participants feel a part of and included in the group. This may be particularly useful as *belongingness* has been identified as a key aspect of quality physical activity experience for people with disabilities (Evans et al., 2018), including veterans (Shirazipour et al. 2017). Moreover, a t-shirt incentive has been shown to be successful in increasing physical activity behaviour as part of a wider suite of incentives and behaviour change strategies (Ball et al., 2017). However, as the t-shirt incentive was analysed in conjunction with other incentives and behaviour change techniques, understanding how much change was attributed to the t-shirt incentive is difficult to determine. Shirazipour and Latimer-Cheung (2020) also noted how some veterans with physical disabilities wore t-shirts with labels of their physical activity programme to encourage others to ask questions. In this manner, t-shirts could serve as a means of creating awareness of a physical activity intervention.



Participants also suggested that incentives should not be given freely but framed as a reward system for prolonged participation; whereby, incentives are only gained after a veteran has attended a certain number of sessions. This would increase the feeling that it is something the individual has earned. In this style, it additionally prevents the potential abuse of any incentive system that offers free things for initial participation. A workplace intervention that used incentives that reward sustained behaviour has been shown to be successful in encouraging adherence to physical activity guidelines (Losina et al., 2017). Reward-style incentives, therefore, may constitute a more acceptable and appropriate incentive system for veterans that are WIS.

Encouraging inter-charity collaboration was unanimously considered positive among all participants. Participants expressed that the camaraderie and bonds they felt with other veterans outweighed any they may have with certain charities or organisations. Inter-charity collaboration would allow a wider range of veterans to participate in physical activity interventions. From a feasibility perspective, this may prove especially important considering the low number of participants spanning an 18-month period of the group-based exercise intervention. Organisational collaboration would also allow participants to talk to representatives from other charities and veterans with different experiences, ask questions, and learn what support is available to them. Learning through a social network, such as this, has been cited as important for sustaining physical activity as it helps veterans cope with their physical conditions and learn what opportunities are available to them (Shirazipour & Latimer-Cheung, 2020). Based upon these findings, it is recommended that organisations that aim to implement or design veteran physical activity interventions seek other organisations with similar aims to collaborate with, where possible.

Creating knowledge and awareness of an intervention is an important aspect of behaviour change (Michie et al., 2014, 2011). The findings of the studies reported in this chapter presented

the varied means by which participants became aware of their associated physical activity intervention. Providing different forms of communication, by including a mixture of online and offline information may therefore be effective in maximising awareness; especially among individuals who do not frequently use social media.

#### **6.4.2 Overcoming low physical activity self-efficacy in veterans that are WIS**

Low physical activity self-efficacy has been reported, in Chapter Four, as a key barrier to physical activity among veterans that are WIS. Findings of the current study support the existing evidence that low levels of physical activity self-efficacy present a significant barrier to physical activity participation. Most participants within both parts of the current study agreed that low physical activity self-efficacy provides significant challenges following injury or illness. Participants recommended that physical activity interventions should enable participants to undertake physical activity at their own pace, free from the judgment of others, and without any pressure from others to adhere to a group pace that may be beyond their perceived or actual level of capability. Furthermore, when communicating to potential participants, they should be reassured that they are able to undertake physical activity at their own pace. This would be especially relevant during group-based activities, where participants may understandably assume that the activity is conducted at a group pace. In this manner, participants can start at a pace that is comfortable to them and progressively build up in intensity over a time period that suits them. This will likely lead to an improvement in physical activity self-efficacy through sustained participation, or *performance accomplishments* as it is termed in the self-efficacy literature (Schunk & DiBenedetto, 2020; Bandura, 1997). Aligning with the findings of Shirazipour, Tennant, et al. (2019), participants felt that a like-minded and supportive veteran group either did have, or would become a valuable source of self-efficacy; further highlighting the positive effect that veteran physical activity environments can have on

veterans that are WIS. The effect of increases in physical activity self-efficacy through prolonged participation in physical activity interventions for veterans that are WIS may explain why most participants of the group-based exercise class intervention have progressed to more demanding physical activities, noted by them as a product of their participation in the exercise classes. Moreover, in support of the walking group intervention's design, participants suggested that incentivisation, removing the focus from physical activity, engaging with an inspiring role model and including significant others could help potential participants overcome physical activity self-efficacy related barriers to engagement.

#### **6.4.3 Participant ideal physical activity**

The majority of participants noted that their ideal activity would be linked to outdoor-based pursuits. The beneficial healing and therapeutic effect of nature-based activities is a common theme among contemporary veteran physical activity research (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014), possibly as a consequence of their linkage with military life (Shirazipour, Tennant, et al., 2019). For this reason, physical activity interventions, where possible, may benefit from including activity that takes place outdoors and in nature. However, as noted in the current study, ensuring that outdoor-based physical activity interventions have an alternative plan if the weather is particularly bad is additionally important.

#### **6.5 Specific recommendations for changes to the planned walking group**

Despite the fact that the findings of the current study supported the planned walking group outlined in Chapter Five, they also highlighted several ways its design may be improved.

Firstly, the incentive system linked to the planned walking group outlined in Chapter Five may benefit from reflection and revision. In the planned walking group, the main incentive offered

by organisers was in the form of a free café lunch, drink, and parking at the country park where the walking group was to take place. While prospective participants suggested this incentive might encourage some involvement, many veterans did not view it as being necessary nor particularly suitable. According to the APEASE criteria of BCW (Michie et al., 2014), described in Chapter Five, Section 5.2.1, ensuring that behaviour change interventions are cost-effective is an important aspect of their design that also encourages the optimal use of available resources. In the charity-based context of the research reported in this thesis, it is improbable that cost-effect ratio of the lunch incentive would be adequate. Instead of a free lunch, group t-shirts may be a more attractive, beneficial, and cost-effective incentive that could also take the form of a reward system. For example, the colour of a t-shirt that a participant wears could correspond to the number of walks they have attended, such as a light blue t-shirt being awarded after completing an inaugural walk, red for completing four weeks, and green for completing eight weeks. In doing so, this may encourage sustained participation, promote feelings of belongingness, and avoid the possibility of organisers providing a free lunch to individuals who may not be interested in participating in the walking group. However, the free parking and drink incentive would perhaps still add value and complement the t-shirt incentive. This would help to ease any financial burden associated with participating, which veterans identified as a perceived barrier to physical activity participation in the study reported in Chapter Three; while also encouraging socialising among participants.

Secondly, encouraging the group to become self-sustaining beyond the eight-weeks of the walking group intervention would allow participants, who wished to, to maintain their weekly walks in a veteran that is WIS group. This will also allow veterans that are WIS who may not have been able to participate in the walking group at the time of its implementation, to participate at another time. This is particularly important as this community-based intervention aims to increase levels of physical activity among veterans that are WIS, and encouraging long-

term, sustained behaviour change is key to achieving this. In addition, a self-sustaining group would require fewer resources than if it was managed by an organisation. Encouraging the planned walking group to become self-sustaining could be addressed by an organisation identifying and helping to train a small number of individuals to become volunteer walk leaders to help organise, risk assess and manage a walking group. The responsibilities of the participants who become volunteer walk leaders might include communicating with participants regarding the location and time of the walks, contacting the supporting charity for any financial support needed, such as the ordering of the t-shirt incentives, and organising any activities that the group may want to conduct. With respect to the group t-shirt incentive scheme, a specific colour could be used to identify volunteer walk leaders that may help new participants identify them while possibly encouraging participants to volunteer as walk leaders. This may also help to offer reassurances to new members that are unsure of their ability and facilitate effective communication between group members.

Lastly, in respect to the format of the walking group, varying the location of the walks may avoid potential boredom that might stem from repetition of the same routes and scenery, and promote feelings of greater enjoyment. The decision to locate the proposed walking group at Bryngarw Country Park was linked to a number of reasons. Firstly, it provided an almost enclosed and safe area, with several mapped routes that participants could choose from and walk at their own pace while enjoying the scenery of the park. Secondly, the Country Park also provided opportunities for participants to join in with complementary activities. Thirdly, following an initial meeting with Country Park staff, Park Rangers offered their support by offering to help arrange activities and providing free parking and use of the function room; invaluable resources that were not immediately available elsewhere. However, despite the activities on offer, a prolonged period at this location might lose participant interest, discouraging them from engaging. Particularly if the walking group becomes self-sustaining

over a long period, changing the location could be an important aspect of the walking group's design. For this reason, the planned walking group may benefit from identifying several locations where the walking group could take place and alternate the location every eight weeks to help to maintain participants' interest over a longer period. As emphasised in Chapter Five, discussing the design of activities and the broader intervention with participants will likely provide a sense of ownership and autonomy and lead to a greater uptake and adherence.

## **6.6 Limitations, strengths and recommendations for future research**

The Coronavirus pandemic significantly influenced the research reported in this chapter. Despite large changes to the methodology of the originally planned study, outlined in Chapter Five, this alternative study identified key information related to the refinement of the walking group intervention.

A prominent strength of this study relates to the obtaining of direct perspectives of veterans that are WIS from two separate, and different physical activity interventions. This was in direct contrast to the originally planned evaluation, where focus group data was to be collected from participants following completion of the walking group intervention. Drawing upon perspectives of two separate physical activity interventions adds considerably to the reliability of the findings of this alternative study, as it does not depend on a one-dimensional perspective of participants from one group; allowing general recommendations to be made that apply to many different types of physical activity.

In addition to added reliability, information that permits refinement of the walking group, before its implementation, is a distinct strength of this research. Based on the comments for potentially improving the design of some aspects of the walking group intervention such as the types of incentives, encouraging the group to become self-sustaining, and varying the location of the walking group, the original walking group intervention may have resulted in a waste of

resources and reduced effectiveness. The findings of this study highlight the necessity of refining the design of physical activity interventions by examining the perspectives of the target population. This will help ensure optimisation of an intervention's implementation; avoiding unnecessary waste.

This study was not without limitations, however. Some might view analysis of participants' perspectives of an intervention they have not yet completed as a limitation. It is difficult to determine if perceived acceptability of the walking group would change following participation in the intervention, bringing into question the reliability of the results. However, prospective acceptability analyses are common practice and suggested as an important aspect of behaviour change intervention development (Rushton et al., 2020; O'Cathain et al., 2019; Michie et al., 2014). The UKMRC's guidance recommends that intervention evaluations are often undermined by a lack of acceptability, compliance, delivery, recruitment, and retention of participants (O'Cathain et al., 2019; Craig et al., 2013); emphasising that preparatory work is a vital part of the methodology of the development of complex interventions. Indeed, as discussed earlier, may have occurred in a recent physical activity intervention study for veterans (Damschroder et al., 2020). This subsequent evaluation of acceptability and the refining of intervention content has resulted in changes to, and the further optimisation of the walking group intervention, which are likely to increase the effectiveness of the intervention once it is implemented. Moreover, the separate evaluation of the group-based exercise class intervention and the comparison of results added a contrasting dimension to the study which will have improved the reliability overall, as both groups involve the same target population in a physical activity behaviour change setting. Common themes between the perspectives of people who have participated and those that have not yet participated in two different physical activity interventions could be considered relatively reliable. Due to the differences in intervention design, such as type of physical activity, it could be possible that the common

themes identified are relevant to physical activity interventions in general and warrant further investigation. Furthermore, many of these common themes linked to the qualitative literature regarding physical activity for veterans with a physical disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2019, 2018; Shirazipour et al., 2017), suggesting reliability of the findings.

Another limitation of the current research may include the predominately older age of the sample included in this study. However, the demographics of the sample recruited in the current study from those that planned to participate in the walking group is not completely representative of the sample recruited to participate in the walking group intervention. Those who planned to participate in the walking group consisted of veterans that are WIS across a range of ages. Yet, in 2016 it was estimated that 49% of veterans were aged 75 or over (Ministry of Defence, 2019). Thus, the demographics of the sample in the current study may be more representative of the UK Armed Forces veteran population. Moreover, the sample was entirely male, which was also not representative of the future and current participants of both physical activity interventions; however, the small number of potential female veteran participants did not express interest in participating in this study.

Future research may benefit from pilot testing the refined walking group intervention. A six-month longitudinal design that measures physical activity levels, self-efficacy, quality of life, and mental wellbeing, as outlined in Chapter Five, would provide an understanding of the initial effectiveness of the intervention. The pilot intervention evaluation may benefit from using a mixed method design in order to provide both qualitative and quantitative data to understand the effects on, and experiences of participants. Comparing prospective perceptions of participants from the current study to similar retrospective perceptions following participation in the walking group intervention may also further the understanding of differences and similarities between prospective and retrospective evaluations. Taking



advantage of this walking group intervention's optimised design and successive refinement may be highly beneficial as it provides an evidence-informed approach for increasing physical activity among veterans that are WIS in a community-based setting.

## **6.7 Summary**

This chapter presented two alternative studies that were necessary due to the Covid-19 pandemic. Overall, findings were supportive of the walking group design outlined in Chapter Five. Both interventions were perceived to be inclusive, include challenging but adaptable activities, allow participants to feel autonomous, and facilitate group cohesion among like-minded individuals. Participants found the intervention components of including significant others, using incentives, creating fun activities, promoting inter-charity collaboration, and making activities outdoors, where possible, to be acceptable and feasible. However, some suggestions for change to the incentive system, periodically varying the location of the walks, and taking steps to encourage the group to become self-sustaining following the eight-week intervention were recommended.

The following chapter details a series of reflections, based upon the researcher's experiences of 18-months of participation in the group-based exercise class intervention outlined in Part Two of the current chapter. Taking these experiences further, the researcher explores and reflects upon his experiences, thoughts, and feelings and draws upon these to add to, or help contextualise the findings of research reported in this thesis.

## Chapter 7

# Participation in Physical Activity and Support Initiatives for Veterans: The Researcher's Reflections

### 7.1 Introduction

#### 7.1.1 Reflection: Combining Research and Practice through the Researchers' Experiences

Reflective practice has been described as:

*“a state of mind, an on-going attitude to life and work, the pearl grit in the oyster of practice and education”*

(Bolton & Delderfield, 2018, pp. 1)

Reflection enables us to wonder at our own world, work, course, and selves, and make sense of situations that initially make no sense (Bolton & Delderfield, 2018). Bolton and Delderfield (2018) note the many benefits of reflective practice, it can provide a method by which clarity can be developed in a relatively safe and confidential manner that expresses experiences otherwise difficult or impossible to communicate. Reflective practice can also challenge assumptions, ideological illusions, damaging social and cultural biases, inequalities, and question personal behaviours that may silence the voices of others; while encouraging one to learn from their experiences (Bolton & Delderfield, 2018).

Reflection and reflexivity are two essential elements of reflective practice (Bolton & Delderfield, 2018). Reflection is described as:

*“an in-depth review of events, either alone... or with critical support from a supervisor”*

(Bolton & Delderfield, 2018, pp. 9)

During reflection, the reflector attempts to understand what happened, what they thought or felt, who was involved, when and where, and what others might have experienced, thought and felt (Bolton & Delderfield, 2018).

Reflexivity, however, constitutes:

*“finding strategies to question our own attitudes, theories-in-use, values, assumptions, prejudices and habitual actions; to understand our complex roles in relation others”*

(Bolton & Delderfield, 2018, pp. 9)

Reflexivity develops responsible and ethical action that examines how we actively shape our surroundings, way of relating to others, and communication.

Throughout the course of this PhD project, the researcher has accumulated many first-hand experiences among veterans that are WIS, many of which have been in physical activity environments. To add learning and understanding of these experiences and how they explain or add to the information gained through empirical research methodologies, the aim of this chapter is to outline a series of reflective practices that consider both the reflection and reflexivity of the researcher.

### **7.1.2 Objectives**

There were two specific objectives for this chapter:

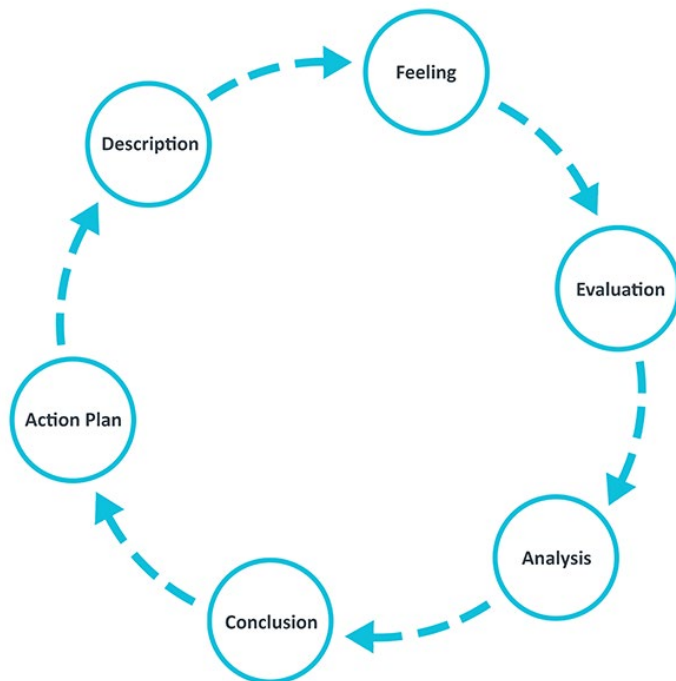
1. Using a reflective process, reflect upon the researcher's experiences as a veteran participating in community-based veteran physical activity and support groups; and
2. Where possible, connect reflective and reflexive practices to the previous findings of research and make recommendations for future practice.

## 7.2 Methodology

Experiences will be individually identified and reflected upon using the Gibbs Reflective Cycle (Gibbs, 1988) (See Figure 7. 1) using a critical event methodology.

Figure 7.1

*The Gibbs Reflective Cycle*



*Note.* Reproduced from Gibbs (1988)

The Gibbs Reflective Cycle is a commonly used model on which to map the reflective process for learning from experiences (Bolton & Delderfield, 2018). It is comprised of six stages that allow for further consideration of *action plans* derived from the initial reflective process. The stages are as follows:

1. **Description** of the experience
2. **Feelings** and thoughts about the experience
3. **Evaluation** of the good and bad aspects of the experience
4. **Analysis** of the situation to make sense of it

5. **Conclusion** about learning and what could be done differently
6. **Action plan** for general changes for improvement or how similar situations could be handled differently in the future

The Gibbs Reflective Cycle was chosen for reflection on this project as, whilst facilitating reflection amongst beginners, it gives a clear structure to the process of reflection (Bolton & Delderfield, 2018). Specifically, feelings surrounding the experience may be particularly important given that the researcher has extensive military and operational experience that may cause unconscious bias. Therefore, reflecting on his feelings may help to highlight, understand, and reduce any potential biases. Moreover, this reflective cycle is unique in its inclusion of an action plan stage. Throughout this PhD, the researcher has worked very closely with the charity Help for Heroes which has, and intends to continue, implementing the findings of this research. With the inclusion of an action plan stage, reflections can be easily applied to the future practice of the researcher and provide recommendations for Help for Heroes and other practitioners who aim to promote physical activity among veterans that are WIS.

### **7.3 Context and reflexivity: My 18-months participating in Veteran Support Groups**

The context from which these reflections are drawn comprises the researcher's 18-months of participation as a veteran who is not WIS in several veteran physical activity and support groups across South Wales.

Leaving school at 16-years old, the researcher joined the British Army where he spent 8 years in Northern Ireland within the infantry regiment *2 Rifles*. Over the span of 8-years, the researcher completed operational tours and training exercises all over the world including Afghanistan, Africa, and Germany. In the last four years of his military career, the researcher specialised as a Physical Training Instructor where he eventually finished as second in command of 2 Rifles physical fitness and deployability standards. Eventually becoming tired

of the lack of control in his day to day life, which is common among military careers, the researcher decided to leave the Army and pursue a master's degree following the completion of an undergraduate degree that he had been studying over the last three years of his time in the Army. Following this, the researcher aspired to complete a PhD and successfully applied for this project at Cardiff Metropolitan University.

The PhD project was funded by Knowledge Economy Skills Scholarships (*KESS 2*), a European funding organisation that aims to promote the use of research within industry in Wales and requires PhD projects to gain the support of an organisation external to the University who can act as a sponsor. This includes a small financial contribution and research related assistance. The *KESS* contract also requires PhD students to support organisations with 90-days of work within the organisation over the 3-years of funding.

For this PhD project, it was agreed with Help for Heroes that the researcher would participate in, and support Help for Heroes led community-based interventions that aimed to increase levels of physical activity among veterans that are WIS in the South Wales area. This consisted of many different activities, but mainly included a monthly sport and exercise project in Newport and a weekly group-based exercise class in Bridgend. Both the Newport and Bridgend initiatives were frequently attended by the researcher until March 2020 when the COVID-19 public health crisis led to the closure of all group-based activities. However, following the first month of participation in these initiatives, it became clear to the researcher that the veterans he was interacting with in the Help for Heroes context were perhaps not the target population of the intervention that he was aiming to develop. This was due to the fact that all of the veterans that were attending the Help for Heroes interventions were generally already engaging with physical activity to some extent. Experiences and opinions of these individuals, while perfectly valid and useful, created a bias, particularly in a research context. Considering one of the primary aims of this project was to increase levels of physical activity among veterans that are

WIS, understanding the perspective of veterans that are WIS who are not engaging in physical activity, and who may be more socially isolated, was imperative.

After receiving permission from Help for Heroes to expand our research to include veterans that are not beneficiaries of Help for Heroes, the researcher contacted several other veteran support groups that were not associated with Help for Heroes. One initiative, the Cardiff City Foundation, the Cardiff professional football team charity, held a weekly tea and toast morning for veterans. This tea and toast meeting, rather than promoting physical activity, like the Help for Heroes initiatives, prioritised reducing social isolation and improving wellbeing among veterans. The researcher became a regular attender of this group that met every Wednesday and through this group was able to meet more socially isolated veterans who were not participating in any physical activity. While accessing socially isolated veterans was still a significant challenge of this project, attending this group allowed for a more balanced perspective of promoting physical activity among veterans that are WIS; although, accessing those veterans who were completely socially isolated continued to be a challenging aspect of this PhD project.

The researcher built rapport with many veterans over the 18-month period; many of whom supported and aided recruitment in the research related to this project. It is from the experiences of participation in these veteran physical activity intervention and support groups, and as a veteran himself, that the researcher's reflections are drawn.

## **7.4 Reflections**

### **7.4.1 Reflection One – “Accessing the inaccessible”**

#### **Description**

Throughout the first half of my PhD, I was grateful for the opportunities that I had to meet a wide range of veterans. Some had fared well in the civilian world, while others had noticeably been not coping quite as well. I felt a particular respect for those individuals I met who were struggling. It couldn't have been easy to attend physical activity or support groups during such difficult times. At least they were there. I believe my experiences as a combat infantry veteran provided a lot of insight into the veteran population. I knew that for every injured veteran struggling with their physical and mental health that attended the group, there were probably nine or ten others who were experiencing the same issues but did not attend. I have seen it for myself in my ex-colleagues. I knew that these veterans, the ones who spent months, or even years, alone, their mental and physical health constantly declining, were the ones that my research could help the most. But trying to access those who had shut themselves away from the world was a constant struggle. A Help for Heroes survey found that it can take up to four years for veterans that are WIS to seek help (2019, June 13). In many cases, this was too late.

#### **Feelings**

Frustration was prominent. I knew veterans in this situation. I had ex-colleagues and friends of friends in this situation. But despite my best efforts, none of them agreed to talk with me or participate in my research. I wanted to help, but it felt as though many did not want it; or were at least not in the right state of mind to receive it. This could be due to a number of reasons. Perhaps the product of a difficult transition that veterans that are WIS are particularly vulnerable to (MacLean et al., 2014), embedded hegemonic masculinity (Green et al., 2010),



or caused by one of the many barriers to support seeking, such as stigma surrounding mental health, stoicism, religious constraints, lack of trust in support services, and male role gender expectations (Fischer et al., 2016). Indeed, many of these may, jointly, play a role in the lack of the seeking or acceptance of help or support.

I felt frustration too that charities and other services were not doing more to intervene with these vulnerable individuals sooner. Often, it felt as though they were simply left to their own devices and that it was up to them to seek help. For many, I felt that by then, it would be too late.

My previous experiences as a veteran perhaps magnified my feelings of frustration. In the military, we support each other, at home and on operations. Veterans who deny this support and isolate themselves break these core values. In addition to this, it felt as though veterans were being forgotten; left to deteriorate beyond help. I knew, however, that expressing my frustrations would not be ethical nor effective in reducing their social isolation. I ensured that I kept silent in my frustrations and tried to approach any such situations in an objective and supportive manner.

### **Evaluation**

A lack of socially isolated veterans was causing a bias in my experiences and research. Something that needed to be addressed in order to develop a complete picture of veterans that are WIS and physical activity behaviour.

### **Analysis**

Veterans, including those that are WIS, can take a long time to seek help from charities or support services, making researching with only veterans who are engaging with these services biased, as it does not include the perspective of those who are socially isolated.

Considering my potential impact on others, it may be challenging for veterans that are WIS to accept help from me as an individual. Comparatively, despite my experiences as a veteran, I may be perceived as having adjusted well to the civilian world, having obtained a relatively high level of education and health. Particularly considering that the research reported in Chapter Four highlighted low physical activity self-efficacy as a prominent barrier to physical activity, perhaps my perceived success or fitness exacerbated the already challenging barriers.

It is also important to note that, as a veteran that is not WIS I am not able to fully understand the struggles and challenges that a veteran that is WIS may face. Challenges such as coming to terms with their new sense of identity as a person with disabilities who is no longer a military fit soldier. While I try to analyse this through an objective lens, my thoughts and perceptions may differ from the reality of a veterans that is WIS.

### **Conclusion**

Veterans that are WIS may be more vulnerable to social isolation, stemming from difficulties in transitioning from the military to civilian world. It is important that the perceptions of these individuals, while difficult to gain, are included within research in this area.

### **Action plan**

In my research, I believe, I addressed the limitation of studying those who are socially isolated to the best of my ability. One that was, to my knowledge, not present or considered in other literature. Questionnaire-based research, such as that conducted as part of the research reported in this thesis, may be an effective means of accessing veterans who are socially isolated. Rather than speaking with or interviewing someone directly, questionnaires require less effort, can be conducted in the comfort and safety of one's own home, and enable participants to maintain a level of autonomy which may be important for overcoming barriers associated with social isolation. While recruiting socially isolated veterans may still be a significant challenge,

designing research that can be conducted while a veteran is socially isolated may prove useful. I hope the findings of this thesis and its publications encourage future researchers to take this limitation and bias into account in their own research.

Overcoming the impact of my own person is more challenging, especially as most of the research reported in this thesis was qualitative and required direct communication. However, while I did attempt this throughout my time among the veteran that is WIS community, in future research I will take extra precautions to ensure that I am more careful with how I present myself and how I communicate. I will try to ensure that the conversation is focused upon them and that I use simple language in order to reduce any negative feelings or unintended intimidation that some may potentially perceive.

#### **7.4.2 Reflection Two – “I’ll join in next week...”**

##### **Description**

Throughout the first half of my PhD, I attended almost every weekly session of the group-based exercise class intervention led by Help for Heroes. I thoroughly enjoyed the exercise classes and my time with the group. I saw first-hand the positive impact that groups such as this can have on veterans that are WIS. Over the 18-month period that I attended, all of the participants became close and very friendly, with participants bouncing the usual military banter off of one another; a sign of their liking and comfort with one another. It surprised me, however, that the number of members of the group never grew significantly over the period which I attended. In my time with the group, two new participants joined, an average of one per nine months. Although, rather than increasing the number of participants of the group, these participants joined at a time where others had dropped out of the group due to a number of reasons, including injuries and difficulties in their personal lives, and simply replaced those members who had dropped out. This led to an equilibrium in the number of participants

attending the exercise classes, which averaged around three veterans that are WIS, myself, and a Help for Heroes support worker. This is not to criticise Help for Heroes, however. In fact, I believe that they had done a tremendous job in organising the exercise class initiative. They just struggled to increase the number of participants.

A lot of veterans expressed interest in joining the exercise class initiative. Once per month, a coffee morning would be organised prior to the exercise classes; a chance for veterans to come and talk with Help for Heroes support workers and chat with their fellow veterans. Naturally, the exercise classes were advertised to participants during the coffee mornings and many took the opportunity to observe the exercise class, expressing to the Help for Heroes support worker that they were very interested in joining and would attend the following week. However, this was very rarely followed through. I spoke to the Help for Heroes support worker who regularly attended the classes about this a lot. They often expressed their own frustrations that veterans tended to sign up or express interest in the wide variety of physical activity interventions they were offering that was followed by cancellations or non-attendance on the day. As some interventions are limited to a small number of veterans, this would take valuable spaces away from others. Veterans not attending despite expressing interest was very confusing for me at first. I could understand this instance occurring a few times, but in the context of the exercise class, it occurred almost every time and led me to think there may something significant in this. The Help for Heroes support worker conveyed that this was not just common among sport and exercise, but even among more novel physical activity interventions such as surfing.

### **Feelings**

I felt that there was something more to this than perhaps met the eye. I thought that these individuals were at least physically capable of participating. If they were unable to, for example, travel to the location of the exercise classes, this is something they would likely have

expressed at the time. I genuinely believe that, at the time the veteran expressed interest, they whole-heartedly intended to join. However, I felt that there was possibly a psychological barrier stopping them from participating, one that, when an individual is alone and has the time to consider the prospect, at least a week in the case of the exercise classes, their thoughts whittle away at their resolve. This seems to suggest a gap between intention and behaviour. While some behaviour change theories, such as the Transtheoretical Model of Health Behaviour Change (Prochaska & Velicer, 1997), have linked intentions to behavioural outcomes, Gomes et al. (2017) found that, in isolation, intention to exercise was a poor predictor of exercise behaviour. I therefore felt that understanding the cause of this intention-behaviour gap was important in the future promotion of physical activity behaviour among veterans that are WIS.

### **Evaluation**

Intention to exercise not resulting in exercise behaviour seemed common among veterans that are WIS across many different types of activities. The identification and reduction of the attributing barrier, however, will likely lead to greater levels of participation and engagement with physical activity interventions.

### **Analysis**

Reflecting upon this experience, the research conducted as part of this thesis may help to explain this intention-behaviour gap. The findings of the study reported in Chapter Four suggested that low physical activity self-efficacy was a prominent barrier to physical activity participation. The Behaviour Change Wheel (BCW) (Michie et al., 2014) categorises this as reflective motivation, as it involves one's evaluations and planning. In addition, Cane et al. (2012) mapped the Theoretical Domains Framework (TDF) construct of *intentions* to the reflective motivation category of the BCW. This may further evidence the prominence of reflective motivational barriers to physical activity among veterans that are WIS. This may

explain why veterans that are WIS do not attend the physical activity interventions even though they have expressed interest and intention. It may be the evaluations of the physical activity that occur during the time leading up to intervention that discourage them from attending. Perhaps, in the moment of observing the exercise class, participants expressing interest saw the veterans that are WIS exercising despite their conditions and limitations and were inspired to pursue a similar activity. However, once they returned home, their reflective motivational barriers caused them to negatively evaluate participation in the exercise classes. After consideration they may not have believed themselves physically capable of exercising to the perceived required level, which may be embarrassing as one participant noted in the study reported in Chapter Six.

The research reported in this thesis may provide an evidence-informed explanation of a potential cause of the intention-behaviour gap that commonly occurs among veterans that are WIS in the South Wales area. However, my own inexperience as a researcher and practitioner in this field may cause me to analyse this through a one-dimensional perspective related to the findings of my own research. Perhaps due to my knowledge of the prominence of reflective motivational barriers, I was inclined to apply this to this real-life scenario. Nevertheless, to date, the studies reported in this thesis are the only physical activity behavioural analyses among veterans that are WIS that reside in the UK. Thus, whilst further research is warranted, this is an evidence-informed explanation.

## **Conclusion**

The intention-behaviour gap may be explained through the lens of reflective motivation. It is not easy, in any situation, to put yourself in a position where you do not believe yourself capable and feel that you will likely just humiliate yourself. In the moment of observing other

veterans that are WIS exercising, a veteran may feel inspired and motivated, but this may reduce as the veteran has more time to fully evaluate participation in the activity.

### **Action plan**

Key to this, as has been emphasised throughout this thesis, is overcoming reflective motivational barriers among veterans that are WIS. This can be done in many ways, several of which have been highlighted in previous chapters. Building upon this, the following and final chapter of this thesis aims to outline recommendations for practice, including overcoming reflective motivational barriers, such as low levels of physical activity self-efficacy. In doing so, I believe that this common intention-behaviour gap can be reduced among veterans that are WIS in relation to physical activity interventions.

In addition to this, increasing my own personal knowledge of how to identify and reduce intention-behaviour gaps will likely help reduce this issue in the future. Perhaps contacting those that intended to attend and exploring this situation directly may prove an effective means by which I can improve my personal understanding and practice.

### **7.4.3 Reflection Three – “I’m just not able...”**

#### **Description**

I vividly remember many of the interviews I conducted for my first qualitative study reported in Chapter Three. Not only was it my first-time conducting interviews, but it was my first opportunity to sit down one-to-one with some of the veterans that are WIS that I had come to know through the various groups I had attended. In the interviews, we discussed what they felt they could gain from physical activity and what was stopping or could stop them from regularly doing it. More so than the others, I remember talking with a particular participant who had suffered a mixture of illnesses and injuries that had significantly impacted on his life. He told

me he was a keen boxer back in the day, representing his military unit in many fights. It was clear that he held fond memories of physical activity, his eyes would light up as he described his previous achievements. He had been involved in other sports too, with many successes in running. Here we were, however, sat in café, many years after this individual's athletic heyday. When I asked him whether he had been interested in reengaging with some form of physical activity he had previously enjoyed, I received the reply "I would love to do some kind of physical activity. I love it. I just can't do it anymore". And with that belief, this individual continues to completely avoid physical activity, not gaining the clear benefits it could have on many aspects of his wellbeing. This situation was common among many of the non-active veterans that are WIS. Physical activity was simply "not for them anymore" or they "were not able" to do it since their injury.

### **Feelings**

I wanted to help these individuals. I knew they could gain a lot of benefits from physical activity participation. I also didn't believe that these veterans were unable to do any physical activity. I felt that there was some kind of underlying barrier discouraging them from participating in physical activity. Something that I hoped to address in my research.

### **Evaluation**

Believing that they are too injured was providing a significant barrier to physical activity participation. One that discouraged many who stood to gain a lot from physical activity participation.

### **Analysis**

Based on conversations with individuals such as this, most understood that physical activity could encompass many different types of activities - from walking to climbing a mountain, and everything in between. However, while capable of participating in light physical activities,



there seemed to be a belief that was stopping them from engaging. This highlighted and provided a real-life context of the findings reported in Chapters Three and Four. The findings reported in Chapter Three suggested that, due to an objective limitation due to a veteran that is WIS's injuries, they were not able to participate. However, quantitative analysis of this, reported in Chapter Four, revealed that this likely represented a belief about their physical capability, rather than an objective reality. Therefore, in this context, it is likely that these individuals' beliefs about themselves were providing a barrier to physical activity participation. Considering the implications of my own person on these individuals, it may be that they were describing physical activity from my perspective; one that is conducted by a younger and healthier person. They might have believed that it was this, more intense kind of physical activity that they were incapable of doing. Despite my efforts to define and explain the concept of physical activity, it could be the case that these individuals' understanding of physical activity differed to my own.

### **Conclusion**

Research conducted as part of this thesis suggested that beliefs about capability represent a key barrier to physical activity participation, rather than the objective reality conveyed during the interviews. This real-life example highlights the complex issues related to physical activity and veterans that are WIS and provides an explanation to a situation that I was previously struggling to understand. However, differences in our conceptualisation of physical activity, despite my efforts to define it, may have differed.

### **Action plan**

Future research and practitioners may benefit from addressing these beliefs about physical capability among veterans that are WIS. For my own future practice, it is also important to understand that information gained through interviews and discussions is very subjective and

that an individual, while thinking they are expressing an objective reality of their condition, may be expressing erroneous beliefs. However, while identifying the difference can be challenging, it is something that requires consideration in my future qualitative research. As seen in Chapter Four, quantitative analysis can be useful in this context for exploring qualitative data that can help identify and define latent constructs.

In relation to the conceptualisation of physical activity, taking more care to explain and adjust definitions for individuals is something I plan to apply in the future. Rather than explaining the concept of physical activity, I think that creating a short discussion around physical activity in an attempt to come to a mutually agreed definition would be more effective. During this discussion, it may also be beneficial to help participants understand that physical activity does not necessarily relate to their capabilities of the past, but rather can encompass a range of activities that may not be as intense as those of the past. In doing so, this will help develop a definition from the participant's perspective, while reaching a mutual agreement of the terminology and helping the individual to understand the wide range of activities that encompass physical activity.

#### **7.4.4 Reflection Four – “Nobody wants to hear your moaning...”**

##### **Description**

During my time attending the various physical activity and veteran support groups, I often noticed distinct differences in the atmospheres of different groups. Some were noticeably positive; participants would joke, laugh, and talk about their plans for the future. Other atmospheres were noticeably more negative, with conversations surrounding injustices they had experienced, things that were wrong in the world, and what seemed like trivial complaining. In one particular group, I could often predict the conversations I would have with certain veterans. The topic of conversation was always negative. I sympathised with these

individuals; they were obviously experiencing great difficulties in their lives that had existed over many years. I knew that, despite being a veteran, I was not able to understand the suffering of a veteran with a significant injury or illness. But I did not consider the effect this may have been having on other veterans attending the group. I met many veterans who had decided to stop going or change groups due to the atmosphere created by other negative members.

### **Feelings**

I sympathised with all of the veterans who were experiencing difficulties. Helping them was the reason I chose this PhD project. At first, I never took too much notice of this complaining. Afterall, there is a famous saying in the military that goes along the lines of – “if a soldier stops complaining, it means there is something wrong”. Complaining seemed to coincide with military culture. It wasn’t until after I met an individual who had stopped attending a group due to its negativity, that I began to realise and think about the effects that this was having on the recruitment and participation of veterans.

### **Evaluation**

Negative attitudes of others were causing a lot of veterans to lose interest in groups. Not only was this negative atmosphere potentially harmful to participants but it created a barrier to engagement among other veterans who were trying to make positive changes in their lives.

### **Analysis**

Veterans, particularly those that are WIS, experience significant difficulties and challenges. However, there exists a number of veterans who, despite these difficulties and challenges, participate in physical activity or support groups in the hope that it will have a positive impact on their lives. For these veterans, being surrounded by large amounts of negativity can be frustrating and undermine their positive intentions. As outlined in Chapter Three, this can create a barrier to participation in such groups.

## **Conclusion**

While a culture of complaining may be prominent in the military, veterans and groups that are predominantly negative can be damaging, both to the members of the group and to the recruitment and retention of members; undermining the purpose for creating the group.

## **Action plan**

In terms of the walking group outlined in Chapter Five, I had made a decision to carefully read and monitor the atmosphere of the group. Complaining about life is natural and can sometimes provide a source of humour. However, if I felt that the walking group was becoming overwhelmingly negative, I planned to intervene and encourage more positive conversation. In this manner, I feel that practitioners and support workers who organise such groups would benefit from monitoring negativity and encouraging more positive conversation when appropriate.

### **7.4.5 Reflection Five – “I’m always wary around civvies...”**

#### **Description**

*Civvie* is a shortened version of the word “Civilian” and a term used throughout the military to describe those not serving in the military. Even though veterans are not technically serving, the term tends to encompass those with no experience in the military. As such, veterans do not tend to consider themselves Civvies.

Military culture is distinctly different to civilian culture in the UK. Military culture is characterised by camaraderie and ensuring the safety and wellbeing of your fellow soldiers. In most cases, my own included, the lack of this in the civilian world is painfully obvious. It is no wonder that many veterans tend to associate with other veterans, almost exclusively, post-discharge from the military. I experienced many such cases throughout my time at the various

veteran groups I attended. Some of which were managed and organised entirely by the veteran community, others, such as Help for Heroes, were organised by civilians. I often noticed a difference in attitudes towards civilians who managed groups, compared to the veterans who managed others. There was an obvious lack of trust in civilians. Even in the context of offering support, civilians would be met with more distrust than their veteran counterparts.

### **Feelings**

I can very much empathise with veterans who felt this way. It took me over a year after discharge to begin making relationships with non-veterans. However, I believe there is a need to integrate with civilians and civilian culture. Afterall, even if we don't like it, we technically all become civilians after we leave the military. I believe embracing this and creating meaningful social connections with those from a non-military background is vital to an effective transition from the military to civilian world. I believe that leaving the military starts a new phase in one's life and that living only in the past can be very damaging for veterans' wellbeing.

However, I am not a veteran that is WIS and my experiences post-military are likely very different. Leaving the military was a personal choice; a choice that many veterans that are WIS are not able to make. Many veterans that are WIS lose their military identity following discharge due to their injuries or illnesses and have a new identity of being a disabled person forced upon them by society. I felt that this may provide additional challenges to reintegrating with the civilian world.

### **Evaluation**

Distrust of civilians can only be damaging. It may provide barriers to engaging with support services, including physical activity initiatives, where civilians provide great services for

veterans. Furthermore, it may undermine veterans' ability to move forward positively in their post-discharge lives.

### **Analysis**

Identity adjustment difficulties among veterans has been highlighted in the literature. For example, Orazem et al. (2017) noted missing the military, feeling like you don't belong, negative views of civilians, difficulty finding meaning, and feeling left behind as prominent identity related difficulties. This may cause many negative feelings towards civilians, including mistrust, which may create difficulties when transitioning into the civilian world.

In the research outlined in this thesis, distrust in civilians was highlighted in Chapter Six. It is noted as a key motive for participating in the walking group among those interviewed, as participants sought to surround themselves with veterans of a "similar mindset". This is also expressed in much of the literature surrounding quality physical activity participation for veterans with a physical disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017).

Reflecting on my own experiences, distrust in civilians is likely due to a lack of experience with civilians rather than something that is drawn from direct negative experiences with civilians. Researchers have noted the importance of face-to-face exposure in reducing prejudices (Lissitsa & Kushnirovich, 2019). While a lack of camaraderie and support outside of military culture is obvious for veterans, in my experience, it is perfectly possible for a veteran to make deep and meaningful relationships with civilians. Whilst socialising with like-minded veterans may hold many benefits, ensuring that veterans are not exclusively socialising with veterans may be important for promoting trust in civilians and the civilian world; potentially leading to a more successful integration in the civilian world.

Identity adjustment difficulties and distrust of civilians may also explain why many veterans distance themselves and avoid people with a non-military background. Wanting to socialise with people who you can identify with is only natural. However, it can perhaps explain why many veterans are not able to gain the positive experiences of civilians necessary for developing trust and breaking down negative prejudices.

### **Conclusion**

Veterans may hold distrust towards civilians, stemming from the differences in culture and lack of experiences with civilians. This can potentially be very damaging for veterans and their transitions and can provide barriers towards engaging with support services and physical activity interventions.

### **Action plan**

In order to gain experiences surrounding civilians, it is important to create situations which facilitate this. In terms of physical activity interventions, including veterans' significant others, as outlined in Chapter Five, could provide opportunities for veterans to meet and develop relationships with civilians; creating a roughly 50/50 split between veterans and civilians in the group. However, the role of veterans who organise and manage such groups should not be overlooked. Using their position of trust, veterans who organise and manage such groups may benefit from developing veterans' trust in civilians, particularly among civilians who play active roles in veteran groups.

Organisations may also benefit from developing programmes that promote positive identity formation post-discharge from the military and that breaks down the negative perceptions surrounding civilians.

#### **7.4.6 Reflection Six – “I can’t afford to lose my income”**

##### **Description**

Following injury and discharge from the military, many veterans depend on the UK government’s Personal Independence Payment (PIP) allowance. PIP provides financial support to people living in the UK with disabilities, including veterans that are WIS, who are unable to work due to their medical conditions. An inability to work is a situation common among veterans that are WIS, with many depending entirely on this financial support. The extent of financial support provided by PIP is calculated through an assessment of an individual’s functioning, with the lower levels of functioning determining greater levels of financial support.

I met many veterans that are WIS throughout this PhD project, many of whom could benefit greatly from regular participation in physical activity, particularly those whose physical condition had deteriorated due to a lack of movement, resulting in lower physical functioning. But in many of these cases, the veterans reported that a low level of physical functioning was a necessary part of their lives; it determined the amount of financial support they would receive from the government. While many of these veterans that are WIS seemed to want to increase their physical functioning through physical activity, they said they could not afford to lose their current PIP allowance. Their belief being that if f their next PIP assessment determined them to have a higher level of functioning, it would mean losing a large portion of their financial support.

##### **Feelings**

I have no experience of PIP and its assessments. I could not determine whether this was true, or rather just a perception. To me, it was almost unbelievable, both in an economic and moral sense, that the government would incentivise greater levels of disability, or at least coerce



people away from improving their physical functioning and health. According to the UK Government website, it does seem that this could be the case (Department for Work and Pensions, 2020). But it is difficult to determine the reality of this without going through the process myself. However, I felt that even if this problem did not exist, and it was simply a misinterpretation of the PIP policy on the veterans that are WIS's behalf, the perception that it did exist was a significant barrier towards physical activity.

### **Evaluation**

This reality or perception surrounding PIP policy was creating a significant barrier towards physical activity participation among those who relied on their PIP allowance. This, too, may not only impact on veterans that are WIS, but people with disabilities in general who financially rely on the government's PIP allowance.

### **Analysis**

The analysis of this situation is perhaps quite simple to understand. Physical activity, while having the potential to have a great impact on veterans that are WIS's holistic wellbeing, in comparison to having the finances to support your, and perhaps your family's, basic needs, it is a naturally lower priority. Basic needs provided by financial support will always be someone's higher priority, not only on an empathetic level, but even traditional theories of human motivation, such as Maslow's Hierarchy of Needs (Maslow, 2013), emphasise the importance of meeting one's basic needs.

Considering that veterans that are WIS with lower health statuses may experience greater benefits from physical activity (Duvall & Kaplan, 2014), ensuring that these individuals feel as though they are able to do so without negative repercussions is vital.

## **Conclusion**

There exists a perception that veterans that are WIS will lose their current level of financial support if they increase their levels of functioning, discouraging many who depend on their current PIP allowance to participate in physical activity. Whether this is a reality or perception, this provides a significant barrier towards physical activity participation among veterans that are WIS.

## **Action plan**

It is clear that this policy needs to be assessed. If it is true that the PIP policy is coercing people with disabilities in the UK from doing physical activity and, thus, gaining its associated benefits, the policy itself requires revision. However, if it just a perception or misinterpretation of the policy, rather than a reality, those who manage PIP related policy should ensure that the details of their policy are clearly communicated to people with disabilities, so that it does not discourage them from increasing their functioning and subsequently their wellbeing.

Physical activity interventions for veterans that are WIS may benefit from clearly communicating and educating the PIP policy to potential participants. If the intervention will not reduce an individual's PIP allowance, clarifying this point will likely lead to greater engagement in the intervention.

In terms of the walking group described in Chapter Five, while walking has been shown to have a large number of benefits on holistic wellbeing, walking as an activity may not be perceived to increase functioning to the same level as that of sport or fitness classes. For this reason, walking may be more suitable for engaging veterans that are WIS who may have concerns relating to their PIP allowance, as it may be perceived to not increase physical functioning to the same extent as that of more intense sport or exercise activities.

#### **7.4.7 Reflection Seven – “I don’t want to use a wheelchair...”**

##### **Description**

I attended many physical activity sessions over the first 18-months of my PhD. The activities ranged from the more regular group-based exercise classes, to adapted sport. Ensuring inclusivity is an important aspect of organising physical activity for veterans that are WIS and has been associated with quality participation (Shirazipour et al., 2018, 2017). Veterans that are WIS can face many different physical conditions. For example, any one physical activity session may have a range of veterans with either a brain injury, a spinal cord injury, an amputee, or osteoarthritis in their upper or lower body. This comes with unique activity design challenges that must ensure that it is suitable for everyone participating. For this reason, some physical activity sessions were based upon wheelchair-adapted sports, such as wheelchair rugby, as this was generally suitable for most veterans that are WIS; even those who do not regularly use a wheelchair. Whilst many veterans enjoyed these wheelchair-adapted sports, noting how they appreciated the opportunity to further their understanding of those who play sport using wheelchairs, there was a significant portion of veterans who distinctly expressed their disinterest in wheelchair-adapted sport.

##### **Feelings**

At first, I was surprised when this was first mentioned to me, and I instinctively felt defensive on behalf of many of my close friends who I served with who became injured and regularly use adaptive equipment in sport. However, once this knee-jerk reaction subsided, I felt that perhaps their comments were not a slight against adaptive sport and those who participate in it, and I tried to understand this statement from their point of view.

## **Evaluation**

Veterans that are WIS not wanting to participate in wheelchair-adapted sport has a negative impact, not only on the organisation which has invested resources into organising the activity, but the veterans who do not participate might miss out on a physical activity session and may have to wait for up to a month before the next opportunity.

## **Analysis**

After discussing this subject in more detail with veterans who had spent many years in the recovery process, I discovered that it was not the case that veterans who were disinterested in participating in wheelchair-adaptive sport thought less of adapted sport. Rather, these feelings stemmed from feeling as though they were regressing in their recovery process. Some veterans that are WIS were only able to run, jump, and move without adaptive equipment due to great effort and overcoming many significant challenges. It is understandable that wheelchair adapted sport would not be of interest to those who have worked hard to achieve a higher level of functioning. In addition, adapted sport may be perceived as less challenging. Challenge has been identified as a key component of quality physical activity experiences for veterans with a physical disability (Shirazipour et al., 2018). Therefore, adaptive equipment may be perceived by some veterans to reduce the quality of the physical activity.

Exercising in a wheelchair may also make one feel as though they are more disabled; an identity that may be undesirable among ex-military personnel (Shirazipour & Latimer-Cheun, 2020) who may be averse to expressing weakness due to embedded hegemonic masculinity in their military identities (Caddick et al., 2015; Green et al., 2010). Furthermore, Shirazipour and Latimer-Cheun (2020) noted that some veterans with a physical disability had internalised negative perceptions of disability and may aim to protect themselves from these negative perceptions. Whilst this can be achieved through adaptive sport (*i.e.* participation in high level

competitive sport) (Shirazipour and Latimer-Cheun, 2020), veterans who do not regularly use wheelchairs may want to avoid the internalised negative perceptions that may be associated with wheelchair use. However, participation in wheelchair adaptive sport may also be useful in reducing negative perceptions (Shirazipour & Latimer-Cheun, 2020). Therefore, encouraging participation in these sports may be beneficial.

Considering my initial feelings, my internal reaction and feelings towards my initial experience of an individual not wanting to do adapted sport highlighted my lack of understanding of veterans that are WIS's thoughts and experiences and my own subconscious biases. It can perhaps be too easy to assume that, due to our mutual experiences in the military, that our thoughts would be similar. However, this emphasised the need for me to take a step back and try to analyse such things from the perspective of a veteran that is WIS.

### **Conclusion**

Wheelchair adaptive sport may not be appealing to some veterans that are WIS. It may cause veterans to feel more disabled, undermine their effort spent overcoming significant challenges, and may reduce the perceived challenge of the activity. This can cause these individuals to avoid such activities and may result in a lower number of participants. However, participating in wheelchair adapted sport may reduce negative perceptions and may therefore be beneficial in some contexts.

This experience also highlighted the need for me, as a researcher, to be mindful of my subconscious biases that may be present despite my experiences as a veteran.

### **Action plan**

Ensuring physical activities are inclusive is important as the condition of veterans that are WIS can vary greatly. Although wheelchair-adapted sport can be enjoyed by many and may be a beneficial form of physical activity in some situations, an over reliance on wheelchair-adaptive

sport may exclude those who do not wish to participate in such activities. Identifying activities that are inclusive but do not make participants feel more disabled and include some challenge may be an effective way of maximising engagement in the physical activity. Activities such as the walking group outlined in Chapter Five may perhaps be an example of how a physical activity intervention can offer a high level of inclusivity and create some challenge, whilst not requiring any adaptive equipment. Moreover, practitioners may benefit from considering activities that can facilitate both people that use adaptive equipment and those that do not, such as swimming.

In terms of my own learning, I aim to be more mindful of the different perspectives that can occur among veterans and people in general. In this situation, I assumed our opinions would be more similar due to our shared military experiences. However, in the future I will ensure adequate reflection and reflexivity is conducted often to reduce the subconscious biases that I may hold. It also highlighted that my own assumptions towards veterans that are WIS and physical activity may be wrong. This emphasises the need for interventions to include the target population at the beginning of their development, even if those developing the intervention have experiences among the target population.

#### **7.4.8 Reflection eight – “I don’t want to compete in the Invictus Games...”**

##### **Description**

The Invictus Games is a large scale, international sporting competition whose aim is to use the power of sport to inspire recovery, support rehabilitation, and generate a wider understanding and respect for veterans that are WIS (Invictus Games Foundation, n.d.). Nations from around the world create teams of veterans that are WIS who compete in a wide range of events, such as wheelchair rugby and athletics. The Invictus Games receives a wide range of media coverage, including social media and national television coverage through the British

Broadcasting Corporation (BBC) and has done tremendous things for the international community of veterans that are WIS.

Working with Help for Heroes I met many individuals who had competed in previous Invictus Games and told their story of how the games had changed their lives. They described how it brought them out of the depths of depression and despair and placed them on a new path where they built confidence and gained a new sense of purpose. It is through Help for Heroes that veterans that are WIS are selected and trained for the Invictus Games, and many continued their affiliation with the charity following competing in the games. It was not until I attended other groups that did not specifically focus on physical activity, that I discovered a different impression of the Invictus Games.

I often mentioned to veterans that I met that Help for Heroes offered free sport or exercise opportunities for veterans that are WIS, in the hope of encouraging more to get more physically active. The vast majority of veterans that are WIS are aware of the Invictus Games. In fact, I have never met one who wasn't. However, many declined to attend the sport or exercise sessions after hearing it was led by Help for Heroes. They felt that Help for Heroes had become entirely focused on the Invictus Games and that was something they did not want to be involved in. The high competition, time demand, and intensity was not appealing to many.

### **Feelings**

I quickly learned, during my time with Help for Heroes, that I was likely seeing only one side of the veteran that is WIS and physical activity perspective. Of course, those who had benefited from or planned to participate in the Invictus Games would be affiliated to Help for Heroes and likely continue to participate in their physical activity groups. After meeting those who were not affiliated to Help for Heroes, I could understand their feelings and perception that Help for Heroes' exclusively targeted those who aspired to participate in the Invictus Games.

## **Evaluation**

The perception that Help for Heroes' exclusively targeted veterans that are WIS who aspired to participate in the Invictus Games was having a negative impact on physical activity engagement among veterans that are WIS. Help for Heroes is the predominant provider of physical activity opportunities for veterans that are WIS in the South Wales area. If a veteran does not attend any of the many opportunities that Help for Heroes provides, other opportunities designed for a veteran that is WIS group were significantly limited. Considering the benefits of doing physical activity in a veteran that is WIS group, as discussed in Chapters Three and Six and the quality physical activity participation literature (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017), not attending the Help for Heroes led physical activity interventions could reduce the potential extent of benefits that a veteran that is WIS could gain from physical activity.

## **Analysis**

Not wanting to participate in the Invictus Games could stem from many reasons. One participant touched upon this subject in the study reported in Chapter Three, suggesting that physical activity for veterans that are WIS in general had come to reflect the Invictus Games image. Particularly considering that low physical activity self-efficacy has been identified as a key barrier to physical activity in the study reported in Chapter Four, Help for Heroes holding the image of being associated entirely with the highly competitive and demanding Invictus Games may be damaging when it comes to encouraging participation in their physical activity interventions.

## **Conclusion**

The Invictus Games has the potential to, and has had, many positive effects on the international veteran that is WIS community. However, Help for Heroes' image has become closely



associated with this high level of competition. This may be providing a significant barrier among those with low physical activity self-efficacy and so result in less participation in the physical activity opportunities available to veterans that are WIS in the South Wales area.

### **Action plan**

To overcome this, Help for Heroes may benefit from more carefully managing their image related to the Invictus Games. It is true that the Invictus Games can be inspiring for many, but equally there may be those for whom it provides a barrier. Ensuring that the physical activity interventions that are aimed at the more basic, non-competitive physical activities are communicated to potential participants in an equal manner to the Invictus Games may prove useful.

### **7.4.9 Reflection Nine – “What happens to the majority who aren’t selected for Invictus?”**

#### **Description**

As outlined in the previous reflection, participating in the Invictus Games can have a significant positive impact on the wellbeing of veterans that are WIS. In order to be selected for the Invictus Games as part of the UK team, a veteran that is WIS must attend trials that run over a five-day period in England organised by Help for Heroes and the Royal British Legion. According to Help for Heroes (n.d.- c), 350 veterans attended the 2019 trials, with 65 of those veterans being selected to compete in the games and 6 additional reserves. Successful selection is based on several things, including athletic ability and the extent to which that individual would benefit from competing in the games. It is not an easy task to attend these trials, people travel from all parts of the UK and generally stay at the location of the trials for the entire period. It is likely that the 65 selected veterans will go on to compete in the games and their

experiences greatly benefit their recovery. But the effect these trials have on the 285 veterans that are WIS who are not selected needs to be considered.

I often heard stories of those who were not selected. Not being selected had not accelerated their recovery. In fact, it discouraged the majority from participating in physical activity altogether. Those who were not selected felt as if they did not stand a chance of selection; that they were generally competing against semi-professional athletes, many of whom had participated in several previous games. It left many bitter, with feelings that they were there as a formality, rather than with any realistic hopes of selection.

### **Feelings**

I felt that not being selected must have a significant impact on these individuals' motivation. The disappointment of the effort placed into preparation and attending the trials, resulting in not being selected is surely difficult. However, based on conversations I have had with those who had attended the trials, I felt that selecting those who are already high-level athletes and had already attended previous games undermines the objective of the Invictus Games that is to help veterans that are WIS recover from their conditions.

### **Evaluation**

The negative impact of not being selected can be very damaging and has the potential to discourage some veterans that are WIS from seeking other physical activity opportunities. For example, this could further reduce their beliefs about their physical capability, resulting in decreased levels of physical activity self-efficacy that was identified as a key barrier in the study reported in Chapter Four.

## **Analysis**

The current format of the Invictus Games trials in the UK may have a significant negative impact on those who are not selected. The selection of generally high-level athletes who have participated in previous games suggests that those organising the trials may be prioritising medals and success at the games, rather than the positive impact it can have on an individual's rehabilitation process. Even if this is not the case, not being selected for the Invictus Games can cause significant feelings of disappointment that may discourage a veteran from participating in any form of physical activity in the future.

## **Conclusion**

The Invictus trials offer a great opportunity for those who are selected for the games. However, there exists a large number who are not selected, some of whom feel that selection was never a possibility after seeing those who were selected. Although it is difficult to determine whether this is the reality or erroneous perception, this may have a significant negative impact on physical activity self-efficacy and have implications for future physical activity participation.

## **Action plan**

It is difficult to find a balance between building people's hopes and selecting a team that will be feasible. However, it is also important to consider the impact of not being selected on veterans that are WIS. In this manner, the Invictus trials and selection process may benefit from review, in order to minimise the negative impact it may have.

One potential option for practitioners could include creating local competitions for those who are not selected so that they still have the opportunity to participate in a competition. While this may not be as desirable as participating in the Invictus Games, it provides an opportunity where similar benefits can be created for those who are not selected for the international competition.

#### 7.4.10 Reflection Ten – “They’re not a veteran...”

##### Description

I imagine that it is difficult for people with no military experience to understand the subtle differences among veterans. In my experience, civilians generally consider being a veteran as a group in itself, all holding similar ideologies and experiences. From a veteran’s perspective, however, this is far from the truth. Differences in branch of service, regiment, and service history are key to one’s identity as a veteran. I often struggle to remember names of many veterans that I meet. But I am easily able to describe them through their regiment or service history; it is a key element of military culture. The greater your experiences, the greater your respect among military circles. As noted throughout this thesis, the British government defines a veteran as:

*“...anyone who has served for at least one day in Her Majesty’s Armed Forces (Regular or Reserve) or Merchant Mariners who have seen duty on legally defined military operations.”*

(Ministry of Defence, 2017)

I have never met, or believe I will meet, a veteran who has served their minimum four-year contract who considers an individual who has served for just one day in the military as a veteran. The cultural definition of a veteran held within the military is not limited to simply one day of service. Many believe that serving in operations overseas is what qualifies one as a veteran. It is this distinction that can cause problems in organised activities for veterans. I saw this many times; an operationally experienced veteran that was WIS would be discouraged from attending a veteran group because they felt the group almost entirely consists of veterans who are not operationally experienced or what they consider as a veteran. As an operationally experienced veteran, they did not want to associate with those who were inexperienced and

whose injury likely occurred through training. They did not feel that the experiences of operationally inexperienced veterans related or corresponded to their own.

### **Feelings**

As a veteran with operational experience myself, I can understand these feelings. In similarity to the problem often noted among veterans that civilians cannot understand their experiences, those who have not served on operations can similarly not understand the experience of operational deployment. If you are to imagine a veteran with 10-years' military experience who became an amputee in an explosion on operations in Afghanistan and compare this to a veteran who injured their back two weeks into their basic training, the experiences of these two individuals are likely very different.

### **Evaluation**

This issue can have damaging effects on engaging veterans that are WIS with operational experiences. Arguably, veterans that have served on operations are at greater risk of developing mental health conditions and may, therefore, potentially gain more from physical activity participation or veteran support groups.

### **Analysis**

It is important to keep in mind the cultural differences between military and civilian environments (Cooper et al., 2017; Cooper et al., 2018). The military is a hierarchical culture that has a direct impact on veterans' perceptions and beliefs, and subsequently their behaviour and motivation to participate in physical activity or support initiatives.

From my own viewpoint as an operationally experienced veteran, I may be over sympathetic to this. My experiences in the military were conducted almost entirely with operationally experienced military personnel that may cause underlying biases in my thoughts and feelings.

It is possible that other sub-groups of veterans, such as branch of service, may also prefer to mix with those veterans with similar experiences. However, as physical activity can provide an opportunity to break down these limiting beliefs, including many types of veterans could be beneficial.

### **Conclusion**

Based on my experiences within the veteran community, due to cultural beliefs surrounding the definition of a veteran, operationally experienced veterans that are WIS may not want to participate in groups with members who have little operational experience. This can have a significant negative impact on engaging veterans that are WIS who are operationally experienced who may greatly benefit from physical activity and support initiatives. However, including a wide spectrum of veterans may help to break down these limiting beliefs.

### **Action plan**

No individual should be denied support, veteran or not. But it is important to consider these cultural dynamics when designing interventions for veterans. Recruitment of veterans that are WIS has been difficult throughout this PhD. Within the research outlined in this thesis, I purposefully broadened the definition of a veteran that is WIS, so that I was able to recruit adequate numbers for the research. In a situation where the number of participants is plentiful, developing interventions that are open to operationally experienced veterans that are WIS and another for those who are not operationally experienced may prove an interesting line of enquiry, however, this may be problematic. Research related to prejudice has shown that face-to-face exposure can reduce prejudices (Lissitsa & Kushnirovich, 2019). Therefore, developing programmes and interventions that include many types of veterans may lead to opportunities where these beliefs can be challenged and reduced.

#### **7.4.11 Reflection Eleven – “They’re our veterans...”**

##### **Description**

There exists upwards of 1500 registered military and veteran charities in the UK. Before working with Help for Heroes, I never knew the vast range of charities that a veteran has access to. What surprised me more, however, was the lack of inter-charity collaboration. As discussed in Chapter Six and a previous reflection, the number of participants who attended Help for Heroes led physical activity interventions was often quite low. This was not just a problem with Help for Heroes; many of the support groups and initiatives I attended were struggling to increase participant numbers. As someone who was working closely with Help for Heroes without directly being employed by them, I perhaps had an outsider’s perspective on this matter. I felt that collaborating between veteran charities in the local area could be nothing but a positive thing. It would allow participant numbers to increase, while being able to share resources and fund better and more attractive activities and interventions.

In my informal focus group, reported in Chapter Five, I planned to invite many of the charities I had been involved with outside of my work with Help for Heroes. I knew this would be a challenge. I often noticed the language charity support workers would use when talking about their charity’s beneficiaries. “Our veterans...” was often used, highlighting the sense of ownership they felt. Despite this, I thought this would be an ideal opportunity for charities to get together and discuss physical activity interventions and how each could provide some level of support, even if this support was just placing a poster in their place of work or sharing their thoughts and experiences. Out of the three charities other than help for heroes that were invited, none attended on the day. One of the charities emailed to explain that urgent business had meant he could not attend, but it was disheartening that the other charities, despite the positive benefit it could have, had little apparent interest in collaboration.

## **Feelings**

I felt a lot of frustration, especially when none of the other charities attended the meeting, as many had expressed to me, on many occasions, that they were very keen to collaborate. The phrase “our veterans...” was also frustrating. I felt that as a charity, their responsibility lies with the wellbeing of the veteran. Veterans can undoubtedly benefit from inter-charity collaboration and an unwillingness to do so, I thought, completely undermined the aim of the charitable organisations.

## **Evaluation**

A lack of inter-charity collaboration is reducing the potential effectiveness of physical activity initiatives in the South Wales area. Where there are four or five small physical activity interventions struggling to recruit sufficient numbers, there is potential for combining these and sharing resources to create more effective physical activity interventions. Not only this, however, but broadening the interventions’ members can help provide a social learning network that reaches a greater number of veterans that are WIS, which has been linked to quality physical activity (Shirazipour & Latimer-Cheung, 2020). This was also explicitly expressed by many of the participants of the research reported in Chapter Six.

## **Analysis**

Based on the language used and my experiences of trying to promote inter-charity collaboration, I feel that this lack of collaboration may stem from charities competing with each other, each aiming for the top place. Not only is this reducing the potential effectiveness of physical activity interventions, but research reported in Chapter Six suggested that veterans do not hold the same bond and loyalty to a charity that they do to other veterans. This therefore likely originates from the motivations of the charitable organisation. Whilst it may be an



outcome of financial or organisational pressure, it is something that may be of benefit to the promotion of physical activity among veterans that are WIS.

Considering my own position, it may be difficult for me to fully understand what may be complex interactions between organisations. It might be possible that issues surrounding previous negative experiences, funding or losing control over projects that they have developed may play a role in the lack of inter-charity collaboration.

### **Conclusion**

Charities currently lack inter-charity collaboration in terms of physical activity for veterans that are WIS. Despite my best efforts, I was not able to improve this situation that I feel may stem from charities competing against one another. Currently, this is decreasing the potential effectiveness of physical activity interventions in the area in which I worked.

### **Action plan**

To overcome this, practitioners should seek to collaborate with other charities where possible. In terms of the benefit for veterans, there are few, if any negative implications of this. However, organisations may be limited in their ability to collaborate.

## **7.5 Possible directions of future research**

This chapter provides a series of reflections based upon the researcher's personal experiences. Although these provide insight into his first-hand experience, the absence of a scientific approach limits the reliability of their findings. Despite this limitation, however, the reflections provide potential directions for future research that can be explored through a scientific lens; providing more rigorous insight into the topics discussed in the reflections. Based upon the 11 reflections above, four possible future directions of research are proposed.

Within reflection two, the researcher discusses the intention-behaviour gap observed among veterans that are WIS. The researcher explained this through the findings reported throughout this thesis, however, whilst this hypothesis was evidence-based, investigating the intention-behaviour gap through the perspective of the veteran may reveal key information related to its cause and means by which it can be overcome.

Reflection six highlighted the impact of the PIP policy, the policy that determines people with disabilities' financial assistance, on physical activity behaviour. Not limited to veterans that are WIS, exploring the impact of this policy on the wider population of people with disabilities living in the UK is vital to understanding the extent this policy impacts physical activity. If it determined that the PIP policy negatively effects physical activity behaviour, scientifically-based evidence will be key to stimulating positive revisions to the policy.

Research relating to the Invictus Games has largely focused upon those who have participated in the event (Roberts et al., 2020). However, as discussed in reflection nine, the veterans that are not selected for the games may struggle with their motivation to remain physically active. As the number of veterans that are WIS who are not selected greatly outnumber those who are, understanding the implications of not being selected is imperative. In doing so, practitioners can ensure that physical activity behaviour can be supported among those who are not selected; leading to greater levels of physical activity among veterans that are WIS.

Military culture has been explored in many studies over the past few decades. However, this literature has predominantly focused upon describing military culture as a whole or comparing it with civilian culture (Cooper et al., 2018; Soeters, 1997). Whilst this has provided rich information, to the researcher's knowledge, little research has been conducted that compares military sub-cultures. As described in reflection 10, this can have several implications, not only limited to physical activity behaviour. Thus, future research may benefit from exploring these

sub-cultures and how they impact social dynamics among veteran groups. With this information, the social environment can be understood and optimised; a key aspect of quality physical activity for veterans that are WIS (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2018, 2017).

## **7.6 Summary**

This chapter brings together the researcher's 18- months of personal experiences of attending physical activity interventions and social support initiatives for veterans that are WIS in the South Wales area. Reflection has helped to understand these experiences, and in some cases, their link to the research outlined in the literature and this thesis. Recommendations for action plans for my own practice and other practitioners, as well as suggestions for future research, have then been provided that may help to overcome some of the problems associated with these experiences in order to promote physical activity behaviour among veterans that are WIS.

The next and final chapter of this thesis provides an overview of findings of the entire thesis and aims to make specific recommendations for future researchers and practitioners who seek to design physical activity interventions for veterans that are WIS.

## **Chapter 8**

# **Implications and Recommendations for Future Practice: Encouraging Physical Activity Behaviour in Veterans that are Wounded, injured, and/or Sick**

### **8.1 Introduction**

The research reported in this thesis aimed to develop a better understanding of physical activity behaviour among veterans that are WIS, and provide practical recommendations by which it can be increased, through the development, implementation, and evaluation of a community-based physical activity intervention. However, due to the COVID-19 public health crisis, the final pilot intervention implementation study was adapted to ensure the safety and wellbeing of participants and comply with University and Government health policy. The research was focused upon five objectives:

- 1) Consolidate and evaluate the current evidence surrounding the effects of physical activity on veterans that are WIS using a systematic review of the literature, and where possible, compare activity types;
- 2) Use a mixed methodology and BCW approach to identify perceived barriers to, and benefits of physical activity among veterans that are WIS, specifically among those with low current levels of physical activity;
- 3) Employ findings outlined within this thesis, and the wider literature, to develop a physical activity intervention that aims to increase physical activity levels among veterans that are WIS;
- 4) Evaluate the intervention developed and a separate Help for Heroes led exercise intervention for acceptability and feasibility using a qualitative methodology to provide recommendations for improvements to the developed intervention and general

considerations for the acceptability and feasibility of physical activity interventions for veterans that are WIS;

- 5) Consolidate research findings from this thesis and provide general recommendations that practitioners can apply to their current and future practice.

In order to meet these objectives, the United Kingdom Medical Research Council (UKMRC) guidance for the development and evaluation of complex interventions provided a framework (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008; see Chapter One, Section 1.1.3.4). The research reported in this thesis utilised the first two stages, *development* and *feasibility/piloting*, of this framework.

The results of the research outlined in this thesis met the above objectives. Chapter Two reported on the identification and consolidation of the relevant evidence base related to physical activity intervention research for veterans that are WIS and those experiencing mental health conditions through a systematic review. Following this, Chapters Three and Four reported on the development of a theory surrounding physical activity behaviour change among veterans that are WIS. This resulted in the design and modelling of the process and outcomes of a physical activity intervention for veterans that are WIS reported in Chapter Five. Despite the original plan to pilot and feasibility test the intervention and conduct preliminary evaluations, the COVID-19 public health crisis resulted in cancellation of developed plans. In replacement of this, perceptions about the acceptability and feasibility of the planned walking group intervention and a separate, existing physical activity intervention were evaluated in Chapter Six. Based on personal experiences and insights gained during the PhD journey, Chapter Seven reported the researcher's reflections on physical activity intervention participation by veterans that are WIS. The current chapter consolidates findings of the research outlined in this thesis and presents recommendations for practice and future research. These recommendations can be used to encourage physical activity behaviour among veterans that are WIS.

## **8.2 Overview and discussion of findings**

Physical activity can have a number of positive psychosocial outcomes for veterans/servicemen with a physical disability (Shirazipour, Tennant, et al., 2019), veterans with post-traumatic stress disorder (PTSD) (Greer & Vin-Raviv, 2019), and combat veterans (Caddick & Smith, 2014). Therefore, increasing physical activity behaviour among veterans that are WIS is likely to result in a number of positive outcomes. However, to date, physical activity behaviour among populations of veterans that are WIS has only been examined in a small number of studies. These include post-deployment veterans (Buis et al., 2011) and veterans with lower limb loss (Littman et al., 2017; Littman et al., 2014). However, most of these studies applied qualitative methodologies using small sample sizes, thus limiting their generalisability. In addition, to date, no physical activity behavioural research has been conducted with specifically UK Armed Forces veterans that are WIS, as defined throughout this thesis. This is particularly important, as being specific in your target population is a crucial aspect of behaviour change (O'Cathain et al., 2019; Michie et al., 2014; Craig et al., 2013), and many current physical activity interventions in the UK target this population (Help for Heroes, n.d.- b). In this context, it is therefore important to develop population-specific research evidence on which to base the design, implementation and evaluation of such interventions.

Additionally, research reported in this thesis aimed to address the six knowledge gaps surrounding veterans and physical activity outlined in the scoping review published by Shirazipour, Tennant, et al. (2019). The six knowledge gaps included:

- 1) A lack of longitudinal research;
- 2) A lack of understanding of diverse types of physical activity;
- 3) A lack of consideration for the systemic influences of the injury/illness and physical activity experience;

- 4) A lack of understanding of female service personnel and veterans;
- 5) A requirement of increasing the diversity of psychosocial outcome measures in research; and
- 6) A lack of consideration of programme implementation.

To achieve these aims, the Behaviour Change Wheel (BCW) was selected as a guiding framework for assessing behaviour and intervention design (Michie et al., 2014; 2011) (See Section 1.1.3 for rationale and descriptions).

Existing evidence was systematically collated and reviewed and then reported in Chapter Two. This systematic review focused upon published work associated with physical activity intervention research for veterans that are WIS or were experiencing mental health conditions (excluding those with mental illness that caused them to experience psychosis or require high levels of care). The findings of this review revealed unique information regarding potential intervention effects. Prior to this review, other reviews with similar populations integrated qualitative, cross-sectional, and interventional research within their reviews (Shirazipour, Tennant, et al., 2019; Greer & Vin-Raviv, 2019; Caddick & Smith, 2014). Although these reviews provided information surrounding the potential outcomes of physical activity participation, it limited their applicability to interventional research.

The systematic review reported in Chapter Two identified that the psychosocial effects of physical activity included decreases in symptoms of PTSD, depression, anxiety, stress, negative affect, perceived functional impairment, and increases in quality of life, social wellbeing, sleep quality, mindfulness, and positive affect; with some of these being more predominant in veterans with lower health status. To address the *lack of understanding of diverse types of physical activity* gap in knowledge, as identified by Shirazipour, Tennant, et al. (2019), where possible, comparisons explored the impact and efficacy of different activity

types. Outdoor recreation-based physical activity appeared be more consistent in reducing PTSD symptoms than other physical activity types, while yoga and horse riding seemed more impactful on stress and anxiety. Despite many positive outcomes immediately following a physical activity intervention, many of the benefits significantly decreased over time. Including a significant other (*e.g.*, either a partner, peer and/or close friend) in the intervention, however, increased the sustainability of beneficial effects.

Despite many beneficial findings of the systematic review reported in Chapter Two, a prevalence of biased methodologies among interventional studies published in this field was identified. Overcoming this limitation is an important step towards understanding the effects of physical activity, the impact of diverse types of physical activity, and the role of veterans' significant others. Following the publication of the review reported in Chapter Two (Walker, Smith, et al., 2020), more physical activity randomised controlled trials (RCT) have been published among veteran populations (Lang et al., 2021; Damschroder et al., 2020; Davis et al., 2020), suggesting that a less biased evidence base is currently being established. In the years to come, there may be opportunity to conduct a subsequent systematic review that includes exclusively RCTs, with scope to conduct meta analyses, that can be used to gain a clearer picture related to physical activity and veterans.

Qualitative research reported in Chapter Three revealed a number of perceived barriers to, and benefits of physical activity among a small sample of veterans that are WIS through a BCW lens. As noted in Chapter One, Section 1.1.4, this study was the first to apply the BCW in a veteran context. A COM-B analysis of the themes identified from the qualitative data revealed that *physical capability*, *psychological capability*, *physical opportunity*, and *reflective motivation* were frequently cited barriers to physical activity engagement. Further, a particular British governmental policy was identified that appeared to discourage veterans that are WIS, and perhaps the wider population of people with disabilities living in the UK, from participating



in physical activity. Many of the perceived benefits of physical activity, categorised entirely as *reflective motivation* as they were considered *beliefs about consequences*, seemed to mirror the perceived barriers; suggesting a reciprocal relationship.

The findings reported in Chapter Three held important implications for intervention functions relating to the design of future behaviour change interventions. However, due to the qualitative nature of this study's design, further quantitative analysis was required to overcome some of the associated limitations. This was the focus of a follow-up study, which helped address the limitations of the initial study and ensure an effective behaviour change theory was developed; as recommended by the UKMRC (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008).

Using the themes identified through the thematic analysis of the qualitative data reported in Chapter Three, a questionnaire was designed and distributed to explore the perceived barriers to, and benefits of physical activity and how they related to physical activity behaviour among a larger, more diverse sample of veterans that are WIS. This study recruited a number of female veterans that are WIS in order to be representative of the veteran demographic and help address the associated gap in knowledge (Shirazipour, Tennant, et al., 2019). *Poor mental health, negative beliefs about physical activity, and beliefs about physical capability* were identified as barriers to physical activity. Despite the wide range of categories identified in the qualitative study reported in Chapter Three, a second COM-B analysis of the data reported in Chapter Four revealed that only psychological capability and reflective motivation COM-B categories were represented within the data. Based upon the findings of the study reported in Chapter Four, *beliefs about physical capability*, conceptualised as physical activity self-efficacy, was significantly lower among insufficiently active participants while also related to physical activity levels; suggesting this as a key barrier to physical activity. Physical activity self-efficacy was shown to be an important antecedent to physical activity behaviour (Bauman et al., 2012; McAuley & Blissmer, 2000), including among people with disabilities (Jaarsma &

Smith, 2018). It has also been shown to facilitate leisure time physical activity among people with physical disabilities (Martin Ginis et al., 2016), and has been used in the promotion of physical activity among older veterans with PTSD (Hall et al., 2020). Qualitative research has also identified self-efficacy as a barrier to physical activity among veterans with lower limb loss (Littman et al., 2017).

The importance of physical activity self-efficacy in the physical activity behaviour of veterans that are WIS was a novel finding within the research reported in this thesis. In a practical context, it suggested that practitioners, such as Help for Heroes community support workers, could encourage greater levels of physical activity in this population by developing methods and environments whereby low physical activity self-efficacy can be overcome and increased.

Perceived benefits of physical activity were identified as improving mental health, improving physical health, giving a sense of purpose, and increasing physical fitness. All of which were categorised as reflective motivation.

It is important to note, however, that future research is warranted to explore physical activity behaviour among veterans that are WIS. Although research among vulnerable groups will likely be limited to small populations, there exists a need to develop research methods that overcome these limitations related to statistical power (Etz & Arroyo, 2015). To overcome these limitations, researchers have recommended mixed methods approaches in order to pool the unique strengths of each methodology (Fok et al., 2015). Indeed, this was the approach taken in the research reported in this thesis. Bayesian statistical methodologies was also suggested as a method of overcoming limitations related to small sample sizes (Fok et al., 2015). Whilst Bayesian statistical methods require prior information input into the analysis, and was thus inappropriate for the research reported in this thesis, with the establishment of the behaviour change theory reported in Chapter Four, perhaps Bayesian methods would provide

an interesting direction of future research. In addition, reducing biases in measurement tools and instruments may be another method of overcoming statistical power limitations within small sample research (Fok et al., 2015). Therefore, the development of new and accurate measures of physical activity behaviour and its determinants in a veteran context is important. Future researchers may benefit from using results reported in Chapter Four to inform the design of any future measures related to the barriers to, and benefits of physical activity among veterans that are WIS.

Whilst interventions that target outcome expectations (*i.e.* perceived benefits) have shown some success in physical activity behaviour change, a review of reviews by Choi et al. (2017) suggested that targeting physical activity self-efficacy may be a more effective method of behaviour change. Indeed, this was consistent with findings reported in Chapter Four where physical activity self-efficacy appeared to be a stronger correlate with physical activity levels. Therefore, overcoming and developing physical activity self-efficacy among participants was selected as a key aim of the intervention designed as part of this research and reported in this thesis.

Using the BCW, alongside Bandura's Self-Efficacy Theory (Bandura, 1997; Schunk & DiBenedetto, 2020), and the quality physical activity for veterans with a physical disability literature (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2019, 2018; Shirazipour et al., 2017), a walking group intervention was designed and detailed in Chapter Five. This intervention included the BCW intervention functions of *incentivisation*, *enablement*, *persuasion*, and *modelling* that aimed to overcome perceived barriers to physical activity and enhance physical activity self-efficacy that the BCW conceptualises as *reflective motivation*.

The walking group intervention design provided a novel, evidence informed intervention that future practitioners may benefit from pilot testing. This intervention, to date, is the first of its kind to employ the rigorous intervention development processes outlined in the UKMRC guidance and BCW in a veteran context. Considering the acceptability and feasibility issues that have been noted in veteran physical activity intervention research (Damschroder et al., 2020), such detailed development processes are vital to ensuring the efficacy of interventions.

Although there exists an increasing number of physical activity behaviour change interventions for veterans, only some have described their interventions through the use of behaviour change techniques (BCTs) (Buis et al., 2019). BCT Taxonomy v1 provides a comprehensive list of BCTs that allows behaviour change interventions to be described through a common language, so that interventions can be accurately replicated (Michie et al., 2014). The inclusion of BCTs in the description of the walking group intervention reported in Chapter Five will therefore provide practitioners with an intervention that can be accurately replicated. To ensure that successful physical activity behaviour change interventions for veterans are able to be replicated, practitioners should ensure the inclusion of BCTs within the intervention descriptions. In doing so, the benefits of these intervention can be gained within greater numbers of veterans.

Despite planning and recruitment, the pilot intervention study could not be implemented due to the COVID-19 public health crisis. To provide an alternative research direction that could meet the aims and objectives of this PhD project and its stakeholders, qualitative evaluations of the acceptability and feasibility of the planned walking group intervention and a separate Help for Heroes, group-based exercise class intervention were undertaken. The latter intervention had been ongoing and implemented in a community setting for two years. Ensuring that an intervention is acceptable is an important aspect of intervention design as it reduces the likelihood of unintentional harm, while also optimising its design and value

(O'Cathain et al., 2019). This study also provided information related to the *lack of consideration in programme implementation* and *lack of consideration of systemic influences in the injury/illness and physical activity experience* knowledge gaps previously identified (Shirazipour, Tennant, et al., 2019). Volunteers viewed both interventions as acceptable and feasible, including the intervention components of including significant others, using incentives, creating fun activities, promoting inter-charity collaboration, and making activities outdoors where possible. Both interventions were also perceived to align with the elements of quality physical activity for veterans with a disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour, Aiken, et al., 2019, 2018; Shirazipour et al., 2017), suggesting the interventions would promote quality participation experiences. However, a small number of minor changes were recommended to improve the walking group's design. Specifically, framing the incentives as a reward system, varying the locations of the walks, and encouraging and facilitating the intervention to become self-sustaining following the initial pilot implementation were suggested. Participants highlighted that physical activity interventions should emphasise the social opportunities, be adaptable, and facilitate challenge that can be conducted at the participant's own pace.

Although such a detailed acceptability analysis was not planned in the original development process of the walking group intervention, the evaluation of acceptability highlighted key information that added strength to the intervention's design. Acceptability as a part of detailed developmental processes are often overlooked in the design of an intervention (Michie et al., 2014), and this certainly appears to be true in many cases within the veteran physical activity literature (Damschroder et al., 2020; Miller et al., 2017). The research reported in Chapter Six, therefore, emphasises the need for detailed acceptability evaluations prior to pilot intervention implementation. A strength of the design of this research lies in the inclusion of two different types of physical activity interventions, a walking group and a group-based exercise class. Due

to the differences in physical activity types, the themes identified may be applicable to physical activity interventions in a more general sense. As many practitioners may be restricted in the time and resources they can dedicate to the design, implementation, and evaluation of an intervention, detailed acceptability evaluations may not always be possible. The results reported in Chapter Six may, therefore, provide general considerations related to acceptability that can inform the development of interventions where practitioners are unable to conduct their own evaluations. However, where possible, acceptability should be conducted in its specific context to ensure accurate, context-specific results.

### **8.3 Recommendations for practice**

Using the research findings reported in this thesis, eight recommendations for encouraging physical activity behaviour among veterans that are WIS can be made.

#### **8.3.1 Create a physical activity pathway by offering less physically intense activities**

Research reported in Chapters Two, Three and Four identified perceived beneficial and positive effects that physical activity can have among veterans that are WIS. However, despite charitable organisations in the South Wales area developing community-based sport and exercise interventions, findings and reflections reported in Chapters Six and Seven suggested that attendance at these interventions remain low. One of the primary findings of the research outlined in this thesis is the important role of physical activity self-efficacy in encouraging physical activity behaviour among veterans that are WIS; with lower levels of physical activity self-efficacy being associated with lower levels of physical activity. Contemporary understanding of self-efficacy and physical activity suggests a positive relationship between them (Bauman et al., 2012; McAuley & Blissmer, 2000). The research reported in Chapter Six, for example, identified an individual who felt embarrassed to participate in physical activity as he did not perceive himself to be as capable as his pre-injured self; creating a significant barrier

to physical activity. It is therefore imperative that there is a suitable environment for veterans that are WIS to overcome and develop physical activity self-efficacy. An absence of this may result in a lasting barrier and long-term physical inactivity.

Creating challenge is an important aspect of quality physical activity for veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017), and is an important aspect of self-efficacy development (Schunk & DiBenedetto, 2020; Bandura, 1997). Whilst high levels of challenge are likely desired among many veterans, it is important to understand the relative nature of challenge and how it relates to an individual. Creating challenges that are too ambitious, may be particularly problematic among veterans that are WIS with low physical activity self-efficacy. If a veteran perceives that they are physically incapable of succeeding in the challenge, it is likely to decrease motivation and cause them to avoid activity altogether (Schunk & DiBenedetto, 2020; Bandura, 1997). Moreover, as reported in Chapter Five, the balance between challenge and injury is delicate and can result in a lack of participation in physical activity if poorly managed. It is therefore important to create challenge at an appropriate level for the target population. For example, the walking group intervention reported in Chapter Five targets veterans that are WIS who may be experiencing low levels of physical activity self-efficacy. Among such participants, who may also be experiencing social isolation, the act of attending the intervention and walking a short distance among others may be perceived as very challenging. Thus, it is important to tailor levels of challenge to the individual or target population.

Many charitable organisations that develop physical activity interventions focus their activities around sport, exercise, and/or physical challenge. In fact, within the South Wales area, where the majority of the current research was conducted, these types of activities were the only regularly available physical activity opportunities for veterans that are WIS. These activities may cause significant barriers among participants with low physical activity self-efficacy and

may explain the low levels of participation in the interventions reported in Chapters Six and Seven. However, in an international perspective, this may not be the case, with prominent organisations, such as Soldier On (n.d.) and the Wounded Warrior Project (n.d.), offering a range of activities, including yoga and archery.

Physical activity providers may benefit from regularly offering activities that require a low level of physical activity self-efficacy; one that can create an environment where veterans' physical activity self-efficacy can be built upon and developed over time. Not only will this increase levels of physical activity among veterans that are WIS, but likely lead to increases in participation in the available sport, exercise, or physical challenge opportunities following increases in physical activity self-efficacy.

Physical activity environments that overcome and increase low physical activity self-efficacy can take many forms. Self-Efficacy Theory (Schunk & DiBenedetto, 2020; Bandura, 1997) highlights four sources of self-efficacy - *performance accomplishments*, *vicarious experiences*, *forms of social persuasion* and *physiological/emotional indexes*. Whilst the BCW suggests *education*, *persuasion*, *incentivisation*, and *coercion* can help overcome an individual's beliefs about their own capabilities (*i.e. reflective motivation*). Through using the principles emerging from these theories, the development of physical activity interventions must consider physical activity self-efficacy levels of prospective participants.

An example of how one may design a physical activity intervention that targets physical activity self-efficacy for veterans that are WIS can be seen in Chapter Five. In this, Self-Efficacy Theory and the BCW informed the development of a walking group intervention that aimed to overcome and develop participant physical activity self-efficacy. The low physical activity self-efficacy requirements of self-paced walking in a supportive group environment that provided education, role models, and persuasion was considered likely to be an effective



environment for developing physical activity self-efficacy; specifically, through *performance accomplishments*, *vicarious experiences*, and *social persuasion*. With this walking group intervention, veterans that are WIS will have a pathway to many other physical activities provided by charitable organisations, such as competitive sport, group exercise, and physical challenges. In this manner, a veteran may participate in an activity requiring a low amount of physical activity self-efficacy that leads to greater levels of belief about physical capability and participation in different kinds of physical activity. While physical activity pathways may include many different journeys and may not always lead to sport, exercise or physical challenge, offering an activity where physical activity self-efficacy can be overcome and developed will likely result in a greater level of physical activity among veterans that are WIS. Therefore, practitioners should be made aware of such physical activity self-efficacy barriers and ensure that a progressive physical activity pathway, where a veteran can start low and build up, is developed to overcome this and encourage greater levels of physical activity.

### **8.3.2 Where possible, use reward-style incentives to promote initial engagement in physical activity**

Creating a physical activity pathway will help encourage veterans that are WIS with low physical activity self-efficacy to participate and provide an environment where self-efficacy can be developed. However, providing activities that require low physical activity self-efficacy may not be enough to engage those with extremely low beliefs about their physical capability. To overcome this barrier, the BCW suggests that *incentivisation* can be utilised. Incentive-based interventions have been shown to increase physical activity levels in many different physical activity contexts (Losina et al., 2017; Ball et al., 2017; Finkelstein et al., 2016; Norman et al., 2016) and may, therefore, be effective among veterans that are WIS.

Linked to the intervention design reported in Chapter Five, the planned walking group aimed to use a free café lunch, hot drink, and parking to encourage veterans that are WIS to participate, whilst also promoting the social aspects of the walking group. Although this was not negatively received in the acceptability and feasibility study reported in Chapter Six, some participants felt that an incentive system such as this may be susceptible to abuse by individuals who were not interested in participating in the walks. Moreover, the food-based incentive did not suit or interest many of the participants.

Results of the acceptability and feasibility study suggested that a reward-style incentive scheme would be more acceptable. Researchers have successfully implemented such incentive schemes, reward sustained physical activity behaviour in a workplace environment (Losina et al., 2017). Participants of research reported in Chapter Six felt that a reward-style incentive system would be less open to abuse, due to the necessity of continued participation to gain the incentive, whilst also encouraging sustained participation and fostering feelings of earning the incentive. Therefore, this may be a more appropriate method of implementing and monitoring an incentive scheme for veterans that are WIS.

In the context of a food-based incentive, reward-style incentives could include the free café lunch following the completion of four walks, with a free hot drink after each walk. Yet, as food did not seem particularly desirable, a clothing-based reward incentive, potentially giving participants a certain coloured t-shirt based on the number of walks completed was recommended in Chapter Six. In this respect, participants may feel an increased group identity that mirrors that of the military and fosters feelings of belongingness that have been linked to quality physical activity for veterans with a physical disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017), and people with disabilities (Evans et al., 2018).

T-shirt reward incentives, however, may not be appropriate in some contexts. Therefore, if financially viable, practitioners should offer incentives framed clearly within an explicit, reward-based system. Although, it is important to note that providing incentives is not necessary for engaging veterans that are WIS in physical activity interventions, it represents a tool that can help to motivate and encourage those who may be ambivalent about participation.

### **8.3.3 Inspire and inform by promoting physical activity related stories of veterans that are WIS**

Physical activity can have many psychosocial benefits for veterans (Chapter Two; Shirazipour, Tennant, et al., 2019; Greer & Vin-Raviv, 2019; Caddick & Smith, 2014). In the research reported in Chapters Three and Four, a wide range of perceived benefits were identified. Four perceived benefits related to physical activity levels. These were beliefs that physical activity can: 1) increase physical fitness; 2) increase physical health; 3) increase mental health; and 4) provide a sense of purpose. Therefore, increasing these beliefs among veterans that are WIS may result in increases in physical activity.

According to the BCW, education can increase an individual's beliefs surrounding a behaviour (Michie et al., 2014; 2011). Education can occur in many forms; however, simply providing information is among the most frequently used behaviour change techniques (Michie, 2014). Inspirational physical activity stories of veterans that are WIS may be an effective method of providing information. In these stories, veterans can describe personal experiences and explore what they gained from physical activity. This form of education may help shape beliefs surrounding physical activity. These could include the beliefs surrounding the benefits of physical activity, but also beliefs in one's physical capability, by providing a source of physical activity self-efficacy, acquired indirectly through *vicarious experiences (i.e. role modelling/social comparison)* (Schunk & DiBenedetto, 2020; Bandura, 1997). This is

particularly important considering the prominence of physical activity self-efficacy barriers among veterans that are WIS identified in the research reported in Chapter Four.

A wide range of physical activity stories may be effective in this context. Asking those who have used physical activity as a platform for recovery and wellbeing post-WIS to share their story may provide an emotional, engaging, and informative face-to-face experience or audio-visual resource. For example, British Rowing provides an example of how videos such as this may be developed (British Rowing, 2018). In their video, Pa Njie, a veteran who is a double lower limb amputee, shares his experiences of rowing. He explains how it has positively influenced his life inside and outside of the sport during his journey to competing in the Invictus Games. Inspirational stories, such as this, are prime examples of how videos can be developed to educate and shape beliefs among veterans that are WIS. However, it is also important to include a wide range of stories related to veterans that are WIS and physical activity. As noted in Chapters Three and Seven, a focus on solely Invictus Games stories may not suit all veterans that are WIS. Moreover, ensuring that viewers perceive a high level of similarity and identify with the inspirational veteran is an important aspect of modelling/social comparison related sources of self-efficacy (Schunk & DiBenedetto, 2020; Bandura, 1997). Therefore, including stories of those whose physical activity was not competitive sport or exercise by providing a wide range of inspirational stories may be beneficial.

Video-based modelling has been shown to increase physical activity self-efficacy among people with Chronic Obstructive Pulmonary Disease (COPD) (Selzler et al., 2020). However, the video focused on coaching physical activity technique, rather than physical activity stories. Nevertheless, it provides an example of how video-based material can be utilised to increase physical activity self-efficacy. The effects of an intervention utilising physical activity stories of veterans that are WIS may prove to be an interesting line of future research.

In the context of veterans that are WIS and physical activity, practitioners may benefit from promoting the physical activity stories of veterans that are WIS via their communication channels, such as email and social media platforms. Videos can be developed in an inspiring and engaging manner that can be shared through many different online platforms. In doing so, physical activity behaviour may be encouraged among veterans that are WIS.

#### **8.3.4 Make physical activity social**

Transitioning from the military to civilian world can be challenging for veterans, especially among those with lower health statuses (MacLean et al., 2014). This may result in feelings of disconnection and lowered social support upon returning to civilian life (Blackburn, 2017; Ahern et al., 2015; Thompson et al., 2015). Systematic reviews have suggested that physical activity can allow veterans to reconnect with others who share a similar mind set (Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014). Indeed, this was noted as a predominant perceived benefit as a result of the study reported in Chapter Three and was the most common reason for engaging with physical activity (belief about outcome) among participants in their relevant physical activity intervention, as reported in Chapter Six. The social environment has been linked to quality physical activity experiences among people with disabilities (Evans et al., 2018), and veterans with physical disabilities (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017). Developing social connections can promote healing among veterans, create a social network where veterans can learn from their peers, and promote personal growth post-injury (Shirazipour & Latimer-Cheung, 2020). Fostering social connections within physical activity programmes has also been recommended as a strategy that can foster quality physical activity experiences for veterans with a physical disability (Shirazipour et al., 2018). In an interventional context, two recent and separate randomised controlled trials (RCT) that aimed to increase physical activity behaviour among veterans actually observed reductions in

physical activity behaviour at six-months (Christiansen et al., 2020), and 12-months (Damschroder et al., 2020) following participation in telehealth interventions. Although it is difficult to determine the reason for this, the unintended decrease in targeted behaviour may be the result of a lack of social interaction caused by the interventions' telehealth designs. However, more RCT research is needed in this area to confirm this hypothesis. Nevertheless, research findings reported in this thesis and in the wider literature highlight the importance of promoting the social aspects of physical activity for veterans.

Social interaction can take many forms. For example, the Help for Heroes group-based exercise class intervention, outlined in Chapter Six, consisted of 'coffee mornings' once per month that attracted large groups of veterans. However, outside of these monthly social events, social interaction was not a principal feature of the intervention. The difference in the number of participants between social and non-social activities was clear and explored as part of the interviews reported in Chapter Six. The findings of this suggested that increasing social opportunities within the intervention would encourage more to participate in the exercise classes.

The walking group intervention, reported in Chapter Five, was designed with a specific aim to promote social interaction both during and after the physical activity. Using the café and adjacent function room at Bryngarw Country Park, participants would have been encouraged to socialise over a free drink or lunch. However, whilst this was later refined in the planned study reported in Chapter Six to not include the free lunch as part of the intervention, the free drink was recommended to be retained as it can encourage desirable post-walk social gatherings in the café. Although group walking has the additional benefit of participants being able to socialise during the physical activity, not all physical activities allow for this and encouraging separate social opportunities pre- or post-activities would likely be an effective strategy to encourage and facilitate social interaction.

### **8.3.5 Provide the option for significant others to participate in the physical activity**

Significant others can play a vital role in the wellbeing and care of a veteran who is WIS. As one participant explained as part of the study reported in Chapter Three, significant others can often act as the main caregiver of a veteran that is WIS. Providing the option for significant others to participate can have beneficial implications related to both the outcome and target behaviour of the intervention.

In a behavioural context, the first qualitative study conducted as part of this thesis, related to the perceived barriers to, and benefits of physical activity and was reported in Chapter Three. One participant believed that his significant other, who was his main caregiver, was neither considered nor catered for in many of the physical activity interventions available to him at the time. This created many difficulties in attending physical activity interventions, as because they were required for transportation and support this would take significant amounts of the caregiver's time. Allowing significant others to participate in the intervention would likely help to reduce this perceived barrier to engagement.

Physical activity interventional studies among veterans that are WIS reported in the current literature have adopted a wide range of physical activities and modalities. Outlined in the systematic review reported in Chapter Two, interventions that included significant others appeared to lengthen the positive psychosocial effects of the intervention. Maximising the positive psychosocial effects of a physical activity intervention is particularly desirable considering the increased likelihood of poor mental health as an outcome of military service (Williamson et al., 2019). The inclusion of significant others may, therefore, be especially desirable in the context of veterans that are WIS.

Shirazipour and Latimer-Cheung (2020) identified family as an important aspect of the social environment. Including family constituted an optimal physical activity experience that allowed

the family and veteran to heal together. However, research findings have also noted that the inclusion of family coincides with complex programming considerations and that family members may be overprotective, hampering attempts to promote independence among veterans (Shirazipour & Latimer-Cheung, 2020).

The walking group intervention outlined in Chapter Five encouraged the participation of participants' significant others. Walking was considered by the researcher to be an activity where significant others could be easily integrated, while creating the first step for veterans with low physical activity self-efficacy to reengage with physical activity. The concerns related to complex programming considerations and hindering independence noted by Shirazipour and Latimer-Cheung (2020) were therefore not pertinent to the walking group intervention. However, other physical activities, such as group-based exercise or sport, may require greater consideration of these concerns. Nevertheless, the research reported in this thesis and other literature seems to indicate a positive benefit, overall, when including significant others.

The research reported in Chapter Six explored the acceptability of including significant others among those who planned to participate in the walking group intervention, as well as participants of a Help for Heroes led group-based exercise class intervention. Including significant others was considered highly acceptable. Participants felt that significant others could provide support to veterans that are WIS who were experiencing poor mental health and may be uncomfortable entering a new environment alone. This is particularly important as the research reported in Chapter Three identified *discomfort in a new environment* as a barrier to physical activity participation, which was found to represent the same construct as *poor mental health* in the research reported in Chapter Four. Participants of the research reported in Chapter Six also felt that, not only could significant others provide support to attend the intervention, but support and encourage social interaction among the members of the intervention. This may



help to ease social interaction within physical activity interventions; likely leading to more quality physical activity (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2018, 2017).

Despite the potential benefits and acceptability of including significant others, some participants stated, in the research reported in Chapter Six, that some veterans who were not participating in the study may not feel comfortable including their significant other as it would compromise some much-needed personal time. Moreover, socialising among like-minded veterans was a common theme in the research reported in Chapters Three and Six, and the inclusion of significant others could be viewed as a contradiction to this. However, the common support for the inclusion of significant others alongside providing opportunities to socialise with like-minded veterans suggested that, rather than being considered a person with a different mindset, significant others are considered to share this like-mindedness and understanding of veterans' experiences. This could be due to the prominent role that significant others, such as military wives, might have played in military culture, with some describing their marriages to military personnel as a three way relationship, the third aspect being the military itself (Aducci et al., 2011).

The dyadic relationship between veterans and their significant others and its impact on physical activity behaviour is a complex, social issue that warrants further research. Although an outdoor recreation intervention for veterans that are WIS that included marriage counselling as part of a multi-activity programme was found to improve PTSD symptoms for up to six months following the intervention (Townsend et al., 2018), the extent that marriage counselling and veterans' relationships with their significant others attributed to this is difficult to determine. However, contemporary research suggests that if an intervention does not include significant others, it may undermine its potential benefits. Therefore, it is recommended that the inclusion of significant others is optional to accommodate those who would prefer to attend individually. In this manner, the benefits can be maintained while not creating pressure for those who may

not want to include their significant other. Yet, as this may still discourage those who do not wish to involve their partner from participation in the intervention, it may be also be beneficial to ensure that a small number of other interventions, if possible, exist that do not include significant others. If this is not possible, however, it is recommended that interventions aim to include significant others.

### **8.3.6 Get outdoors and immersed in nature**

Several researchers have identified nature-based activities as providing particularly important psychosocial benefits for veterans (Shirazipour, Tennant, et al., 2019; Caddick & Smith, 2014). Shirazipour, Tennant, et al. (2019) suggested that this could be due to its linkage with military life. Among the interventional studies for veterans that are WIS, or who are experiencing mental health conditions included in the systematic review reported in Chapter Two, outdoor recreational activities were found to more consistently reduce participants' PTSD symptoms; a condition that veterans may be particularly vulnerable to (Williamson et al., 2019).

Other research outlined throughout this thesis indicated the desirability of nature-based physical activity. The study reported in Chapter Three, for example, identified being outdoors and in nature as a perceived benefit of physical activity participation among veterans that are WIS. In addition, ideal physical activities, identified by participants in the study reported in Chapter Six, indicated that the vast majority of veterans would prefer to engage with outdoor, nature-based activities.

Nature-based physical activity is a common theme in the literature surrounding physical activity participation for veterans with a physical disability (Shirazipour & Latimer-Cheung, 2020; Shirazipour et al., 2017). Nature-based recreation was commonly linked to healing (Shirazipour & Latimer-Cheung, 2020), and is highly valued by veterans with a physical disability (Shirazipour et al., 2017). It can provide an environment where a veteran can be

challenged and acquire a sense of mastery (Shirazipour et al., 2017); important aspects of the quality physical activity participation framework for people with disabilities (Evans et al., 2018), and veterans with a physical disability (Shirazipour et al., 2017).

Nature-based physical activities can constitute a number of different activities; surfing, scuba diving, and fishing are just some examples outlined in the systematic review reported in Chapter Two. However, nature-based activities do not always require large costs and planning. The intervention developed and reported in this thesis planned to employ an inclusive walking group to allow participants to encounter nature whilst they socialised and participated in low level, self-paced physical activity. The walking group intervention represents a low-cost example of nature-based physical activity. Although, as outlined in Chapter Five, ensuring that contingency plans are made in case of things such as poor weather is important.

### **8.3.7 Make physical activity inclusive but not always with adaptive equipment**

Inclusivity is an important aspect of programme structure for developing quality physical activity experiences for veterans that are WIS (Shirazipour et al., 2018). The research reported in Chapter Six noted the value of inclusivity in both the walking group and the acceptability and feasibility of an existing group-based exercise class intervention. While inclusive, however, neither the walking group nor group based-exercise class interventions required the use of adaptive equipment. This is particularly important as research reported in Chapter Three suggested that some veterans that are WIS may be opposed to using such equipment. Veterans may be adverse to expressing weakness (Caddick et al., 2015; Green et al., 2010) and hold negative perceptions of disability (Shirazipour & Latimer-Cheung, 2020) and, therefore, try to protect themselves from situations where they may be perceived as disabled. In addition, in many cases, veterans have perhaps overcome great difficulties to avoid the use adaptive equipment. In this context, some may perceive the use of a wheelchair, for example, as a

regression in their recovery journey. Moreover, using adaptive equipment may be perceived by some to take this challenge away from the physical activity, an important aspect of quality physical activity participation for veterans with a physical disability (Shirazipour et al., 2017).

There may, however, be benefits associated with participation in adapted sport. It can provide important insights and opportunities for those who wish to pursue these types of activities and may help reduce negative perceptions (Shirazipour & Latimer-Cheung, 2020). Yet, it is important to keep in mind that inclusivity does not necessarily require the use of adaptive equipment. Maintaining flexible physical activities, such as providing multiple options for exercises in group-based exercise classes, or using physical activities that do not require high levels of functioning such as walking, can be effective in maintaining inclusivity while not alienating those who do not wish to use adaptive equipment.

#### **8.3.8 Seek opportunities to collaborate with other organisations and charities**

As reported in Chapter Seven, the researcher perceived there to be little evidence of inter-charity collaboration within the South Wales area. Whilst the researcher may not be in a position to understand inter-organisational dynamics, it seemed that charities would often perceive other charities as competition, rather than actively seeking to collaborate. It is with such avoidance of collaboration that many opportunities may be missed; opportunities that may have large benefits to the veteran that is WIS community. In the research reported in Chapter Six, inter-charity collaboration was found to be a highly acceptable aspect of the walking group intervention. Many participants felt that, by working together, the opportunities and knowledge of available support would increase. Learning through a diverse social network, such as this, may be important for sustaining long-term physical activity, as it helps veterans cope with their physical conditions and learn what other opportunities may be available to them (Shirazipour & Latimer-Cheung, 2020). In addition, from an organisational perspective, interventions that

may struggle with recruiting sufficient numbers will be able to increase the reach of their recruitment, likely leading to greater levels of participation. Resources can also be shared to improve the development of physical activity interventions; likely resulting in more attractive opportunities for veterans that are WIS. It is suggested, therefore, that where feasible, practitioners and veteran groups would likely benefit from inter-charity /organisation collaboration. However, this recommendation is based primarily on the researcher's own experiences, and feedback from participants included in the research reported in this thesis, thus, it may only apply in the limited context of the environments within which this current research was completed.

#### **8.4 Infographic of recommendations**

The Knowledge Economy Skills Scholarships (KESS) 2 funding the research reported in this thesis aims to integrate its research with small enterprises. In order to achieve this, the researcher has developed an infographic that can be distributed to local Help for Heroes community support offices that provides a summary of the recommendations for practice listed above. As it is unlikely that many community support workers will be able to, or wish to read the research outlined in this thesis in full, an infographic provides key recommendations that can be applied to current and future practice. This infographic can be seen in Figure 8.1.

Figure 8.1

Infographic of Recommendations for Physical Activity Behaviour Change among Veterans that are Wounded, Injured, and/or Sick



## **8.5 Recommendations for future research**

The research findings reported in this thesis suggest several directions for future research. Firstly, the analysis of physical activity behaviour among veterans that are WIS would benefit from additional research to overcome limitations of the studies that have been conducted to date. Due to the application of the questionnaire and factor analysis reported in Chapter Four, a further questionnaire based upon the results of this, but on a larger sample of veterans that are WIS may be an effective line of enquiry. As the newly developed questionnaire may consist of fewer items due to the factor analysis, this would allow other constructs to be added without risking participant response fatigue. In this manner, other dimensions of the BCW that were not included in the questionnaire, such as those that represented social opportunity, as identified in the study reported in Chapter Three, could be added and explored in a newly developed questionnaire. This may not be limited to the themes identified in the study reported in Chapter Three, but upon new and/or other existing literature. In doing so, an accurate measure can be developed, helping to overcome limitations related to small sample research that often occurs with veterans that are WIS (Fok et al., 2015). This will lead to a clearer understanding of physical activity behaviour among veterans that are WIS that could be applied in the development, implementation and evaluation of future behaviour change interventions.

Secondly, continued development, implementation, and evaluation of the walking group intervention will reveal the effectiveness of the intervention and highlight important information related to physical activity behaviour among veterans that are WIS. The UKMRC guidance suggested that piloting the intervention is the next stage in the development and evaluation of an intervention (O'Cathain et al., 2019; Craig et al., 2013; Craig et al., 2008; Campbell et al., 2000). Piloting and feasibility testing the walking group intervention could be conducted using the methodology and intervention design detailed in Chapters Five and Six. This should reveal key information related to the required sample size, testing procedures, and

recruitment and retention of participants, whilst furthering the understanding of the acceptability of the intervention. Providing that the intervention shows a promising effect, results could be used to refine the intervention further. The refined intervention could then be implemented on a larger scale using the required sample size and a one-year longitudinal follow up. With this, key limitations of the current literature identified in the systematic review reported in Chapter Two can be overcome, and detailed information can be revealed related to the effects of the walking group intervention. Future researchers may benefit from applying objective measures of physical activity behaviour in the larger scale implementation of the walking group intervention. Lines et al. (2020) identified longitudinal differences and weak associations between self-reported measures of physical activity, device measured physical activity, and sedentary behaviour. This highlights the need for more stringent measures of physical activity to be developed and the importance of accurate measures of physical activity. To achieve this, future interventional studies may benefit from applying device-based measures of physical activity.

Although the research reported in this thesis aimed to address the six knowledge gaps outlined by Shirazipour, Tennant, et al. (2019), more research in this area is still required. Despite the findings of the research reported in this thesis adding information towards these knowledge gaps, as noted throughout this thesis, limitations caused by the COVID-19 public health crisis, resulted in an inability to address some of these gaps. Namely, the *lack of longitudinal research* and *a requirement of increasing the diversity of psychosocial outcome measures in research* knowledge gaps require investigation. To overcome these, future research may benefit from randomised controlled trial interventional research that is conducted in a longitudinal manner and considers a variety of quantitative and qualitative methods of evaluation.



## 8.6 Comments on the BCW and physical activity behaviour change

Recommended by the UKMRC (O'Cathain et al., 2019), the BCW proved to be an effective framework for assessing physical activity behaviour and developing a behaviour change intervention for veterans that are WIS. Not only was the BCW appropriate in an academic context but it provided a simple and clear method of communicating findings to the non-academic audiences associated with this thesis, such as Help for Heroes community support workers, a key aspect of this PhD project. Although the pilot intervention was not able to be implemented, the BCW framework has guided the development of recommendations for future practice for those who seek to increase physical activity levels among veterans that are WIS.

The use of the BCW in the research reported in this thesis identified a practical recommendation for the application of the framework. Findings reported in Chapters Three and Four suggested that qualitative data categorised to the BCW and COM-B model benefited from subsequent quantitative analysis. Qualitative data was found to represent several latent variables and, subsequently, had significant impact on the COM-B analysis related to the perceived barriers of physical activity among veterans that are WIS and intervention design. It is therefore recommended that, where possible, qualitative data would benefit from quantitative follow up. In doing so, practitioners can ensure that behavioural analyses more accurately represent existing constructs.

Based on the behavioural analyses reported in Chapters Three and Four, Chapter Five detailed the design of an intervention that aimed to overcome a key reflective motivation barrier to physical activity, self-efficacy. To achieve this, the intervention included several intervention functions recommended by the BCW. However, the intervention function *modelling* was not recommended as a means of overcoming reflective motivation by the BCW (See Figure 1.6). This is a direct contrast to one of the primary theories of motivation, Self-Efficacy Theory

(Schunk & DiBenedetto, 2020), that proposes role modelling/social comparison as one of the primary sources of self-efficacy. Due to the significant literature and evidence surrounding Self-Efficacy Theory, modelling was also incorporated into the intervention design. The reason that modelling is not included as an intervention function that can overcome reflective motivation barriers in the BCW is difficult to determine. However, the developmental process of the BCW may provide a possible explanation. The BCW was developed through systematic review that combined a large number of behaviour change theories in order to provide one simple, clear, and intuitive behaviour change framework (Michie et al., 2014). Thus, the role of modelling in reflective motivation in this relatively new framework may have been overlooked during its development. Moreover, the authors of the BCW suggested that, whilst the BCW provides a guiding framework, its contents remain flexible and does not represent strict concepts that cannot be adapted (Michie et al., 2014). During the final six months of this PhD project, the researcher had the opportunity to study under the authors of the BCW at University College London's Centre for Behaviour Change, on their biannual behaviour change course. During this, the researcher posed this question to the authors of the BCW directly. They explained that the use of modelling in overcoming reflective motivation barriers was certainly evidence based and that they were aware of this limitation within the BCW and planned to edit this in next version of the framework. Therefore, in the period before the next update to the framework, practitioners would benefit from utilising modelling to overcome reflective motivation and ensure they keep up to date with later versions of the framework.

### **8.7 Concluding remarks**

Physical activity can have many positive effects for veterans that are WIS. The research reported in this thesis has identified the positive psychosocial effects of physical activity intervention research and suggests that low physical activity self-efficacy is a key barrier to physical activity amongst this population. A walking group was designed to overcome low

physical activity self-efficacy and provide an environment where physical activity self-efficacy can be developed. Practitioners may find the application of behaviour change tools and theories, such as the BCW and Self-Efficacy Theory, to be particularly useful in understanding and informing interventions that target physical activity self-efficacy among veterans that are WIS.

The research reported in this thesis has achieved its novel contribution to knowledge outlined in Chapter One, Section 1.1.4. In addition to this, five further notable and novel contributions to existing literature have emerged from the research reported in this thesis. Firstly, the systematic review reported in Chapter Two provided the first systematic review of quantitative physical activity intervention research among a veteran population. This resulted in unique findings related to the effects of physical activity interventions among veterans that are WIS or who are experiencing mental health conditions, and the increased longevity of intervention benefits when significant others were included. Secondly, the studies reported in this thesis were the first to apply the BCW in a veteran physical activity context, allowing physical activity behaviour to be assessed through a unique lens that offered suggestions for intervention design and behaviour change. Thirdly, research that reported on the perceived barriers to, and benefits of physical activity among veterans that are WIS was the first of its kind among UK Armed Forces veterans that are WIS, with most studies assessing veterans in an American context (Littman et al., 2017, 2014; Buis et al., 2011). The research reported in these chapters, therefore, provided a novel understanding of physical activity behaviour in this context. Fourthly, research reported in Chapter Four provided a novel contribution to the literature by identifying the first quantitative association between physical activity self-efficacy and physical activity behaviour among veterans that are WIS. This was a significant finding that has important implications in terms of physical activity behaviour change in this population. Lastly, the research reported in this thesis provided a physical activity intervention for veterans

that are WIS developed using the detailed guidance of the UKMRC and the BCW. This intervention provides practitioners with an evidence informed intervention that is ready to be piloted and evaluated and can path the way for future research and furthering the understanding of physical activity behaviour change among veterans that are WIS.

The novel aspects of the research reported in this thesis resulted in eight recommendations for practitioners. These are: 1) Create a physical activity pathway by offering less physically intense activities; 2) Where possible, use reward-style incentives to promote initial engagement in physical activity; 3) Inspire and inform by promoting physical activity related stories of veterans that are WIS; 4) Make physical activity social; 5) Provide the option for significant others to participate in the physical activity; 6) Get outdoors and immersed in nature; 7) Make physical activity inclusive but not always with adaptive equipment; and 8) Seek opportunities to collaborate with other organisations and charities. Using these approaches, practitioners can overcome key barriers to physical activity behaviour and promote a greater level of physical activity among veterans that are WIS.

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