The physical activity message preferences of disabled people: a mixed methods study

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Abstract

Physical activity for people who identify as disabled is crucial for overall health and wellbeing. Despite this, at this time current physical activity statistics evidence that people who identify as disabled are less likely to perform physical activity than those who do not identify as disabled. People who identify as disabled experience unique barriers that those who do not identify as disabled face, shaped through the medical and social models of disability. Research also sheds light on multiple ways that physical activity information and participation for people who identify as disabled can be improved.

This research explored a gap in the literature by utilising a mixed methods approach as well as encompassing a pragmatic paradigm to investigate and analyse the creation and utilisation of physical activity messages tailored for people with disabilities. The Physical Activity Messaging Framework (PAMF) was employed throughout to create three core research questions; What physical activity information would disabled people want to see within physical activity messages? Who would disabled people want to deliver physical activity messages? Where would disabled people want to see physical activity messages delivered? A total of 130 people participated in the questionnaire, with 12 of these individuals also participating in semi structured interviews that elicited rich in detail qualitative data.

The research found that disability specific information and the benefits of physical activity for disabled people were the top preferences of individuals in regard to the information they would like to see displayed within physical activity messages. Trained and qualified health professionals were identified as the key delivers of physical activity messages and

environments where physical activity can be performed was chosen as the best place to receive physical activity messages. This research contributed to the knowledge of physical activity messages and provides analysis and evidence on how physical activity messages should be constructed for people with disabilities.

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Chapter One- Introduction

1.0 What is my Master's about?

This Master's thesis examines evidence-based physical activity message resources for disabled adults. This research employed a mixed- methods approach to incorporate quantitative and qualitative data to provide a comprehensive knowledge of the preferred physical activity message resources of disabled people. With the ultimate goal of enhancing the physical activity involvement of disabled people, this research critically evaluates what, why and how these resources can be best utilised to meet their specific needs.

Throughout this research, three key research questions were constructed; What physical activity information would disabled people want to see within physical activity messages? Who would disabled people want to deliver physical activity messages? Where would disabled people want to see physical activity messages delivered? These three questions wholistically embodied what the research looked to analyse and discussions provided rich in detail analysis of the data to answer these questions.

Furthermore, whilst acknowledging that the differing levels of physical activity differ for people with disability, this research does not measure the frequency and intensity of physical activity participation of the participants because this was not an aim of the research. Despite the frequency and intensity of activity not being investigated within this research, the latest active lives survey details that only 48% of adults with a disability or long-term health condition are active, in comparison to 69% of adults without (Sport England, 2025). This exclusion of current physical activity levels has been included as a limitation of the research.

1.1 Background

Physical activity is important for every individual to prevent and manage noncommunicable diseases and to increase and maintain overall health and wellbeing, however in comparison to people without disabilities, the rates of PA engagement among people who identify as disabled continue to be much lower (Smith and Sparkes, 2019). Data shows that physical activity is less common for adults with a disability or long-term health condition (48%) than those without (69%) (Sport England, 2024). This discrepancy can be the consequence of particular barriers that prevent disabled people from participating in physical activity and therefore emphasises the need for specific message tools and techniques to successfully and effectively promote physical activity to disabled people. There are many different perspectives on disability and physical activity, which are shaped by social, cultural, and infrastructure factors. These various factors can create difficulties and convolution when it comes to creating physical activity messages that are effective for disabled people.

Disability can be recognised through numerous differing models of models, which include the medical, social- relational, social and International Classification of Functioning Disability and Health. Each of these models offers its own unique perspectives and views on disabled physical activity and additionally determine whether disabled people are aided or impeded in participating in physical activity (Smith and Bundon, 2018). Within the United Kingdom the medical model and social model are two of the main models that are focused upon within physical activity for disabled people. The medical model focuses on an individual's impairment as the problem (Areheart, 2008), whereas the social model dismisses the link between impairment and disability and instead implies that disability occurs as a result of society

(Thomas, 2014). This difference in focus reinforces that disability is seen through different lenses within each model.

Within health promotion, it is acknowledged that messaging plays a crucial role in physical activity for disabled adults, although it is also recognised within current physical activity messaging research that further investigation needs to be undertaken in relation to disabled adults (Jaarsma *et al.,* 2019). This is especially important because physical activity messaging is complicated and involves a number of different components, including choosing the right messengers, creating information that is easy to grasp, using efficient message formats, and choosing the right delivery strategies (Williamson *et al.,* 2020).

The purpose of this thesis is to close these gaps within research by creating relevant knowledge concerning physical activity messaging for disabled people. By bridging these gaps, this research will advance knowledge on how models of disability impact physical activity participation and how preferred message concepts can increase physical activity participation.

1.2 Overview of the Thesis

The following is an outline of this studies structure. In **Chapter Two** the conversation is launched with an overview of the pertinent literature, taking into account earlier studies on disability and physical activity. A complete analysis of models and frameworks utilised throughout the research is undertaken here in order to the address the significance and need of investigating and developing evidence-based PA communication options for disabled people.

Chapter Three provides an overview of the research's methodological framework and techniques, including the paradigm that guides the study, techniques for gathering and analysing data, how the findings are represented, ethical procedures and standards for judging the study's quality. It additionally presents the study questions and specifies the goals intended to address the significance and need of investigating and developing evidence-based PA communication options for disabled people.

The research results obtained from the use of semi-structured interviews and questionnaires are presented in **Chapter Four**. This chapter also applies a discussion of the data, involving a thorough comparison of the data's results with those of earlier, comparable studies. In **Chapter Five**, the study findings are synthesised and the ramifications of the findings across theoretical, practical, and empirical areas are highlighted. The limitations of the research and future research directions are additionally outlined, thus concluding the research study.

Chapter Two: Literature Review

2.1 What is disability?

Within the United Kingdom there are 14.6 million people that have a disability, accounting for 22% of the whole population (Kirk-Wade, 2022). Within the disabled population there are numerous different classifications of disability, that can impact an individual in a range of contrasting ways (Leonardi *et al.,* 2006). Currently, an individual is regarded as disabled in the UK under the Equality Act 2010 if you suffer from a physical or mental impairment that has a "substantial" and "long-term" negative effect on your ability to perform normal daily activities. (GOV, 2010). The term "substantial" refers to the impairment being more than just a minor inconvenience, meaning that it takes much longer than it usually would to perform these daily activities. Furthermore, a "long-term" impairment can be classified as an impairment that persists for 12 months or longer (GOV, 2010). Following on from this, these impairments will not only effect daily activities but will impact an individual's ability to partake in any form of physical activity (GOV, 2010). There are varying reasons as to why the disabled population has a lower physical activity participation rate when compared to non-disabled people, however it has been highlighted that inequalities and barriers are considered to be the biggest hindrance to participation in physical activity by disabled people (Haegele *et al*., 2018).

2.2 Disability within different models

2.2.1 ICF Model

The analysis of the existing literature on health and disability within the framework of the World Health Organisations International Classification of Functioning Disability and Health

(ICF) Model, has been undertaken by many authors (WHO, 2001). By analysing all of the literature in this framework authors aim to provide a more holistic understanding of health and disability by facilitating the development of interventions and policies, that address the needs of disabled people in an inclusive way. The ICF model is a framework that provides an extensive and multidimensional approach to health and disability (Van Der Ploeg *et al.,* 2004). It describes and classifies information on health conditions, whilst emphasising the importance of all on shaping an individual's experience of health and functioning (Chan *et al.*, 2009). Furthermore, this model consists of interconnected components that include functioning (Body Functions and Structures, Activities and Participation), and contextual factors (Environmental Factors and Personal Factors) (Martin Ginis *et al*., 2016).

One such review of the literature on factors relating to sport and exercise amongst disabled people, specifically relating to spinal cord injury concluded that most of the factors could be classified within the ICF model (Fekete and Raunch, 2012). However, some factors (eg., depression and independence) could not be fully incorporated into the ICF model, thus highlighting an important limitation. The model has additionally been questioned about its use for non-health care professionals such as coaches, recreations programmers and policy makers who need to understand the factors relating to physical activity participation, due to its complexity and abstract organisation. (Linker and Paquet, 2003). On the other hand the ICF model has been deemed useful in regard to the creation and development of exercise rehabilitation programmes (Rimmer, 2006). Despite its limiting factors it is clear that the ICF model is a relevant and important research tool.

2.2.2 Social Ecological Models

With the recognition of multi-sectoral approaches by experts, social ecological models could provide an appropriate framework for understanding how different sectors influence physical activity participation for disabled people and for developing interventions to increase and encourage participation (Leung, Chung and Chu, 2020). On the whole, social ecological models portray that behaviour is inhibited and facilitated by multiple levels of influence. These levels of influence include individual factors, social factors and environmental factors (McLeroy *et al*., 1988). Whilst other health promotion models have concentrated on looking at the individual, social ecological models recognise the role of the physical and social environments to gain and more complete approach to the understanding and improving of health (Ubeda-Colomer *et al.,* 2019). Every model is different; however all share a similar proposition, that these influences are independent of each other and each influence can directly affect one another. This indicates that an intervention that occurs within one level of influence will have ripple effects on another (Spence and Lee, 2003). Moreover, social ecological models have been utilised in recent research concerning addressing the factors influencing disabled people to participate in physical activity (Vasudevan *et al.,* 2015). This model has been implemented to better attempt to predict physical activity behaviour, despite the fact that few studies have reported the influence of these factors on behaviour (Giles-Corti *et al.,* 2005).

In the social ecological model of health proposed by McLeroy and his colleagues, it was put forward that patterned behaviour was determined or affected by the following levels of influence: intrapersonal, institutional, community and policy (McLeroy *et al.,* 1988). Whilst recognising that clarifying the effects of the different levels on health behaviour, with McLeroy additionally put forward potential interventional strategies at differing levels that aim to change

certain factors and at each level (Hu *et al.,* 2021). Like all social ecological models, McLeroy's can allow for additional models and theories (Martin Ginis *et al*., 2016). Health behaviour theories such as the Social Cognitive Theory (SCT) can be used to develop interventions that target specific factors at the intrapersonal and interpersonal levels, however are introduced at different levels such as the community or institutional (McLeroy *et al.,* 1988).

The McLeroy model is additionally unique in its description of the separation between institutional and community levels of influence. Whilst other social ecological models (Sallis *et al.,* 2012 and Spence and Lee, 2003) also address the influence of multiple levels on physical activity behaviour, the McLeroy model specifically highlights the role of institutions and communities in the promotion or hindrance of physical activity (McLeroy *et al.,* 1988). Moreover, the institution and community levels are the most commonly researched and practiced within physical disability research, despite the fact there has been minimal cooperation between them (Rimmer, 2012). This means that it is critical to establish between institutional and community level factors when adopting a social ecological model into research surrounding physical activity for disabled people (Martin Ginis *et al*., 2016).

2.2.3 Medical Model

There are many different models to guide us in understanding disability and the medical model has been utilised within physical activity and sport research for disabled people, predominantly to understand disability and shape the positioning of research that is being undertaken (Smith and Perrier, 2014). Through the medical model disability is defined as the inability to perform a task considered normal for any person due to impairment (Huang and Brittain, 2007). This means that disability is wholistically described as being caused by parts of the human body that

fail to work normally (Smith and Perrier, 2004). This model relies on normative categories of "disabled" and "non-disabled" and assumes that a person's disability is a personal or individual problem that requires an individualised medical solution (Areheart, 2008). Furthermore the model emphasises that the impairment itself is the issue (Areheart, 2008) thus meaning that the impairment becomes the focus of the disability experience (Fitzgerald, 2012). Disabled people are often encouraged and assisted to integrate into society and are viewed as victims of biological injustice (Townsend *et al.,* 2015) as a result of disability being created as a divergence from the norm that needs to be accepted, rectified or dealt with (Smith and Perrier 2014).

This medical model has often come under scrutiny for failing to be a model that is inclusive approach to disability. One such problem is the view of disability as an individual issue that exists independently outside of the culture (Thomas, 2004), which supports the conformance of ableist norms and beliefs (Swain *et al.,* 2003). Further problems regarding the medical model have also been highlighted, such as a research project regarding human rights and disability conducted by Quinn *et al* (2002) that regarded the medical model as encompassing a wider and more complex societal outlook rather than a medical outlook. This description of the model emphasised that strong propensities to view people with disabilities as something or someone that needs to be fixed exist and are embedded into everyday culture and ways of thinking (Townsend *et al.,* 2015). This normative perspective of disability creates a normal/abnormal division of disability that fails to factor in the social construction of disability and normality (Townsend *et al.,* 2015*).*

The medical model has additionally been denounced to not wholistically represent the complexities of disability through utilising a reductionist biological approach (Silva and Howe, 2012). This means that psychologists reduce behaviour to a physical level and explain in terms of genetics and biochemical process (Pol *et al.,* 2020), rather than recognising other factors such as the lived experiences of individuals with a disability. Following on from this, another criticism of the model is that it seeks to identify and locate the "problem" within an individual with a disability (Goodley, 2013). By pinpointing the location of an impairment to an individual it shifts responsibility for health to the individual themselves (Brittain, 2004) and this creates and shape's public opinion that disabled people can not care for themselves and require help and assistance in doing so (Brittain, 2004).

With the medical model disregarding that societal factors have a significant impact on the experience of disability; questions were raised doubting the ability of the model to be a success within the world of impairment and disability research. As a result of these criticisms, new models have been constructed and implemented within disability and impairment research to underline the importance of the social and cultural meaning of disability rather than focusing on the medical and biological outlook.

2.2.4 Social Model

The strive for the implementation of the UK social model of disability was pioneered by Michael Oliver in the 1980's and remained at the centre of the disabled rights movements throughout this time period (Thomas, 2014). The model also advocated for by the Union of the Physically Impaired Against Segregation (UPIAS) in a move to reclaim the word "disability" from the medical world (Townsend *et al.,* 2016). The model itself dismisses the casual link

between impairment and disability and alternatively implies that disability occurs as a result of society, specifically the idea that disability is a product of social restrictions and barriers that are placed upon people with impairments (Thomas, 2014).

Unlike the medical model, the social model moves away from the concept of disability as a physical impairment to being a social construction that excludes and oppresses disabled people within society (Townsend *et al.,* 2016). The model aided in transforming social constructs about disability and shifted perceptions away from disabled people being recognised as the "problem" and additionally highlighted social exclusion as being a substantial part of barriers disabled people face (Smith and Perrier, 2014). Additionally, the creation of this model was crucial in implementing Disability Discrimination acts that had a positive and lasting impact on anti-discrimination legalisation, resulting in disabled people gaining equal opportunities and full inclusion within society (Lutz and Bowers, 2005).

Despite being seen as a positive model for changing social approaches to disability, drawbacks have been highlighted by many scholars. Whilst being praised for its simplicity, this aspect is also viewed to be biggest flaw (Shakespeare, 2006). This simplicity has created a conceptual division between impairment and disability and this inconsideration of impairment has led to the human body being ostracised from the understanding of disability (Hughes and Patterson, 1997). Hughes and Patterson (1997) voiced that "disability is experienced in, on and through the body, just as impairment is experienced in terms of the personal and cultural narratives that help to constitute its meaning" On the other hand, the simplicity plays a crucial role within the model as excluding impairment meant that the model remains preserved, rather than

conforming with the biological reductionist approach as seen within the medical model (Thomas, 2014).

Another downfall of this model is that critics have put forward that the idea of the social model being a restricted explanation for everything that is occurring to disabled people in the real world (Oliver, 2013). The social model has been accused of neglecting impairment as an important aspect of disabled people's lives and solely focusing on social arrangements, rather than looking at disability wholistically (Shakespeare, 2006). This is an important insight into the model, as social context alongside foundational aspects of impairment both impact and shape the lives of disabled people (Letz and Bowers, 2005). This means that society is not required to provide the specific needs and services of disabled people if disability is only a matter of social barriers rather than lived personal experiences (Shakespeare, 2014). Moreover, if the focus is set upon dismantling the barriers disabled people face to create a barrier free environment, then this environment created will not benefit all disabled people due to its limitations by the natural environment (Shakespeare, 2014).

On reflection, neither the social model or the medical model incorporate all elements of disability and both fail to consider and capture both physical and social experiences of disabled people wholistically (Lutz and Bowers, 2005). This therefore meant a new conceptual model was needed to accurately depict both of these aspects.

2.2.5 Social Relational Model

With the social and medical models both receiving criticism from multiple scholars, the social relational model was created and implemented into disability research to build upon the already established social model. The social relational model was suggested by Thomas (2007), with the model asserting for theories that "engage both with social structure (order) and social agency (action) and should therefore accommodate analyses of social relations and social forces that construct, produce, institutionalise, enact and perform disability and disablism." (Thomas, 2007, p. 181). The model draws upon the social model, arguing that one of the core principles is that disability is socially constructed and therefore suggests that disability is a social relationship between people (Townsend *et al.,* 2016). This is further reinforced by the social relational definition of disability, which describes disablism as "a form of social oppression involving the social imposition of restrictions of activity on people with impairments and the socially engendered undermining of their psycho-emotional well-being." (Thomas, 2007). The model therefore seeks to identify pathways of oppression not only at the structural level but also at the psycho-emotional level and whilst reiterating the coexistence of differing social relation forms, the basis for the model still remains firmly on oppression (Owens, 2015).

Conversely, the social relational model places disability within sociocultural and historic traditions that shape behaviour within society, meaning that relational practices that have an influence on how individuals perceive the world give disability significance (Smith and Perrier, 2014) and this is important as having a disability is a fixed reality for many people. Despite this, the medical model states that disability is not just an impairment or solely social but is instead a lived and socially formed condition (Townsend *et al.,* 2016).

A key strength of the social relational model has been its praise for its success in society. It has given disabled people a voice to claim their position within global society by standing up to marginalisation and discrimination (Owens, 2015). Following on from this, another strength of the model is the acknowledgement that disabled people can face a variety of forms of oppression including psycho-emotional disablism and structural disablism. However these forms of oppression arise from relationships with other people rather than the individual themselves (Smith and Bundon, 2018). This therefore means that societal insensitivity such as inconsiderate remarks can harm a disabled person on a personal level, even while structural restrictions such as can limit their activities (Thomas, 2007).

On the other hand the social relational model does have limitations and critiques. The model is built on the foundations of social oppression; however this means that within disability research, researchers are dedicated to finding all disabled people oppressed (Shakespeare, 2014). Furthermore Shakespeare went on to further highlight that the social relational model is too closely related with the social model. To combat these critiques Shakespeare created and put forward an interactional model of disability with the goal to "neither reduce disability to an individual medical problem, nor neglects the predicament of bodily limitation and difference" (Shakespeare, 2014). However, this model went on to receive criticism from Thomas (2007) who argued that the interactional model aligned with a biological reductionist view meaning it reinforced the views of the medical model. As a result, even though each model have their flaws, both attempt to claim that individuals with disabilities lead lives that are defined by their disabilities as well as the effects of discriminatory societal conditions (Thomas, 2007).

Experts have recognised that promoting physical activity requires a multi-sectoral approach, that involves collaboration across different sectors (Cerniauskaite *et al.,* 2011). This approach is necessary to construct environments and policies that seek to support and encourage physical activity, to engage health care professionals and behavioural scientists to educate and motivate people to participate in physical activity and to foster environments to promote physical activity participation (Martin Ginis *et al*., 2016). By working together across sectors, it is possible to create a culture of physical activity that supports the health of individuals and communities. Furthermore, there has been growing recognition of the importance of the collaboration between medical or rehabilitation and community sectors in the promotion of physical activity for disabled people. This recognition is driven by research reporting that physical activity can have significant benefits for people with disabilities including greater independence and increased social participation (Rimmer and Lai, 2015).The World Health Organisation has recognised the importance of this multi-sectoral approach and has developed guidelines and resources that support its implementation (WHO, 2004). As a result of extensive research by multiple scholars and the World Health Organisation, the social relational model has been utilised throughout this research.

2.3 Physical activity for disabled people and why it is good for their health?

With the main priorities of this research concerning physical activity messages for disabled people, it is additionally imperative to understand how this physical activity can positively affect a disabled persons health. On the whole, participation in sport, exercise and physical activity by disabled people has been shown to result in various health benefits (Carroll *et al.,*

2014). Physical activity can also provide disabled people with the opportunity to enhance their physical and health- related quality of life (Martin Ginis and Hicks, 2007). To add to this, a collaborative in-depth review was undertaken by Smith and colleagues (2018) to determine the outcomes of the impacts of physical activity for disabled people. This review consisted of analysing 255 qualitative and quantitative studies in addition to more than 15 systematic reviews and meta analyses. The review concluded that physical activity for disabled adults was recommended to enhance health and reduce the risk of chronic diseases. The evidence identified within this review proposed that disabled adults should perform at least 150 minutes of moderate to vigorous intensity exercise per week to obtain significant health gains, in addition to indicating that 2 sets of demanding strength and balance exercises, repeated twice per week were also required to reap health benefits for disabled adults. Conversely, the evidence also suggested that participation in moderate intensity physical activity for shorter time durations, such as 60 minutes per week can also result in health benefits for disabled adults. However these benefits were not as monumental as when physical activity is performed at a higher intensity and longer duration. This therefore confirmed that even though participating in some physical activity is better than none, for greater health benefits, a greater intensity and duration of physical activity is needed.

With previous research confirming that participation in physical activity by disabled people will result in health benefits, it is also just as vital to understand what these health benefits are. The physical health benefits of physical activity for non-disabled people have been well known for a substantial amount of time and there is a substantial overlap with the physical benefits of physical activity for disabled people (Durstine *et al.,* 2000). Some of these benefits include skeletal development during childhood, maintaining peak bone mass in adulthood and delaying the onset of high blood pressure (Durstine *et al.,* 2000). On the other hand, specific benefits

that can be achieved through physical activity participation have been highlighted to have a greater impact on disabled people than non-disabled people. A physical activity for disabled adult's infographic created using the UK Physical Activity Guidelines included key physical health benefits for disabled people such as the strengthening of muscles and bones, improvement of fitness and aiding in the easier maintenance of a healthy weight. Further physical benefits such as improvement of mobility and balance and the facilitation of daily tasks, was additionally echoed in Van der Ploeg and colleagues (2004) research. Physical benefits for disabled people were sundered into three levels of body functioning and structural level, activities level and participation level. The body functioning and structural level consisted of benefits such as improved cardiopulmonary functions and muscle power, the activity level was compromised of benefits such as the better and easier performance of actions and lastly the participation level encompassed the benefit of improved functioning leading to better performances in real life situations (Van der Ploeg *et al.,* 2004).

Like the physical health benefits, psychological health benefits to physical activity have been identified by various scholars, however these benefits can vary. Firstly, disabled people experience life on a daily basis in a "hostile environment" and are often worried about their "uncertain future" which can leave them more vulnerable to anxiety and depression than non-disabled people (Shephard, 1991). Regular physical activity for disabled people has been shown to reduce these levels of anxiety and depression (Geron, 1976). Disabled people also experience self-image related problems and the gap between perceived and desired body is larger in disabled people than non-disabled (Shephard, 1991). Physical activity can improve these self-image related problems, with early research conducted by Ankenbrand (1972) uncovering substantial improvements in self-concept and self-acceptance throughout an 8 week bowling programme aimed at high risk college freshman. More recent research has supported

these findings, with disabled people participating in physical activity viewing themselves in a similar way to non-disabled people participating in physical activity (Scarpa, 2011). The study, which aimed to investigate the role of physical activity participation on physical self-esteem and self-concept additionally noted that disabled people who completed regular physical activity did not show significant differences in self-concept or self-esteem when compared to non-disabled people. On the other hand, whilst some benefits may differ or have a more substantial impact on disabled people, many psychological health benefits of physical activity are the same for everyone. These include benefits such as improved sleep quality, stress management and self-efficacy (Durstine *et al.,* 2000).

Regular physical activity participation will also provide disabled people with a range of social benefits. It has been emphasised in previous research that the sociological gains of new experiences and new friendships are important benefits for disabled people (Shephard, 1991). The development of new friendships occurs as a result of physical activity participation in a team sport or environment, as these environments are key for the facilitation of social networking opportunities (Smith and Sparkes, 2019). Moreover, meeting new people and creating friendships was the main social benefit portrayed on recent government physical activity infographics aimed at disabled children and disabled young people (GOV, 2022). A 2018 review for the UK Chief Medical Officer's update of the physical activity guidelines by the UK Government also provided insight into the health benefits of physical activity for disabled adults (GOV, 2018). Within this review that consisted of 37 separate studies, the evidence was overwhelmingly clear that physical activity participation is strongly associated with improved community involvement within disabled adults who possess a physical, intellectual or mental impairment (GOV, 2018). Furthermore, this community and social involvement is the initial benefit described on the "Multi-faceted dose-response curve of

exercise", that can lead to other crucial physical benefits such as strength and cardiovascular disease prevention, if more frequent and intense physical activity is undertaken (GOV, 2018).

Despite the evidence regarding the benefits of physical activity on disabled people's health being made apparent, disabled people have been overlooked within health promotion initiatives (Rimmer, 2009). This oversight is partially due to the traditional medical conceptualization of disability and health, with disabled people being recognised as already too "ill" for health promotion initiatives to concern them (Martin Ginis and Hicks, 2007). Moreover, this is one of the leading contributors to the disabled people's participation rates in physical activity being significantly lower than non- disabled peoples (Smith and Sparkes, 2019). It is vital that these participation rates are increased, as Carroll and colleagues (2014) stressed that despite this clear proof, the majority of disabled people to not participant in sufficient amounts of physical activity to reap the health benefits. With this documentation of health benefits being overwhelmingly evident, it is important that they are incorporated into physical activity messages promoted to disabled people. Awareness of these benefits spread within physical activity messages could help bring positive change to disabled physical activity participation rates, therefore making this research necessary and crucial for this specific population.

2.4 What inequalities and barriers do disabled people face?

Despite the benefits of physical activity, disabled people are more likely to be inactive and take part in less physical activity than non-disabled people (Smith and Sparkes, 2019). The latest Active Lives Survey revealed that disabled people or others born with long-term health conditions are twice as likely to physically inactive (43%) when compared to non-disabled people (23%) (Sport England, 2022). Additionally, this inequality drastically increases when

the number of impairments a person has also increases, with 51% of people with three or more impairments currently physically inactive (Sport England, 2022). It is therefore clear that a large disparity exists between disabled people and non-disabled people, with these inequalities needing to be appropriately addressed.

Disabled people experience discrimination through medical professionals, with suggestions that doctors contribute to the social exclusion, stigma and discrimination encountered by disabled people (Melville, 2005). A study conducted by Byron and colleagues (2005) investigated medical student's attitudes towards disabled people by enquiring about associations that the students associated with the term "disability". The study concluded that a medical professionals outlook on disability is heavily influenced by the medical model of disability, meaning medical professionals view disabled people as disadvantaged and dependant on others. Furthermore, healthcare workers additionally incorporate discriminatory practices within their work with disabled people, such as "forced sterilisation, involuntary admission and treatment and even institutionalisation" (WHO, 2023). These actions partnered with the medical professional's perspective on disability has been blamed for significant health inequalities for disabled people in comparison to non-disabled people, with attributes such as lack of knowledge and training being seen as the main contributors (Kinne *et al.,* 2004).

To combat the limited education and discriminatory attitudes of medical professionals, programmes have been developed that utilise disabled people as trainers or teachers of disabled education towards medical professionals (Melville, 2005). Disabled people can provide insight and first-hand knowledge of disability and the effects of impairments on an individual to medical professionals, which in turn can leave a memorable impact on medical students and medical professionals attitudes and approach to working with disabled people (Shakespeare

and Kleine, 2005). In 2002 at Leeds University, seminars for undergraduate medical students were lead by local disabled people that included deaf people, people with intellectual disabilities and people living with mental health conditions. The purpose of these seminars was to encourage students to reflect on their own attitudes towards diversity and to break down the stereotypical views of disability within society and the medical sector (Thistlethwaite and Ewart, 2009). They also aided in developing the medical students understanding of how a disability affects how different events are experienced, through disabled people's first hand experiences. Overall the seminars were hugely successful and students left positive feedback including newfound knowledge on communicational approaches and false stereotypes (Thistlethwaite and Ewart, 2009). With this seminar programme being recognised as a success, this research looks to incorporate a similar technique in which lived experiences and knowledge provided by disabled people will be utilised to create physical activity messages.

With 22% or one in five people across the UK population having a disability and 43% of disabled people being inactive (Sport England, 2022), it is important to recognise why a large percentage of disabled people do not regularly participate or participate at all in physical activity (Kirk-Wade, 2022).With that being said, there are many reasons as to why disabled people are less likely to participate in physical activity and these reasons are frequently banded together and labelled as "barriers" (Smith and Sparkes, 2019). With this research concerning physical activity messaging, it is important to consider how information regarding physical activity barriers and facilitators can be included within messages to positively promote and increase participation numbers for the disabled population.

There are various studies that have explored the barriers to physical activity for disabled people, however all have reached differing conclusions and overarching themes that encompass all barriers disabled people will face. In early research, physical activity barriers for disabled people were divided into 2 themes of personal or environmental barriers (Jaarsma *et al.,* 2014) and this was based upon and in accordance with the International Classification of Function, Disability and Health (ICF) (World Health Organization, 2001). The theme of personal barriers included factors such as lack of energy and lack of motivation. (Van der Ploeg *et al.,* 2008). On the other hand, the theme of environmental barriers included factors such as accessibility, transport, sports facilities and cost (Wu and Williams, 2001).

In more recent times reviews of previous research and new studies have put forward new suggestions of themes and factors relating to the barriers of physical activity participation for disabled people. One such qualitative review of previous research conducted by Martin (2013) analysed the barriers of physical activity participation of disabled people and categorised them into 4 overarching themes: medical, social, psychological and environmental barriers. Medical barriers to physical activity are barriers that are difficult to overcome and include factors such as, diseases or impairments that may restrict certain physical activity (Martin, 2013). Social barriers can stem from the people you are closest to and surround yourself with and factors include lack of encouragement and support from family members and the fear of meeting and interacting with new people (Bodde *et al.,* 2009). Psychological barriers are a result of an individual's mind and can include factors such as lack of confidence and fear of being injured (Arzu *et al.,* 2006). Lastly, environmental barriers are barriers that occur within the domain we live and have a substantial influence on our physical activity. They include factors such as transportation, accessibility to sports facilities and costs (Kars *et al.,* 2009).

On the other hand, other studies have suggested that these 4 overarching themes do not cover all barriers that disabled people will face when participating in physical activity. One such study conducted in America utilized focus groups to investigate the barriers and facilitators to disabled people participating in sport (Rimmer *et al.,* 2004). The study resulted in 178 barriers and 130 facilitators being identified, with these being condensed into 10 main themes: (1) barriers and facilitators related to the built and natural environment; (2) economic issues; (3) emotional and psychological barriers; (4) equipment barriers; (5) barriers related to the use and interpretation of guidelines, codes, regulations, and laws; (6) information-related barriers; (7) professional knowledge, education, and training issues; (8) perceptions and attitudes of persons who are not disabled, including professionals; (9) policies and procedures both at the facility and community level; and (10) availability of resources. Moreover, a study conducted by Úbeda-Colomer, Devís-Devís and Sit (2019), echoed that the 4 suggested overarching themes do not accurately cover all barriers experienced by disabled people participating in sport. The study investigated the physical activity barriers for disabled high school students and identified four main themes: (i) intrapersonal; (ii) interpersonal; (iii) organisational and (iiii) community. Although these themes may intersect with themes derived from Martin's (2013) study, they distinguish additional barriers that are not recognised within the previous research. Furthermore it is concluded that there are significant differences in barriers depending on variables such as sex, age, disability grade, congenital-acquired disability and disability type (Úbeda-Colomer *et al.,* 2019). This therefore reinforces the suggestion that Martin's (2013) 4 overarching themes do not cover all perceived barriers to physical activity.

Despite multiple scholars reporting differing themes and identifying various barriers to physical activity, the principal point is that barriers do exist. Positive physical activity messages can be created to bring around change regarding barriers and relay messages to disabled people

that these barriers can be overcome and physical activity is possible, despite their existence (Monforte *et al.,* 2021). The attempts at a positive outlook on physical activity for disabled people can be evidenced in the media coverage of the Glasgow Commonwealth Games 2014, in which the media drew attention to barriers affiliated with pessimistic attitudes and inconsistent physical structures faced by para-athletes (McPherson *et al.,* 2016). This depiction of para-athletes as inspirations may inspire other disabled people to participate in physical activity. However, this attempted message through media resulted in negative repercussions, with many disabled people feeling put off participating in physical activity, viewing and rendering the media's representations of physical activity as unattainable (Braye *et al.,* 2013). Since then, large disability sport organisations have changed strategy and moved away from depicting para-athletes as inspirations to promote physical activity to disabled people (Smith and Sparkes, 2019), but so far, no concrete strategy has been proven. This research will therefore aim to provide answers regarding the best physical activity messaging strategies to promote and increase disabled physical activity participation.

When discussing the barriers of physical activity it is also vitally important to identify and analyse the facilitators. However, research and literature surrounding the facilitators associated with the participation in physical activity by adolescent disabled people is very limited with investigations into this area ongoing (Rimmer *et al.,* 2004). Within this restricted literature it has been noted that for the most part, facilitators were the inverse of the barriers. For example, access to the correct facilities is a facilitator whereas no access to the correct facilities is a barrier (Martin Ginis *et al.,* 2016). Despite this, there have been some suggestions of personal facilitators such as fun and health (Wu and Williams, 2001), however with this research primarily focusing on analysing the barriers and facilitators for disabled people with spinal

cord injuries (SCI) or amputees, it is not currently known whether the same barriers or facilitators will be experienced by people with different disabilities (Jaarsma *et al.,* 2014).

On the contrary, research into the barriers and facilitators of physical activity for disabled children by Shields and his colleagues (2012), reported facilitators that would aid in overcoming certain barriers. These facilitators included the child's desire to be fit and active, family support, opportunities sensitive to the needs to children with disabilities, close and accessible facilities, involvement of peers, skills practice, skilled staff and information dissemination (Shields *et al.,* 2012). This study looked at disability wholistically and included children with various types of disability such as physical, intellectual and sensory impairments. In line with Wu and William's (2001) work this means that it is not currently known if certain facilitators will be experienced depending on specific disability. Moreover, these facilitators reported for disabled children could potentially be similar or the same for disabled adolescents, however this can not be assumed and further research must be undertaken to uncover the truth.

Overall it is essential that the possible barriers to physical activity for disabled people are analysed and overcome by identifying, developing and implementing facilitators that can increase physical activity participation for this population. It has also been suggested that gaining a deeper understanding of these potential barriers and facilitators to the participation of physical activity by disabled people, could provide information essential to allow the development of interventions that have a greater chance at succeeding (Rimmer *et al.,* 2004). This therefore means that incorporating messages that include information regarding the barriers and facilitators to physical activity for disabled people could be crucial in changing disabled people's perceptions of physical activity and could increase participation numbers.

2.5 Physical Activity Messaging Framework

Physical inactivity is one of the largest contributors to non-communicable disease and premature mortality rates (Strain *et al.,* 2020). Improving upon specific population physical activity levels could help to reduce these mortality rates (Strain *et al.,* 2020). This can be conducted through a systems approach that not only targets changes to the policy and physical environment, but also targets individual and social factors, such as perceptions or attitudes (Rutter *et al.,* 2019). One way that this can be achieved is through physical activity messaging, defined as "the overall process of creating and delivering physical activity messages" (Williamson *et al*., 2021). A physical activity message itself is defined as "educational or persuasive materials to be relayed to a specific individual or group with the aim of ultimately increasing physical activity levels" (Williamson *et al.,* 2020).

When creating messages concerning physical activity for specific populations, it is crucial that an individual understands how to effectively implement these messages (Williamson *et al.,* 2020). The first reason is that messaging is an approach that is successful in reaching a large audience with minimal cost (Cavill and Bauman, 2004). Following this, effective messages can aid in spreading physical activity related information and recommendations such as benefits to differing populations. This is important as this information is typically not intended to be public or to encourage people to begin or continue to be physically active (Latimer *et al.,* 2010) and the public have very little knowledge and awareness of what the current physical activity recommendations for health are (Williamson *et al.,* 2020). Lastly, interventions linked to physical activity messaging so far have had finite effects on physical activity behaviour and diverse findings in outcomes such as awareness (Brown *et al.,* 2012).

The importance of messaging has become clear in previous campaigns surrounding physical activity, with the VERB campaign producing successful results (Brawley and Latimer, 2007). The VERB campaign was a multi-million dollar social marketing campaign set in place within the USA to combat growing concerns surrounding childhood obesity and children's poor lifestyle habits (Wong *et al.,* 2008). It aimed to promote physical activity to children aged 9-13 years old by portraying physical activity as "fun, doable and cool" (Brawley and Latimer, 2007). It took a different stance on physical activity promotion and instead relayed information to children in ways which they could relate. This campaign was implemented and hoped to be successful in using a different approach as campaigns are more likely to succeed if powerful messages are "unusual, unfamiliar and novel" (Louis and Sutton, 1991). In turn, the campaign became a huge success and had a lasting positive influence on children's physical activity outcomes and behaviours (Huhman *et al.,* 2010). Many of the participants reported that they had processed and remembered the campaigns messages, which was seen as a huge breakthrough for behavioural changes at the time (Huhman *et al.,* 2007). Moreover, the campaigns effects were carried by the children into their adolescent years, therefore further emphasising the triumph of its application (Huhman *et al.,* 2010).

New Zealand have also seen success with physical activity messaging campaigns, particularly with the "Push Play" campaign that was introduced in the late 1990's. The campaign was spearheaded by the Hillary Commission and was created to raise awareness and increase physical activity participation at a population level within New Zealand (Bauman *et al.,* 2003). This was partly in response to the publication of 1996-97 New Zealand Public Health Survey that reported 20% of adult females and 16% of adult males being obese (MOH, 2006). It was also highlighted that 32% of the adult population were inactive and performed less than 150 minutes of physical activity per week (Sullivan *et al.,* 2013) stressing the health problems

across the nation. The campaign itself was media led and included 2 separate adverts that showed an individual in a sedentary position with the message “Do not adjust your set, adjust your life” displayed across the screen followed by a number of New Zealanders choosing to incorporate physical activity into their lives. The overarching theme of the messages were to get adults to consider fun lifestyle related forms of physical activity that reiterated a sense of community and improvement of health (Bauman *et al.,* 2003). The campaign has been viewed as a success and has resulted in over 150,000 extra individuals meeting the 30 minutes of physical activity guideline put in place by the government (Sullivan *et al.,* 2013). Increases in intention to become more active and message recognition were published too, alongside a 3% increase in physical activity participation among the adult population between 1997 and 2001 (Bauman *et al.,* 2003). This again proves that physical activity messaging can be successful if utilized effectively.

2.5.1 The Physical Activity Messaging Framework (PAMF)

Moving on, to develop a successful and conceptual framework for physical activity messaging a rationale must be formed (Williamson *et al.,* 2021). A literature review was recently undertaken analysing 123 separate articles focusing on physical activity messaging and identified four crucial considerations when developing a conceptual framework; (i) physical activity messaging is an intricate realm of growing interest, (ii) terminologies used for, and understandings of, several PA messaging theories are erratically used, (iii) it is often unclear how physical activity messages will change perceptions on physical activity behaviour, and (iv) there is restricted use of formative evaluation and theory, such as psychological theory or social marketing principles, to suffuse message development (Williamson *et al.,* 2020). Furthermore, this same review recognised several concepts that are associated with three

overarching sections; (i) message aims(s) and pathway(s), (ii) message content, and (iii) message format and delivery. This lead researchers to revise and further develop the Physical Activity Messaging Framework (PAMF) and Physical Activity Messaging Checklist (PAMC), as seen in detail below in **Figure 1**.

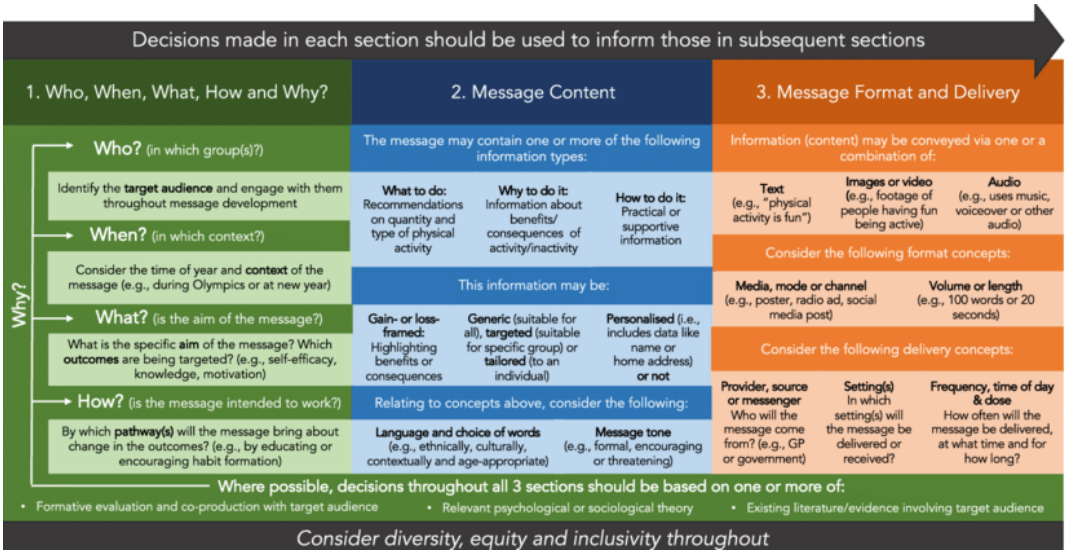


Figure 1 – The Physical Activity Messaging Framework and Checklist

The PAMF is a tool that was developed to aid organisations and individuals to effectively communicate physical activity messages to various populations. It can be utilised as a visual tool for communication, training and teaching purposes and provides a detailed overview of pivotal messaging concepts in regard to physical activity (Williamson *et al.,* 2021). The PAMC is the practical tool that then builds on these concepts proposed in the PAMF and provides detailed checklists for developing, evaluating and categorising physical activity messages. The checklist was created alongside the PAMF to help create clear, concise and effective messages that can help reach their specific target audiences (Williamson *et al.,* 2021).

The PAMF is divided into three sections; (i) who, when, what, how and why, (ii) message content and (iii) message format and delivery. The first section of who, when, what, how and

why is the initial stage of message development and contains 5 levels. Who, is where the user is encouraged to identify their target audience and to continue engaging with them throughout the process (Williamson *et al.,* 2001). It has been suggested that the identification of a specific target audience is crucial to maximising the impacts of physical activity guidelines through a planned framework (Milton *et al.,* 2020). The engagement of target audiences through evaluation and coproduction can also provide valuable insight into an individual's challenges, circumstances attitudes and preferences to physical activity. This can allow for valuable opportunities to deliver messages that are relevant and important for this specific audience, thus creating a higher chance of success (French, 2017). When, asks the user to consider the time of year and context in which the message is being delivered. The promotion of physical activity during the summer months could be perceived as advantageous by the user, due to the better weather and longer days. This can be an effective way to encourage individuals to engage in outdoor physical activity and with messages being developed considering these contextual factors, it can lead to an increase in behaviour change and message uptake (Glowacki *et al.,* 2017). What, refers to the specific aims of the message and what specific outcomes are being targeted by the user. Furthermore, this asks the use to consider what proximal, intermediate and distal outcomes that this message hopes to achieve (Williams *et al.,* 2020). Penultimately, how encourages the user to consider how these chosen messages will help achieve the expressed outcomes. The user should consider the specific approaches and processes that will be employed and could also acknowledge the existence of other theories such as social cognitive theory (SCT) to pinpoint methods in which constructed messages can change the outcome of interest (Connell *et al.,* 2019). Lastly, why stimulates the user to make decisions based on evaluation and coproduction with their specific audience, pertinent theory and current data regarding this specific audience, meaning the user has a clear justification for each decision. Drawing upon theory to create and comprehend health messaging can enhance planning and

targeting, assist define more explicit message targets and potential message pathways eventually leading to the production of more effective communications and successful physical activity uptake (French, 2017). Furthermore, why is applied across the whole of this framework, as it is relevant for all sections and justification for all areas of the framework is necessary for its successful implementation in regard to physical activity participation (Williamson *et al*., 2021).

The second section of the PAMF is concerned with the message contents and contains three levels. The first of these levels requires the user to evaluate what type of information has been input into message, with the three potential types being; (i) what to do, (ii) why to do it and (iii) how to do it (Williamson *et al., 2021*). The what to do type of information seeks to input recommendations on and type of physical activity being promoted, such as the guidelines of 150 minutes of moderate to vigorous activity per week (WHO, 2020). The why to do it will include any information on the benefits or consequences of activity and inactivity, such as potential long term effects of being inactive, being increased risks of diseases such as coronary heart disease (WHO, 2004). Finally the last information type of how to do it, contains practical and supportive information that can provide details for an individual on how, when and where they can potentially be physically active (Williamson *et al.,* 2021).

The second level of this section is concerned with the manner in which information is communicated. There are 3 key factors that relate to this section; (i) information framing, (ii) generic, targeted or tailored messages and (iii) the usage of personalisation. Information framing occurs when the user will highlight the benefits of taking part in physical activity and also the consequences of not partaking. Specifically, gain framing is when an individual is informed of the benefits of partaking such as improved mental health, whereas loss framing

occurs when the user emphasises the negative consequences of inactivity such as increased risk of heart disease (Williamson *et al.,* 2021). Current evidence suggest that gain framing is the most beneficial and commonly used within physical activity promotion (Latimer *et al*., 2010), however it has also been put forward that circumstances exist where an individual would benefit more from loss framing messages (Gilbert *et al.,* 2021).

Information within the promotion of physical activity will be considered generic or targeted, both of which occur at a group level, or tailored meaning that it occurs at an individual level (Williamson *et al.,* 2021). Generic information is deliberately suitable for all audiences, such as universal information on physical activity opportunities and benefits (Williamson *et al.,* 2020). On the other hand, targeted messages are intended for specific groups and could include information on risks of inactivity specifically for individuals with diabetes (Dacey *et al.,* 2008). Tailored messages take this one step further and incorporate user specific data making the information solely relevant to the individual, for instance how many sets an individual has left on the bench press. Lastly personalisation will include information that is not physical activity related for example, someone's credentials or residency and this is commonly utilised to support the salience of a message (Williamson *et al.,* 2020).

In the last level of section two the user is urged to contemplate the language used within the messages and whether it is age, literacy and ethnic appropriate for the intended audience (Williamson *et al.,* 2021). When messages reflect the social and cultural context of the target audience, credibility and attraction may rise (Cross *et al.,* 2017). It is therefore crucial that message content demonstrates a grasp of cultural sensitivity (Nobles *et al.,* 2020). At this level the user should also consider the tone of the message. For instance, is a formal or upbeat tone

appropriate for the intended audience and message goals? Is it possible to identify and steer clear of threatening and patronising tones? (Williamson *et al.,* 2021). Evidence available currently indicates that aggressive and threatening language is at best ineffective and at worst may have negative impacts on physical activity related outcomes such as intentions, motivation and affect (Brengman *et al.,* 2010).

The third and final section of the PAMF and PAMC concerns the format and delivery of physical activity messages. The user is first asked to consider how the messages content could be communicated, such as using specific text or words that encourage the uptake of physical activity, using videos and images of people performing physical activity to convince the target population it is enjoyable and lastly using audio such as a voiceover to make the message seem light-hearted and exciting (Williamson *et al.,* 2021). The next level to this section asks the user to contemplate the media mode or channel of the message and entails deciding where the message will be delivered, such as on an Instagram post or on a radio station advert. The volume and length of this message is additionally important to consider here, whether it be 2 minutes long or only 20 words (Williamson *et al.,* 2021). It is crucial that such decisions be supported by current literature and formative evaluation as this existing evidence suggests that different message format and delivery preferences are needed for specific target audiences (Williamson *et al.,* 2020).

The delivery concepts are discussed in the section's ultimate level. The first of these is the messenger, source, or provider, which is concerned with who will be the message's source, such as an authority figure, the government, or medical professionals (Williamson et al., 2021). Different populations have different preferences for message providers, and message provider

attributes such as appearance, gender and age may affect if the message is accepted by the intended population (Woodall *et al.,* 2015). Moreover, certain populations may value trustworthy information from experts while others may find expert advice to be overwhelming, formative evaluation and co-production with the target audience are essential (Cross *et al.,* 2017). The delivery concept of settings is also vital within the PAMF, as the message must be delivered in the appropriate environment such as the doctor's office or at work to ensure the best quality of promotion of physical activity is being delivered (Williamson *et al.,* 2021). To end the user must lastly consider the frequency, time of day and duration of the message that is being delivered. This is key as this concept can be tailored to target a specific audience by using appropriate theory, research and current evidence that will aid in justifying why specific times or lengths of these messages are selected (Williamson *et al.,* 2021). An example of this would be delivering a physical activity messages intended for the younger population at 5pm because later in the evening is considered the time when they are most likely to be scrolling through their phones.

Despite the PAMF gaining international recognition for its usefulness in physical activity messaging, it still has its limitations. Recent studies have shown that there are limitations to its practical application in addressing systematic barriers such as financial issues and communication barriers (Wang *et al.,* 2025). In addition to this, it has been accredited that within the wider public health field there are insights from individuals that would help enhance the framework and therefore further application of the model must be trialled in a range of disciplinary settings (Williamson *et al.,* 2021). Furthermore it has also been noticed that, despite the PAMF providing a great framework for creating physical activity messages, it is imperative that current physical activity levels are considered when creating the messages. The

type of message that effectively promotes PA appears to vary depending on the message receiver's current physical activity levels (Hevel *et al.,* 2019)

To conclude the PAMF and PAMC are the ideal framework to aid in creating and delivering physical activity messages that appropriately communicate the benefits of physical activity and also promote healthy behaviours. The framework is evidence based, culturally sensitive and is tailored to the needs of the specific target audiences whilst also allowing for flexibility and adaptation in relation to different settings that may arise. Research additionally shows that the PAMF is an effective tool in breaking down messages. This tailoring to preferences and taking into account an individual's preferences has shown to be successful in increasing physical activity participation (Williamson *et al.,* 2021). Therefore the PAMF and PAMC will be utilised throughout this research.

Chapter Three - Methodology

This chapter of the research is divided into 6 separate sub sections. The first section clarifies pragmatism and explains why this approach has been chosen to be applied throughout the research. The following section explores the content validity of the questionnaire and discusses why obtaining content validity is crucial to ensuring that this research accurately measured all aspects of its contrast to its intended measure. It additionally examines the data collection of questionnaires and critically evaluates the usefulness and practicality of questionnaire utilisation within this research. Section three investigates the differing data collection techniques of structured interviews and semi-structured interviews, before providing clear and justification as to why semi-structured interviews was deemed the most appropriate for this research. Section four discusses the participants of the research and why experts who participated in the content validity process and questionnaire participants, who were over the age of 18 and classed as disabled, were selected for this research. It also explains and analyses the purposive sampling techniques of criterion sampling and snowball sampling, giving reasons as to their practicality and why they have been utilised throughout the research process. The penultimate section of data analysis describes the application of content analysis and statistical analysis to the data collected throughout the research. By meticulously employing these data collection methods, practical implications can be drawn upon to aid in further research surrounding this topic. The final section of ethical procedures details how this research was completed safely. Here it is relayed that by utilising numerous forms such as the consent form, information sheet and privacy notice the ethical concerns surrounding the research were minimised.

3.1 Research Paradigm

The research was underpinned by a pragmatist approach meaning that the paradigm of this research was based on a practical approach rather than conforming to existing theories to explain the solution to the research aims (Glasgow, 2013). A pragmatic approach additionally seeks to analyse and meet the particular needs and purposes a particular piece of research rather than exploring information that is already widely available (Bradley, 2003). Furthermore, it is a theory of knowledge production that places a strong emphasis on the useful applications of research findings. Although earlier pragmatists would concur that there is only one reality rather than multiple and that the truth is revealed at the conclusion of an investigation, pragmatism has come to be more associated with practical issues like research utility and less with epistemology, ontology, truth and falsity (Giacobbi *et al.,* 2005). Pragmatism has also been labelled as a unique way to unify qualitative and quantitative approached in a mixed methods study (Ryba *et al.,* 2022). With pragmatism being an approach that evaluates theories or beliefs in terms of the success of their practical application, it was applied throughout this research. The interview and questionnaire questions were designed to follow this pragmatic approach by aiming for responses that would have real world influence on how physical activity messages would be utilised and displayed to people in online and in real world spaces.

This research was specifically concerned with identifying definitive answers from the disabled population on their preferences to physical activity messaging and delivery. This research paradigm used a mixed methods approach throughout to find the answers to the 3 overarching research questions; What physical activity information would disabled people want to see within physical activity messages? Who would disabled people want to deliver physical activity messages? Where would disabled people want to see physical activity messages

delivered? Participant responses to these questions allowed for the implementation of these preferred methods into future physical activity messaging and promotion methods for the disabled population to increase physical activity participation.

3.2 Questionnaire Data Collection

This research was a form of mixed methods research that utilised the data collection techniques of a questionnaire and semi-structured interviews. Questionnaires are defined as a tool for research consisting of several questions designed to elicit data from participants (McLeod, 2018). A questionnaire was applied within this research as it was useful in collecting substantial amounts of data from a sizeable group of participants in a short period of time (Batram, 2019). The questionnaire itself asked that participants completed the questionnaire on their own instead of an interviewer being present. This was advantageous due to the avoidance of interviewer bias, whereby an interviewer could have influenced a participant's response by voicing their own opinions (Phellas *et al.,* 2011). Questionnaires have additionally been highlighted to be more suited to issues that are clear, simple and contain a choice of replies that are fixed categories (Brace, 2018). This consequently further emphasised questionnaires as a beneficial technique to this research, as the questionnaire deployed contained questions asking the participant to rank choices already presented to them. Moreover, in previous research questionnaires had also been practical in the direct link between research questions and results (Geisinger, 2010). This was demonstrated within this research by the fact that a wide range of data was gathered as a result of the questionnaire being tailored to the overarching research objectives, all of which were essential to addressing the research questions. Lastly, questionnaires had been evidenced to also work well in collation with interviews, as this allows

for the questionnaire to be rich in detail and depth (Batram, 2019). With the research also consisting of interviews, this further validated the reasoning to incorporate both techniques.

The questionnaire was comprised of 3 differing sections concerning demographic information, message content and message format and delivery. It generated quantitative data that was used to inform the questions asked within the following interview process that created qualitative data. This mixed methods that incorporated both qualitative and quantitative data was selected as the appropriate research design, as this allowed for the development of a comprehensive understanding of the data. Furthermore, it permitted the chance to draw upon a combination of methods that generated important and justifiable conclusions (Clark, 2019).

3.3 Questionnaire Content Validity

It was important to understand that content validity is an integral part of quantitative research and can be defined as "the degree to which elements of an assessment instrument are relevant to and representative of target construct for a particular purpose" (Yusoff, 2019, p.49). In broader terms this can be simplified and defined as does the questionnaire measure what you want it to measure? (Alshenqeeti, 2014). It is important a high level of content validity was achieved within research as it indicated that the specific instrument that was being employed was relevant to the overarching questions and aims, in addition to covering all relevant topics for the target audience (Zamanzadeh *et al.,* 2014).

Content validity was attained throughout this research by following a 6 step content validation procedure constructed by Yusoff (2019). The first step of this procedure was preparing an

expert recruitment letter **(Appendix A)**. This entailed explaining to the experts why they had been selected to participate in the content validation of the questionnaire for this study and also detailed clear expectations and understandings about the task they were required to complete. The instrument utilised within the content validation procedure was also provided within this form and this was a degree of relevancy scale constructed by Yusoff (2019) seen below in **Figure 2**. This scale was deemed suitable due to its comprehensible and concise instructions, in addition to how it was condensed into a score system that was used to determine content validity index (CVI).

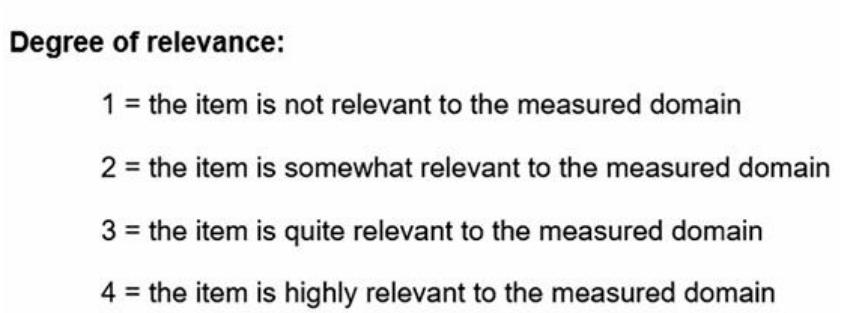


Figure 2 – Yusoff's (2019) Degree of relevancy scale

The second step involved selecting a review of panel experts. The expert participants of this research had to be classified as a specialist within the world of disabled sport and or physical activity. This meant that they currently or previously had experience in working within disability sport and physical activity organisations or performed research concerned with this specific area. Meeting this criteria was crucial to the expert's involvement of the research as their role played a significant part in the content validation of the questionnaire, to ensure that the questions were appropriate and relevant to the proposed research questions and aims. Their background within this topic area guaranteed that content validity was achieved and the questionnaire was of the highest quality when sent out to disabled participants. 5 experts were

contacted and agreed to participate in content validation of the questionnaire, which has been judged a suitable number of professionals to evaluate the content domains (Yaghmie, 2003).

The third step consisted of conducting content validation, meaning the consideration of how the content validation would be completed. It was decided that content validation would take place through a non-face-to-face approach, on account of all experts residing in distant geographically locations, making a face-to-face approach unfeasible. At this point the content validation form and questionnaire were emailed to experts, bringing about a cost efficient process. A systematic follow-up to speed up response times was also made, which was considered to make this strategy even more effective. The content validation form emailed out explained to experts that they would be utilising Yusoff's (2019) 4 point relevancy scale to achieve content validation. The experts were then tasked with marking each individual question on the questionnaire by employing the relevancy scale (Yusoff, 2019). This scale required each expert to grade each question with a score of 1 (the item is not relevant to the domain), 2 (the item is somewhat relevant to the measured domain), 3 (the item is quite relevant to the measured domain) or 4 (the item is highly relevant to the domain) based on how relevant to the domain they think that the question is.

The fourth step of the process, reviewing domain and items, required the experts giving each item a score on the relevancy scale after they had meticulously examined the domain and its items. Throughout this task, experts were exhorted to put forward written comments on adaptations to the items to improve their relevancy. These comments and potential improvements were all taken into consideration before the questionnaire was circulated to disabled participants and appropriate adjustments were made to specific questions as a result

of expert content validation. Following on from these constructive observations, the fifth step solicited experts to then provide a score for each item from the differing domains using the relevancy scale provided within the content validation form. Once this had been completed, all responses were to be submitted to the researcher to begin the calculation of the CVI.

The sixth and final step Calculating CVI, was undertaken once all responses had been submitted by all 5 experts. From this point the item-content validity index (I-CVI), scale-level content validity index based on the average method (S-CVI/Ave) and the scale-level content validity index based on the universal agreement method (S-CVI/UA) were calculated using the formulas provided by Yusoff (2019). Upon completion of these calculations, it was concluded that all index's met the satisfactory level, therefore validating the questionnaires content validity. Once the questionnaire had achieved complete content validity, it was sent out to participants of the research.

3.4 Semi – Structured Interviews Data Collection

There were two main types of interview data collection that were considered for this research; semi-structured and unstructured. Semi-structured interviews are more frequently used since the researcher guides the conversation using a pre-planned interview guide while allowing participants some latitude in voicing their thoughts through open-ended questions (Adeoye-Olatunde *et al.,* 2021). On the opposite end of the spectrum, an unstructured interview starts with open-ended, general questions to encourage conversation and give the participant a lot more say over what they say. In contrast to these methods, a focus group explicitly entails a

number of people working together to share their ideas, feelings, and experiences simultaneously (Chauhan , 2022).

This research implemented the technique of semi-structured interviews into the data collection methods. This specific method of interviewing was applied within this research as this allowed for a well-grounded and deeper understanding of meaning behind why participants ranked specific options higher than others within the questionnaire (Southerland *et al.,* 2005). Examples from this research included asking why the participants ranked gyms higher than town centres as their preferred place for physical activity information to be displayed, or why participants preferences were to hear physical activity messages promoted to them weekly rather than monthly. Semi-structured interviews were also advantageous due to this technique enabling the interview process to be compliant with a "standardised sequence of questioning" (Segal *et al.,* 2006). This meant that the questioning order and wording was identical for each participant, thus implying that response variation to the questions were attributed to the respondent rather than the interview technique (Phellas *et al.,* 2011). Additionally, semi-structured interviews were initially developed to create specific guidelines for coding participant responses (Segal *et al.,* 2006). This technique was therefore ideal for this research as alongside the data analysis component, it permitted for the generation of specific codes that aimed to provide definitive answers to the overarching research questions, through analysis of the informed responses from participants within the interview **(Appendix B**).

3.5 Participants and Sampling

To participate in this study, participants had to meet the requirements of the predetermined inclusion criteria. With the study concerning 2 differing set of participants, those being experts and disabled people, separate and specific inclusion criteria were constructed for both groups of people. However both sets of criteria shared one particular characteristic, that the participant had to have been over the age of 18 and this was due to ethical and safeguarding concerns.

Disabled participants of this research had to meet a different set of inclusion criteria to partake in the study. In addition to being over the age of 18, the criteria for disabled participants required them to be classed as disabled. The UK's Equality Act 2010 states you are disabled if you suffer from a physical or mental impairment that has a "substantial" and "long-term" negative effect on your ability to perform normal daily activities (UK Government, 2010). This medical definition focuses on the concept of disability as a physical impairment and does not fairly represent the true meaning of disability. However, the social definition of disability moves away from the idea of disability as a physical impairment and defines disability as a social construction that includes barriers and attitudes that exclude and oppress disabled people within society from attaining their valued functions (Townsend *et al.,* 2016). This definition is seen as a far more accurate and wholistic representation of disability. In line with the social relational model of disability, participants were required to identify as disabled.

Within this research a purposive sampling strategy was applied to identify and select both expert and disabled participant for the study. Purposive sampling is defined as the selection of

participants based on qualities or characteristics, they share to gain a substantial comprehension of knowledge in addition to information rich cases in a particular field of study or interest (Etikan *et al.,* 2016). Furthermore purposive sampling is used by researchers in order to "select respondents that are most likely to yield appropriate and useful information" (Kelly *et al*., 2010).

This research employed 2 different variations of purposive sampling to ensure that the participant matched the specific criteria required to partake in the research, with the first of these being criterion based sampling. Criterion based sampling involves a researcher predetermining a set of requirements or criteria that an individual must possess in order to partake in a study (Campbell *et al.,* 2020). Participants were selected as a result of them possessing a particular characteristic, attribute, feature or specific experience that assists in satisfying the research questions of the research (Rai and Thapa, 2015). Criterion sampling was deemed as an appropriate sampling strategy for this study as the research was concerned with eliciting distinct criterion: Content validity from the expert participants over the age of 18 and lived experiences of physical activity messaging from disabled participants.

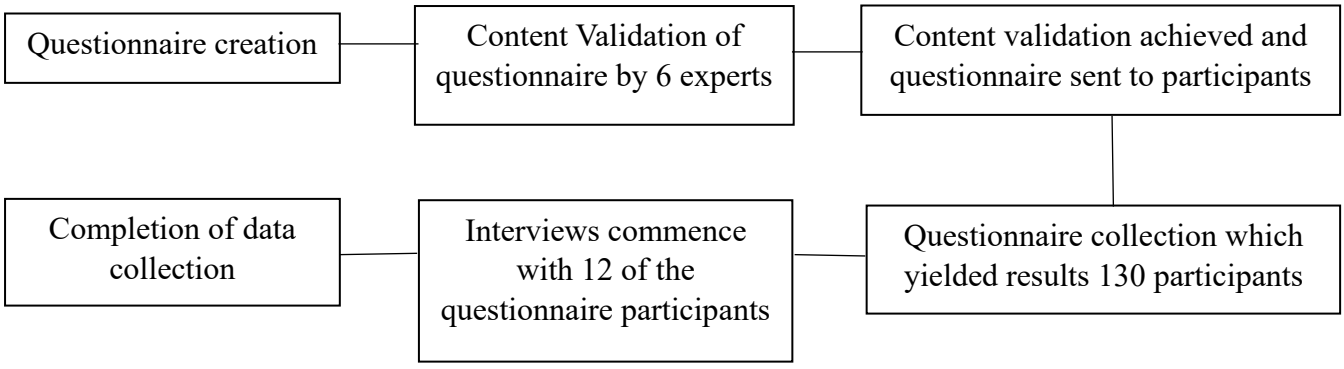
The other purposive sampling technique employed within this research was snowball sampling and this is where participants may be asked to suggest other possible participants who fit the research's inclusion criteria (Parker *et al*., 2019). Snowball sampling has been recognised as a feasible method of recruiting participants that are not easily accessible and involves no direct recruitment on the researcher's behalf, instead relying solely on already recruited participants connecting them with potential participants (Leighton *et al.,* 2021). This sampling technique

was deployed within this research because of the inclusion criteria of having a disability in addition to being over the age of 18.

The experts were the first participants invited to take part in the study and they were contacted via an email that included a expert information sheet **(Appendix C)** that outlined the principal points of the research and why they had been chosen to take part. The email also included a privacy notice **(Appendix D)** for the expert to peruse before signing the consent form **(Appendix E)** and emailing it back to the researcher, agreeing to be a part of the research study. After the experts evaluated the content validity of the questionnaire and adjustments to the questionnaire were completed to match the feedback given by the experts, the disabled participants were invited to participate. Disabled participants were contacted after this expert recruitment process had been completed and were approached through existing contacts within the disabled community and local and national organisations such as Disability Rights UK and Wheelpower. Like the expert participants they were asked to read the participant information sheet **(Appendix F)**, privacy notice and were asked to sign the consent form, once they had read and understood all the details of the research.

Within this research there was a large sample size. The questionnaire that was sent to participants collected 130 different responses. However, the interview sample was smaller with 12 participants taking part within this stage of the data collection process. Participants were asked a question regarding an interview included within the questionnaire that all participants had the choice of accepting or declining. Each participant was asked whether they would like to participate in an interview to go over their response in more depth. This question received 12 positive responses and all 12 participants who consented were contacted to take part in the

interview process. The flow chart below depicts the stages of each process and the number of participants participating.



3.6 Data Analysis

The questionnaire **(Appendix G)** employed within this research was comprised of a few questions that required written answers; however most questions were multiple choice that asked the participant to rank answers already given to them. Descriptive statistics were used to analyse the questionnaire data, as the questionnaire resulted in a large number of scores that needed to be refined to provide a comprehensible understanding of the results (Holcomb, 2016). This was achieved through a simplified scoring system. For example, if a question asked a participant to rank 5 answers from most preferred to least preferred then the most preferred ranked option would receive a score of 5, the second most preferred option would score 4, the third most preferred option would score 3, the fourth most preferred option would score 2 and the least preferred would score 1. Each rated response from every question on a participant's questionnaire that used a ranking system was collated together with responses from other respondents to the same question to provide an overall score for each choice. This aided in

determining the most and least popular answers for each question, which then enabled all possible answers from each question to obtain an overall score. These scores were then taken into account and applied within the construction of the questions asked within interviews, to generate qualitative data about why the participants selected specific options as their most and least favoured.

The qualitative data collected through the semi-structured interview process were analysed using qualitative content analysis. Qualitative content analysis is defined as a technique for data analysis that seeks to find recurring themes or patterns in qualitative data sets and also permits the quantification of this particular data type (Linger *et al.,* 2020). Moreover, it concentrates on the content and underlying themes and meanings in the text. This approach to content analysis looks for and investigates patterns of sense making and meaning creation in the communicative qualities of language used (Presier *et al.,* 2021). Qualitative content analysis is a theoretically expandable method for analysing and constructing patterns and themes in a given data set (Presier *et al.,* 2021). This data analysis method was deemed suitable for this study since it matched the pragmatic paradigm used in the research and the study's objectives.

To guarantee that a thorough analysis had been accomplished, this research followed the phases of qualitative content analysis in an iterative fashion. The first of these stages occurred once the interview process concluded and encompassed data familiarisation and the writing up of familiarisation notes. Within this phase, all semi-structured interview notes were rigorously read multiple times and rudimentary notes were taken throughout this activity, in relation to the qualitative data produced (Vears *et al.,* 2022). These notes were then useful in facilitating the systematic data coding that is recognised in phase two and three.

Phase two concerned defining units and categories of analysis, by incorporating a top down approach to analyse the qualitative data produced via the interviews. Here the units of analysis such as phrases, words and themes were determined to be coded. Following this a coding scheme was developed, by developing a set of rules and guidelines for categorising the data and this included key themes and patterns. Once this had been completed a system of categories was created to arrange and categorise the content according to the coding scheme and research questions.

The next step in phase three entailed coding the content and this was achieved by applying the coding scheme constructed in phase two. Here, codes were systematically assigned to the data based on the previously established categories. This collection of codes was a vital component of qualitative content analysis as this will allow for themes to occur that can be used to analyse and interpret the data (Van Zyl et al., 2021).

The next phase involved analysing and interpreting the results. The data was evaluated and systematically organised into possible themes by deploying a deductive approach guided by the physical activity messaging framework and the research objectives, in order to identify themes and compile any necessary information for each one (Marying, 2021). These themes were descriptive and additionally captured the essence of the data set. This findings within the data were then interpreted in context of the research questions and compared to findings within literature.

The penultimate phase of content analysis involved crosschecking the themes. They were reviewed to analyse their accuracy and consistency. Sections of the data were compared to one another to ensure that the identified themes align with the overall narrative (Presier *et al.,* 2021).

Following this, the themes of message content, message format and message delivery needed to be confirmed as valid and that they represented the underlying patterns within the data. This ensured that quality content analysis had been achieved. These chosen themes were adjudged to be apt for this research as they accurately extracted and analysed data relevant to the research's aims and overarching questions, all the while producing information that was scrutinised within the research's discussion section

Following the completion of theme confirmation, the final phase of writing the report commenced. Participant quotes, passages from interview extracts and analytical narrative were all exploited to give a clear and accurate analysis of the stories that the data communicated across all 3 themes. To ensure that the quality of this qualitative content analysis, this research drew upon the previous studies that had explored the use of qualitative content analysis in mixed methods research (Presier *et al.,* 2021).

3.7 Ethical Procedures

To ensure this research was completed safely there were certain ethical concerns within it that needed to be taken into account. To begin, the expert participants were contacted via a recruitment email that explained the purpose of the study, the aims of the research, how the research would be conducted, why they had been chosen and finally was required of them should they choose to participate. Within this email the participant information sheet, privacy notice and consent form were also attached to ensure that the potential participants were fully aware of everything the research entailed before deciding whether to partake.

Participants from the disabled population were contacted through differing methods of recruitment including through generic contacts already established within the disabled community and local and national organisations such as Disability Rights UK and Wheelpower. In addition to this, the questionnaire was posted on social media apps such as twitter to reach participants that match the inclusion criteria to participate in the study, who otherwise would not have been reached through the other recruitment processes. This questionnaire was created on Microsoft Forms and access was only granted to complete to participants once the information sheet and privacy notice had been read, alongside the signing of the consent form, all attached to the start of this same Microsoft Forms document.

The participant information sheet sent to the experts and the participants from the disabled community included further details on the items listed above but additionally included information explaining the benefits and risks of taking part. Furthermore, the disabled participants information sheets included specific signposting of contact details for the UK Governments disability service. This was information was also included in the consent form to ensure that if the participants feel uncomfortable about any sensitive topics about disability or mental health that arose, they were free to stop the questionnaire or interview process at any point and contact this service, who will provide them with the necessary help and information they were looking for. Participant confidentiality was also assured on this form, which detailed what would happen with the results of their collected data. It detailed that within this research the data collected from the participants will be used to answer the research questions of ; What physical activity information would disabled people want to see within physical activity messages? Who would disabled people want to deliver physical activity messages? Where would disabled people want to see physical activity messages delivered? These definitive

answers will then be used to inform future physical activity promotion campaigns to increase physical activity participation rates for the disabled community.

The privacy notice provided to both sets of participants explained that all data collected from them would be secure on a OneDrive storage that was only accessible by the lead researcher and the research supervisor. It additionally stated that personal data was processed and participant confidentiality was assured by placing all data into this OneDrive storage and that it would be anonymised when being utilised within the findings and discussion section of the research study. Participants were informed that all data would be anonymised within 2 weeks of collection and that once this had occurred data withdrawal would not be possible, as each participants data was no longer distinct. Furthermore participant data was to be fully destroyed after the research had been completed, meaning that their participation in the research could not be linked back to them. This therefore mean that the privacy notice was significantly crucial in guaranteeing participant confidentiality.

Once the information sheet and privacy notice were read and understood by all participants, they were asked to read and sign the participant consent form. Gaining participant consent is required for all research involving human participants and this is to "respect and promote participants' autonomy and to protect them from ignorance about potential harm" (Antoniou *et al.,* 2011). The consent form in this research reiterated that they must be over 18 years old to partake in the study and that they were free to withdraw at any time within the 2 week period leading up to the data's anonymisation. Lastly, the consent form included signposting of the UK Governments disability services that could be contacted at any point throughout the

questionnaire and interview process, if complications arose for the participant surrounding sensitive topics causing the participant to feel uncomfortable.

Chapter Four - Results and Discussion

4.1 Questionnaire

The distribution of the questionnaire lead to 130 completed responses from disabled people, with 12 of these additionally partaking in interviews to further expand and give justification behind the most and least popular answers to each question within the questionnaire.

The responses to the questionnaire were collected from a broad range of participants, with 66 of the participants identifying as male and 64 identifying as female. Alongside this, the age range of participants also provided a diverse set of responses to the questions with the oldest participant 51 and the youngest being 19 and the average age of the participants being 30. Moreover, the data and responses collected resulted in 21 different impairments being identified and were provided by people with impairments that varied from Achondroplasia to Lalopathy to Schizophrenia, further reinforcing that the answers given were distinctive to each participants own lived experiences.

The first question of the questionnaire asked participants whether they would like to gain a deeper understanding on how to get and stay physically active. Out of the 130 responses, 87 (67%) answered that they would, 30 (23%) remained neutral and only 13 (10%) claimed that they did not. Leading on from this, the second question inquired about what knowledge they would to gain the most about getting and staying physically active. The question required participants to rank all ten given options from most useful to least useful. All individual options were then given a points total based on how many times they were picked in each position, tallying a total score with the overall ranking of each option seen in **Figure 3** below.

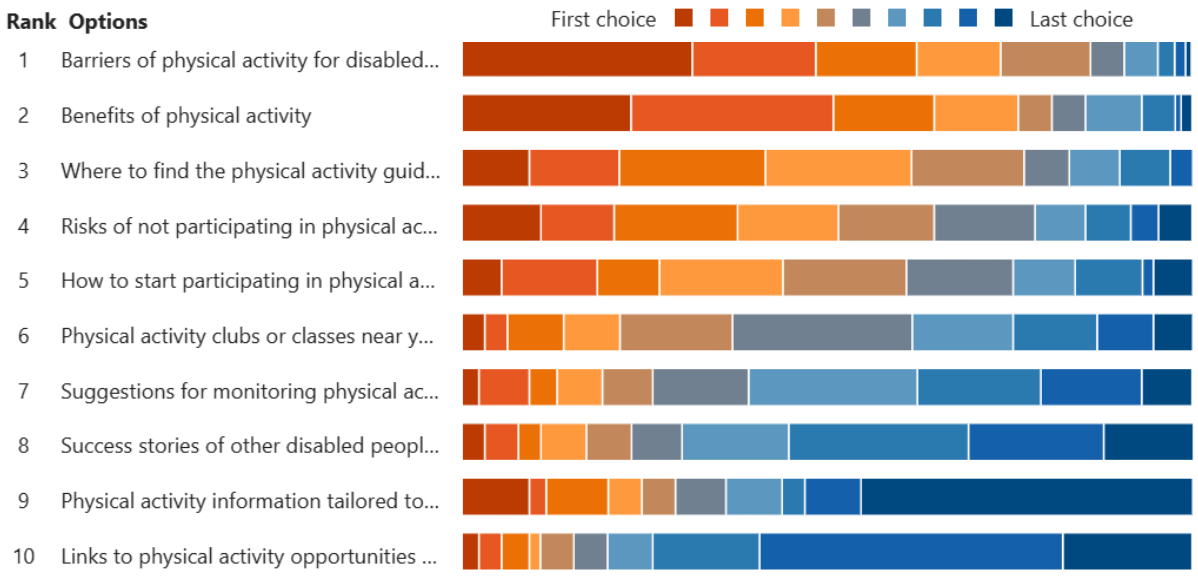


Figure 3 - What knowledge about getting and staying physically active would you like to gain most?

As seen in **Figure 3**, barriers to physical activity for disabled people and how to overcome them ranked as the most popular answer. It received the largest number of first place or most useful votes with 41 (32%) of the participants ranking it as their preference for knowledge they would like to gain the most. Links to physical activity in the community received the lowest amount of most useful votes with 3 (2%). However, physical activity information tailored to disabled people was actually the option that scored the largest number of tenth place votes for the type of knowledge that participants would like to gain the most. 59 participants (45%) placed this knowledge content last place, but as a result of 12 participants (9%) ranking it as their first choice option, compared to links to physical activity in the communities 3 (2%) first placed votes, it scored a higher overall points tally when utilising the points scoring system.

The next two questions were concerned with participants preferences on the best ways to gain information through physical and online resources. Similar to the previous question they, both

asked participants to rank given options from most to least useful and points were then awarded using the same scoring system as before.

Figure 4 below displays the overall scores for question three, which asked participants to rank the best ways to gain information from physical resources from most to least useful. Newspapers ultimately ranked first beating second place magazines. This is despite the fact magazines was ranked first choice by 36 participants (28%), in comparison to newspapers that was only ranked first choice by 30 participants (23%). The reasoning behind newspapers totalling a higher score than magazines lies in the second and fifth place rankings, which saw newspapers receive 38 (29%) second place rankings and 14 (11%) fifth place rankings. On the other hand, magazines received only 25 (19%) second place rankings and 19 (15%) fifth place rankings creating a marginal differential smaller accumulation of total points in comparison to newspapers in the same categories.

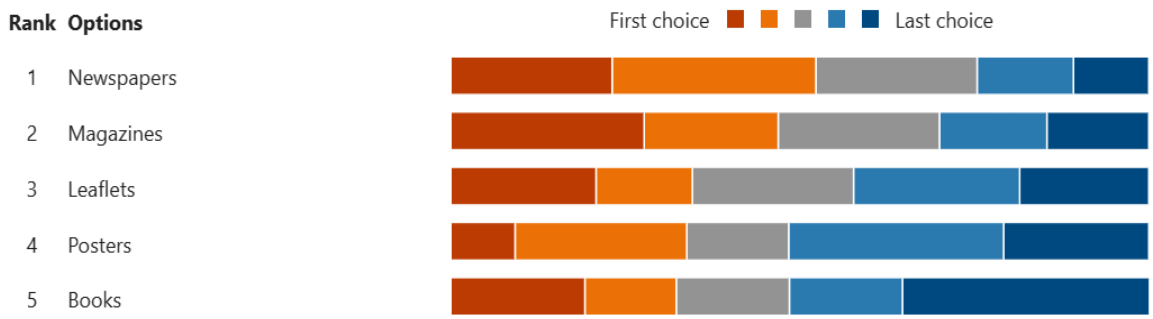


Figure 4 - What would you consider the best way to gain information from physical resources be?

It is also evidenced in **Figure 4** that books placed last in the rankings with 19 more least useful ranks than posters, that itself obtained the least number of rank one votes with 12 (9%), compared to books which received 25 (19%) of first place rankings. The last place ranking of

books over posters can be put down to the fifth place ranking scores, with participants (35%) ranking it as their least useful option. When this score is reflected with posters fifth place ranking, it is clear to see why books totalled the lowest score, with 27 (21%) of participants ranking it as their least useful, a significantly lower number.

Participants were next asked to rank nine options from most to least useful in relation to their preferred ways to gain information from online sources and the results can be seen in **Figure 5** below. Social media ranked first and was additionally ranked most useful by 48 participants (37%), more than any other option. Furthermore, social media alongside podcasts also received the joint fewest amount of ninth place rankings, with both only having 1 participant (1%) rank them as the least useful option.

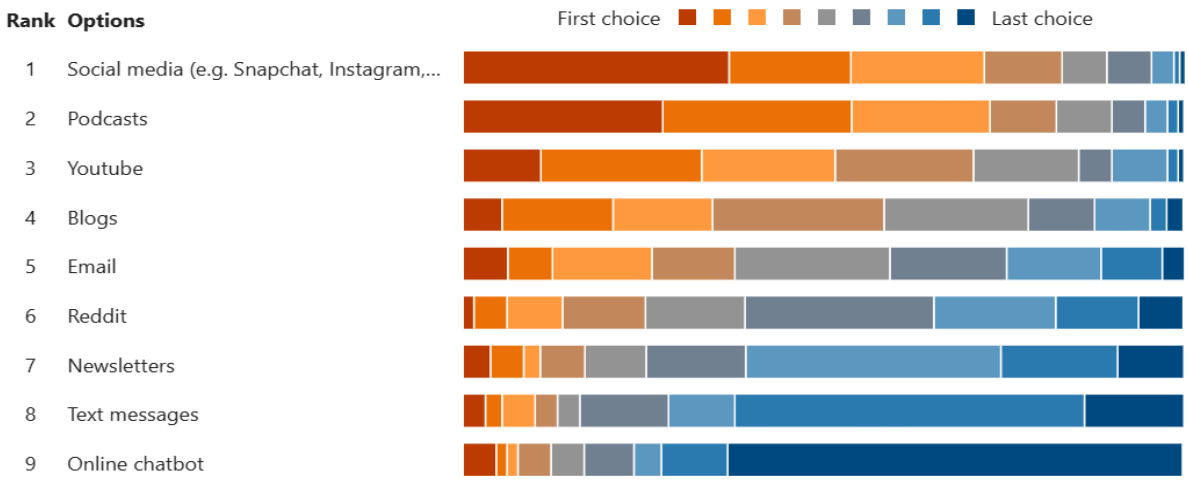


Figure 5 - What would you consider the best way to gain information from online resources be?

Online chatbot was deemed to be the least useful option by participants despite receiving more first place votes than text messages, newsletters and reddit. The large disparity between ninth overall ranked online chatbot and eighth overall ranked text messages can be associated with the amount of numbers each collected from total votes of least useful options. Online chatbot received a staggering 82 (63%) last place votes for usefulness, in contrast with text messages that only collated 18 (14%) of votes in the same position of ranking.

The fifth question of the questionnaire was more straightforward than the previous four and prompted participants to consider whether the best way for them to gain information was through physical or online resources. **Figure 6**, expressed as a pie chart presents that out of the 130 participants, 81 participants (62%) preference was information from physical resources, meaning that 49 participants (38%) preference was online resources.

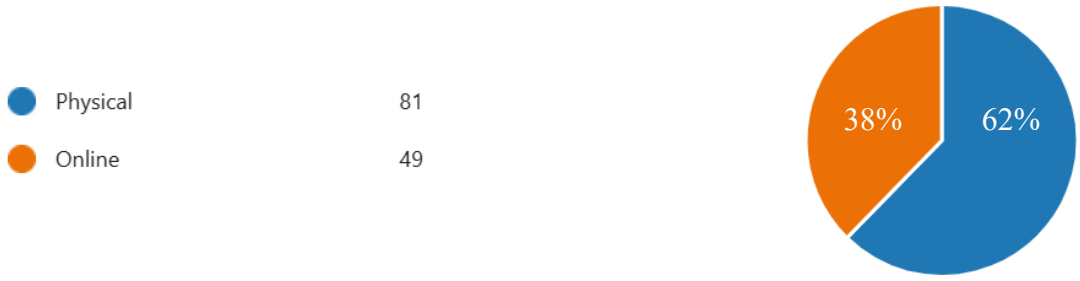


Figure 6 - What way would you consider to be the best to gain physical activity information?

Question six can be linked to question three and delved into further detail surrounding physical resources, asking participants to rank the best places to gain physical resource information. **Figure 7** exhibits that gyms/ leisure centres came out on top of the overall ranking. A significant factor in the notable differential, is that gyms/ leisure centres received 45 (35%) votes for most useful and 42 (32%) votes for second most useful. When compared with second overall ranked

workplaces, that received 21 (16%) most useful votes and 22 (17%) second most useful votes, there is a clear and obvious overall preference for physical resources to de displayed in gyms/ leisure centres over workplaces.

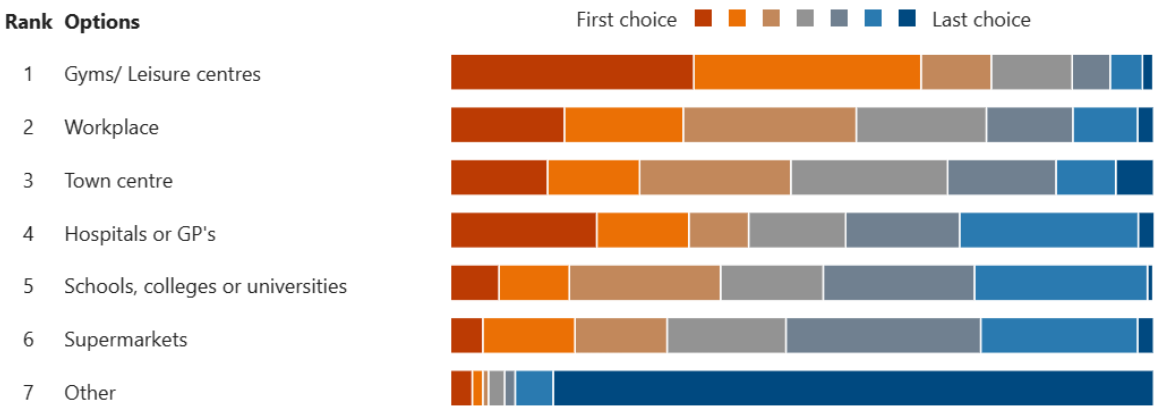


Figure 7 - Where would you consider the best places to gain physical activity information to be?

When looking at **Figure 7** it is also clear to see that the "other" option is by far the least popular option within the ranking data for this question and was voted as the least useful by 111/130 participants of the study. The sixth ranked option of supermarkets had a substantial gap between itself and last ranked "other" and this can be attributed to the "other" option correlating directly with the next question of the questionnaire and being included in the questionnaire to evaluate whether key options were missed in the creation of the questions options.

Following on from this, question seven was the first question where participants were not given options or answers to select from but were instead asked if they had any other suggestions as to other environments/ places that they would like to see physical activity information. This

question was optional, due to the assumption that some participants may have felt that the options listed in the question before covered all areas that met their satisfaction. Despite this, 4 different locations were identified by the participants as being key areas that they would like to see this physical activity information displayed. Recreational areas and community centres were both identified by 1 individual each, sports stadiums were highlighted by 3 participants and finally parks were proposed by 12 participants.

The results of the penultimate ranking question of the questionnaire can be seen below in **Figure 8.** This question tasked participants with ranking ten options from preferred to least preferred, in response to the question "Who do you think would be best to speak to disabled people about getting more physically active?" Occupational therapists were regarded as the participant's most useful option recording 10 more first place votes than general practitioners who finished as the second most preferred option. Moreover, occupational therapists obtained the most points for first and second-place ranks, receiving 36 (28%) and 38 (29%) for each option respectively. This option additionally collected only 1 (1%) tenth place ranking, the joint lowest with general practitioners, further solidifying its place as the number one preferred option for this question.

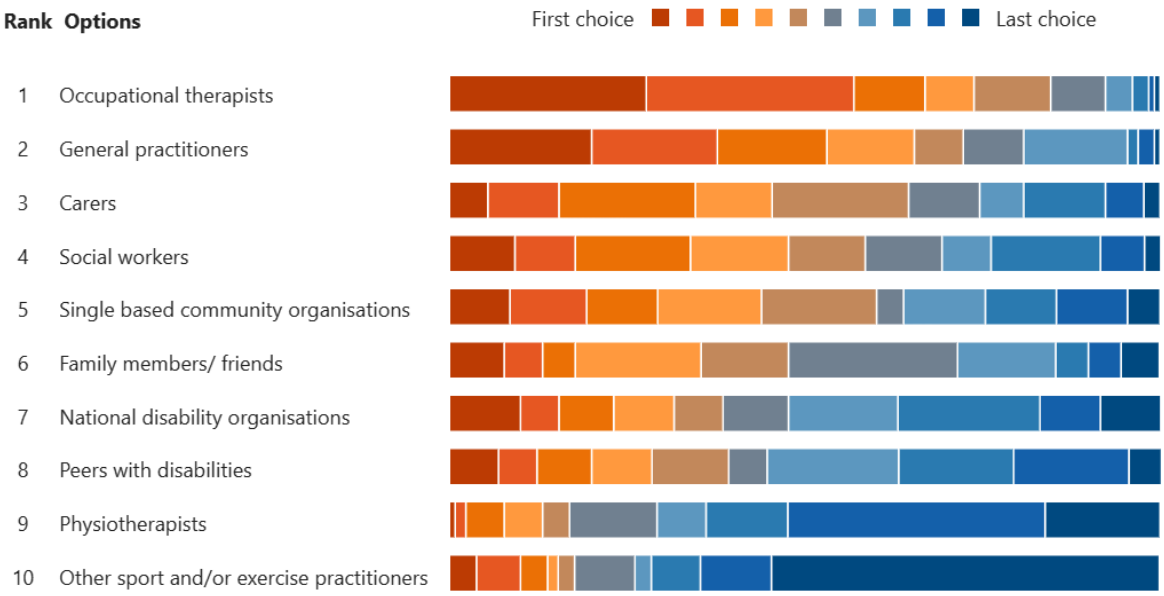


Figure 8 - Who do you think would be best to speak to disabled people about getting more physically active?

Other sport and/ or exercise practitioners ranked as the least useful option by participants. **Figure 8** shows evidence that other sport and/ or exercise practitioners ranked the least preferred option due to it being ranked tenth place by 71 (55%) of the participants, 50 more times than ninth ranked physiotherapists, who acquired 21 (16%) tenth placed ranks. However, like question six, the other sport and/ or exercise practitioners' option was directly linked with the next question in the questionnaire and was added as an option to assess whether there were any additional alternatives that participants would prefer to speak to about getting involved in physical activity.

Question ten similar to seven, was an optional question that inquired whether participants could identify any individuals that they would prefer to speak to about getting involved in physical activity. For the same reason as the question seven, this question was also optional because it is possible that some participants were satisfied with the options already provided. This

question did not receive a large number of responses, nevertheless three suggestions were made for alternative people participants would like to speak to. The first suggestion of fitness instructors was put forward by two participants and the other two suggestions of sports coaches and personal trainers were both proposed by three participants.

Figure 9 below depicts the ranking of 5 options provided to the participants regarding their preferences to how often they would like to see or hear physical activity messages. The ranking of the results showed that participants prefer a higher frequency of messages, with daily proving to be the most useful preference for participants amassing 37 (28%) of the first place rankings for most useful frequency.

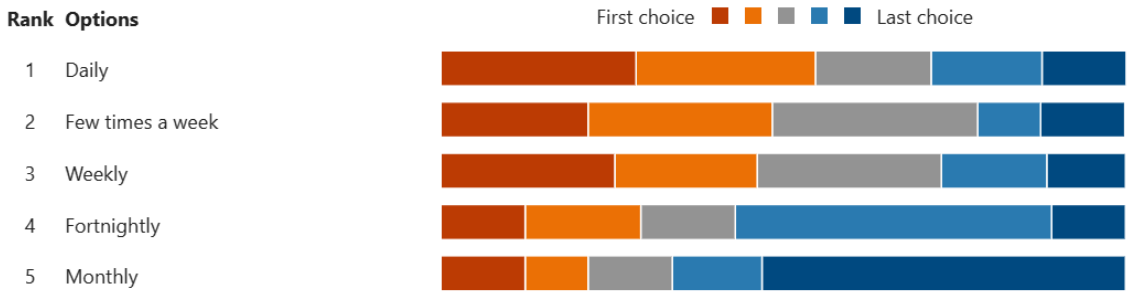


Figure 9 - How often would you like to hear or see messages promoting physical activity?

The monthly option scored a relatively low amount of total points, with the fourth ranked option of fortnightly finishing fourth in the ranking. This differential can be accredited to monthly being ranked as the least useful option by 69 (53%) participants, whereas daily and a few times a week were the joint second most ranked least useful options, both receiving 16 (12%) ranks in the same position.

Lastly, the final question on the questionnaire was another ranking question where participants were urged to rank each option from most useful to least useful. The data in **Figure 10** below provides the ranking results for the question "How long would you like physical activity messages to be?" Participants ranked 10-30 minutes as the most useful with this option marginally ranking higher than 5-10 minutes. This differential can be largely attributed to 10–30 minutes recording the highest number of most useful votes with 33 (25)%, with 2-5 minutes only recording 17 (13%).

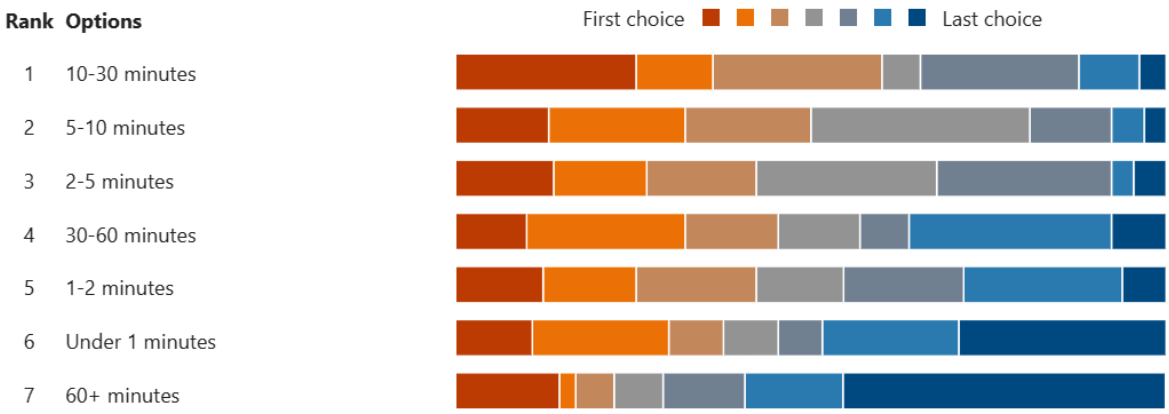


Figure 10- How long would you like physical activity messages to be?

60+ minutes rankled last in the voting, despite the fact that 19 (15%) participants ranked this option as the most useful. This made it the second highest ranked option when it came to most useful, falling short of 10-30 minutes by 14 participant votes. Just looking at this statistic would indicate that this option was a popular choice for participants, yet overall it still ranked last place as a result of 59 (45%) participants ranking it as their least useful option out of the seven.

4.2 Qualitative Interviews

12 post-questionnaire interviews were conducted upon completion of the questionnaire process and the participant demographic information can be seen below in **Figure 11**. Each participants was given a pseudonym to ensure participant confidentiality.

Pseudonym	**Age**	**Gender**	**Type of Impairment**
Adam	28	Male	Arm Dystonia
Bella	33	Female	Musculoskeletal Disorder
Charles	50	Male	Arthritis
Daisy	38	Female	Hearing Loss
Ethan	22	Male	Compartment Syndrome
Fiona	38	Female	Muscular Dystrophy
Gary	45	Male	Diabetes
Harry	24	Male	Hearing impairment
India	26	Female	Visual Impairment
Jack	31	Male	Motor Impairment
Katherine	55	Female	Arthiritis
Luke	24	Male	Diabetes

Figure 11- Demographic information table of interview participants

Questions posed to the participants were constructed utilising the data obtained through statistical analysis of the questionnaire's responses. In conjunction with a deductive approach of the Physical Activity Messaging Framework (PAMF), this process resulted in the three core themes of "message content", "message format" and "message delivery" being deductively constructed based upon the PAMF. Together these key themes accurately encapsulate participants preferences regarding physical activity messaging. The first theme "message content" accentuates the significance of the information that messages contain and why the inclusion of specific and preferred content is deemed more suitable for physical activity messages than other unconventional content. The second theme "message format" explores why intended message recipients place value in information conveyed in a distinct way and how particular message format concepts can be seen as more appealing than others. The third and final theme "message delivery" highlights the importance of key messengers, settings and frequency in relation to the deliverance of physical activity messages and how the effectiveness of a message can increase, as a result of participant preferences being taken into consideration.

4.2.1 Message Content

Within the interviews, all participants aknowledged the importance of useful information displayed within physical activity messages. The majority of participants displayed a strong interest in gaining further knowledge in regard to physical activity, as it was emphasised that an increased uptake of physical activity information would aid in the easier completion of daily tasks as well as an overall improvement in quality of life. One participant further explained that physical activity not only has an effect on her physical wellbeing, but also has a knock on effect on her mental and social wellbeing. This extensive knowledge of physical, mental and social health and the understanding that they are all intertwined led her to believe that physical activity

messages are crucial in the maintenance of overall health. Participants also discussed how physical activity knowledge is specifically vital for disabled people, with Ethan relaying:

> When I first had my injury, which then led on to complications making me disabled, I didn't have any understanding on how to deal and stay physically active with that. I was very active before, but when the injury occurred, I didn't have the information on how I can stay physically active with my impairment.

Ethan's experience perfectly depicts how a lack of physical activity information prevents people being physically active. This again was reiterated by all participants with the majority expressing that there is always room for physical activity knowledge improvement. Participants also expanded on why a small cohort of participants did not want to gain a deeper understanding on how to get and remain physically active. Although they did not agree, they recognised that some participants may have already acquired all of the knowledge they deemed necessary for physical activity performance and therefore do not need additional information to maintain or improve their already active lifestyle. Another reason for this could be that they are not interested in physical activity, with previous research indicating that a small population of disabled people are not interested in starting exercise or physical activity programmes (Rimmer *et al.,* 2004).

When dicussing the information participants would prefer to be displayed within physical activity messages, value was placed upon specific information that contributed towards an increase of their own knowledge in regards to getting and staying physically active. Gary claimed that "I have basic knowledge for physical activity and I know where to find this online

but I struggle to find information that is directly related to me and my disability and that is one of my biggest struggles in taking part." Participants were in agreement with this statement, that whilst there is an abundace of general physical activity knowledge that is easily accessible through a range of sources, there is a limited amount of useful information regarding physical activity for disabled people specifically. Information such as suggestions for monitoring physical activity adherence and links to physical activity oppurtunities were just two of the mentioned information types labelled as "general" by almost all participants. Instead participants favoured information such as barriers to physical activity for disabled people and how to overcome them, as a result of their own lived personal experiences. These personal experiences of barriers played a key role in participants decisions to favour this information as Daisy describes:

> There are different types of barriers. So external barriers, I think those are barriers that may be equipment needed for a specific activity, or a specific space needed to perform that activity and then internal would be something that I have struggled with in the past. Looking back at my motivations I have not been very motivated in the past, and seeing messages that give me motivation or help me to overcome my thoughts in my head would definitely be very useful for me going forwards in performing more physical activity or trying new a new range of physical activity.

The preference of messages containing information regarding barriers and how to overcome them was not only reported by Daisy but echoed by all other participants. New information such as this was regarded as the top priority of all participants to physical activity messages, as this in turn would encourage more individuals to read the message carefully and increase the

levels of physical activity within their lifestyle. Information about barriers and how to overcome them was said to create more opportunities to get involved with a wider range of activities. This was reinforced particularly by Luke who explained "It would be great if there was a page of information that discussed the barriers to certain disabilities getting involved. Everyone is different and having this information available in one place no matter the disability would be a very positive thing." This statement was widely agreed upon creating a sense that understanding barriers and discovering ways to overcome them would inspire participants to branch out and explore new opportunities within physical activity and this would occur as a direct result of gaining this new information that was previously unknown to them. One such study reported that personal, social and environmental barriers were the three core reasons that prevented individuals with physical disabilities performing physical activity (Sharon-David *et al.,* 2020). Furthermore, another study that consisted of investigating the four differing demographics of young adults, adults, older adults and Somali women found that all four distinct groups of participants within the research stressed that displaying barriers to physical activity within messages was helpful (Nobles *et al.,* 2020).

4.2.2 Message Format

The preferences concerning the message format of physical resources containing physical activity information sparked debates within interview discussions. Whilst newspapers ranked most useful within the questionnaire section of the data collection process, only one of the interviewees selected this as their first choice. Despite this, the other interviewees who did not select newspapers as their first selection still provided reasoning as to why newspapers would appear to be the most useful selection for the majority of the questionnaire participants. For example, although posters and leaflets were deemed by most interview participants as their top

choice, they did concede that newspapers had the capacity to provide new information daily. Participants suggested that a large reason for this was because newspapers containing different information was provided by differing publishers daily, whereas leaflets and posters were often not created daily and the same leaflet or poster would be circulated for a long period of time before a new one containing new information was created and distributed. This was seen as a weak point of posters and leaflets, as participants admitted that this repetitiveness of reading the same information would become boring and would not encourage them to perform physical activity.

Charles, who was the only interviewee to place newspapers as his most useful provided further reasoning as to why newspapers would be the most useful option, drawing upon his everyday use of newspapers and the global reach that newspapers have:

> In the grand scheme of things, when we're talking about other people as well, newspapers are bought worldwide, in every single country, by hundreds of people on the daily to get news. So I think messages within there, people will see them, especially if you put them near the big articles or the deemed most interesting, people are very likely to take them on board, especially if it is something that is aimed at them. So I think newspapers, out of those, for me, is definitely the best option.

These comments from Charles show that he is a clear advocate for physical activity messages delivered in newspapers despite that fact that the other participants were not in total agreement. His lengthy experience of reading newspapers over the years puts him a great position to come to this conclusion and suggests that he likes to stick to his routine and would benefit most from

information and messages delivered to him in a way that is comfortable and familiar to him. Although newspapers ranked as the most useful choice, it is also important to state that the majority of participants who placed newspapers as their most useful option were much older than those who selected posters and leaflets. With most of the participants in this research being over the age of 30 years old, this would rationalize why newspapers were voted the most useful option. Previous studies have shown that newspapers are a useful media outlet for physical activity messages. Health experts have previously used media outlets such as newspapers to educate the public and encourage beneficial behavioural changes in lifestyle. They believe that the best use of the media for health advocacy is to utilise articles as a kind of intervention tool, with the ultimate goal being the promotion of healthy behaviours (Heaner, 2009). For instance, a news article that tells the tale of a person's battle to lose weight and the steps they take to keep it off offers a chance for observational learning that could have an impact on the reader's behaviour (Contento, 2007).

The preferences for the message format of online resources containing physical activity information resulted in more straightforward discussions. All participants voiced that social media was the most useful option, mainly because of the sheer amount of users social media platforms have and how often every user spends scrolling through feeds every single day. Every single one of the participants disclosed that they had access to social media accounts that were used daily and were all in agreement that the other listed options were either outdated or not of any use to them such as blogs and Reddit. Moreover, most participants were less interested in receiving physical activity messages via email or text, with Bella remarking:

> You have other options like emails, for example, a lot of people just use that for work, or you get a little spam email. So people just sort of tend to slide across and not really

> think about them or not read them. Text messages, I get a load of spam text messages or messages from my mobile provider and I just glance over them. I don't really take in a lot of it.

This statement from Bella clearly evidences that text messages and emails are not an appropriate and preferred method of physical activity information communication. This was reinforced by other participants who viewed these options as nagging rather than something they would like to do themselves. This would then in turn have the opposite effect on the participants who would then be more likely to participate in less physical activity. Despite all participants ruling heavily against the use of text messages for physical activity messaging, it has been shown that physical activity messages provided through text messages have enhanced physical activity outcomes. Nevertheless to evaluate the effect of various intervention components on long-term involvement and efficacy, longer studies are required (Laranjo *et al.*, 2021). A separate study that assessed the effect of electronic messaging on physical activity engagement within older adults found that the weekly minutes of physical activity increased significantly with the increased frequency of electronic messages (Gell and Wadsworth, 2015).

Participants suggested that a great way to display physical activity messages would be on sporting social media apps. Strava was frequently used by Katherine to connect with friends and family to get an insight into how much physical activity each person has completed. She stated “I can’t move as well with my arthritis and I only perform small amounts of exercise. But Strava is a great way for me to see what other people are up to and it also makes me want to try exercise more when I see my friends doing it too.” Expanding on this point, she thought that having physical activity messages on this app would only bring about positive outcomes,

as it would encourage more people to increase their physical activity levels whilst also having fun, just like she had done. Another participant made a similar suggestion, pointing out that since most people follow sports and fitness accounts on social media, using these pages to spread messages about physical activity would be effective. He demonstrated how the impact could be enormous if the most well-known sports and fitness pages, with millions of followers, shared these messages on physical activity. Multiple studies have been conducted to assess the usefulness of Strava in relation to physical activity engagement levels. One such study by Ploumen (2019) claimed that despite their being no significant differences in general physical activity levels between app users and non app users, app users scored higher on minutes in sport per week and activities at work. With Strava being a social media app where individuals can share their physical activity data, it was also found that an individual being conscious of their peers' levels of physical activity involvement could help them establish their own attitudes about physical activity and as a result, raise their own levels (Zhang *et al.,* 2015).

Moving onto the format of the length of physical activity messages, participants were harmonious in their response with 10-30 minutes being the most useful and ideal length of time for these messages to last. Messages this length were viewed by all participants to present valuable information in great detail, whilst also being short enough that people will take the time out of their day to comprehend and absorb all of the message elements. Adam detailed below that within 10-30 minute messages there would additionally be no limitations on the number of differing pieces of information that could be displayed within one message:

> I think within that time limit you can get a lot of information to people. It's more than just a sentence, which you can just brush off. If it was a very short message that was

> just like, get active or something, it wouldn't sit with you and you wouldn't think about it. Whereas message this option, can be very informative, and you can take home a lot of different messages from that and you're not limited to one physical activity message. It can be speaking about a whole point and go into great detail and it can say if you're struggling to do this, this can be done. The explanation in great length is something I think could be very useful.

Creating messages that provide knowledge on more than one area of physical activity information was also seen as an ideal opportunity by another participant to gain expertise in multiple areas that she was having trouble with, as a result of the minimal information and comprehension of how to overcome barriers she currently possesses. Another reason why 10-30 minutes was seen as the most useful length of physical activity messages, is that it can be easily inserted into participant's daily routines. It was suggested that listening to or watching messages of this length can be done whilst performing other activities such as going on a walk. This would mean that time allotted for gaining physical activity information does not have to be found during the participant's already busy schedule but can instead fit perfectly within their normal routine, in turn increasing people's willingness to listen to these messages.

Participants also raised concerns that any message that is under 2 minutes in length is not substantial enough to deliver an expansive and informative message. Fiona noted that "2 minutes is a very short time and for my condition I need lots of information to help me get into physical activity, I don't think 2 minutes is enough." Her concern with this minimal time is that you can only get across little pieces of information that do not go into much detail, thus making it unhelpful and pointless. In addition to this, there was also caution surrounding short messages

and their ability to draw people in, with Jack commenting “It feels a little silly only being that long, I most likely would forget about it straight away so I probably wouldn’t even bother listening to it.” With this being said, it has been made abundantly clear that he feels longer messages are the preference of the majority of people. This was echoed throughout, with all participants alluding to messages needing to have a substantial amount of information that can be explained in its entirety throughout the whole messages time frame.

Participants were just as unenthusiastic when discussing the idea of messages being over 30 minutes long. Messages this long were described as “overkill” and “boring” by two of the participants. This overkill description suggests that way too much information would be provided to the recipient and components of the message would be lost or forgotten result of information overload, thus again making messages this long pointless. This is further reinforced by another participant who remarked that his attention span would not last this long and that it would feel draining to him. Multiple participants then further added that they have busy schedules throughout the day and that messages this long were impractical and they could not find more than 30 spare minutes within their day to dedicate to listening to physical activity messages. Other research conflicts the participants preferences found within this study. Although there are few studies that focus their attention on the length of physical activity messages, it has been indicated that video messages should be less than 5 minutes. Within a study conducted by Vandelanotte and Mummery (2011), 28 out of 30 participants preferred messages that were between 1-5 minutes long and this was because they believed that these messages should be short, sharp and to the point. 12 out of 30 participants did also relay that some people may prefer longer messages depending on how interested in their own physical activity levels they are and whether the information was specifically relevant to them. Another study involving diabetic patients receiving video messages in a study concerning physical

activity improvement also concurred that messages should be short and powerful, with a preference for one clear message per video so that important information can be supplied to people at the early stages of physical activity improvement (Van Het Schip *et al.,* 2020).

When looking at this wholistically, there is a connection between the highest-ranking message length preference (10-30 minutes) and the highest-ranking physical format (newspapers). Whilst other physical sources of physical activity information such as posters and leaflets all contain short and snappy messages, newspapers can contain long abstracts or articles that go into greater detail (Granner *et al.,* 2010). This therefore can be linked to the preferred message length of 10-30 minutes, with participants wanting to spend more time reading and taking in new information about physical activity. These extensive articles concerning physical activity found in newspapers would be ideal for individuals who prefer longer messages. One such study found that implementing a higher number of articles concerning physical activity within newspapers can be successful in increasing physical activity level (Granner *et al.,* 2010).

4.2.3 Message Delivery

Even though online resources were recognised by all participants to be a valuable way to deliver physical activity messages, physical resources were considered to be the most useful for all but one of the interview participants. The first reason for this was “I am not very good with technology you see, I can not use the internet very well and clicking all the different pages and links is a struggle for me.” The older generation of participants were clear with their explanations that online delivery would cause complications in finding resources displaying physical activity messages. They also noted that technology displaying online information is

very new and they have grown up using physical resources for the majority of their life, meaning that they have familiarized themselves and feel more comfortable using this method. Another reason for this was brought forward by one participant, who highlighted "Sometimes you forgot that everyone is different and you forget that some peoples disability might be that bad that it effects them typing or writing on a phone or laptop." This insightful comment is a clear indication that it would make it harder for them to access these online resources. He proposed that physical resources eliminate this matter by providing easily accessible information that no additional steps are required that an individual would have to make to have access to these messages. Studies have shown that age makes a difference in the preference of message delivery. In a 2020 study adults mentioned the use of billboards, posters and leaflets as a preferred ways of message delivery, whereas younger participants highlighted YouTube, podcasts, apps and video games as preferred vehicle of physical activity messages (Nobles *et al.,* 2020). Another study denoted that people with spinal cord injuries prefer messages delivered by the internet over physical resources (Letts *et al.,* 2007). However most SCI research involves young men and the majority of disabled people are now older due to a general ageing population (Wade, 2023). This suggests that because the average age of my study's participants were older than those in the SCI study's that produced preferences for online message deliverance, this would account for their preference for physical message deliverance.

Conversations concerning the best places to display physical activity messages resulted in an overwhelming preference for gyms and leisure centres. Participants delineated that the main reason for this is that if messages are displayed in places where physical activity can be performed, the message would resonate with people more and create a sense of motivation to put it into practice. This was reinforced by another participant pointing out that if the message displayed in a gym was inspirational, it would inspire him more to "zone in" and be fully focused on the activity at hand. Another reason for this preference is that participants indicated

that performing physical activity in these places where messages are displayed would make them feel as if they were being praised, after already feeling proud of themselves for making the conscious effort to go to the gym or leisure centre. It was also noted that gyms and leisure centres have an array of different physical activities for people to participate in and this was seen as an additional motivational factor for people that want to try something new. Currently there is very limited literature that analyses the use of physical activity messaging within gyms and leisure centres. However research conducted by Jezowski (2023) suggests that placing advertisement and posters in gyms promoting diversity would make the gym feel more inviting for the target audience of the message. Oppositely messaging within gyms and leisure centres has also produced negative results. One such piece of research found that women did not like seeing physical activity messages in gyms, as a result of poor choice of imagery and wording to create unrealistic standards for them to follow. This lead to them leaving the gym and wanting to perform less physical activity (Turnock, 2021).

Similarly to gyms and leisure centres, all participants were big advocators for parks and sports stadiums as well. The reasons why participants displayed encouragement towards the idea of physical activity messages in parks were almost identical to gyms and leisure centres. This was because they are places where physical activity can be performed and there are a variety of different activities that can be performed within their grounds. One of the participants mentioned that he performs the weekly park run with his dad every Saturday and that signs dotted around the park encourage him to keep pushing and work even harder when he is performing physical activity. Daisy also had this to say about her first-hand experience of messaging within parks:

> I've actually seen a few physical activity signs around my local park where I walk the dogs and take the children down to the park. There is a massive poster, just as you come into the entrance, on the gate that speaks about the amount of physical activity children should be having every single day. Although that doesn't relate specifically to what we are speaking about but as a parent, I've seen that, and I now have it in my mind that my children should be active for a certain amount of time a day.

This story shared by Daisy further reinforces that physical activity messages within parks are a great idea, as she has not only seen and taken in the message but also remembered it and integrated it into her everyday routine. Physical activity information displayed within recreational parks have been highlighted as important due to payment not being needed to access these locations. Moreover, this makes parks highly relevant for people with low socioeconomic status, who are less likely to achieve their recommended physical activity levels than people with high socioeconomic status. (Heath *et al.*, 2012).

The reasoning behind participants vouching for sports stadiums was slightly different. They explained that you go to these stadiums to watch their favourite athletes perform in their chosen sport and coupled with physical activity messages within these arenas, this was said to create an extra motivational factor for people. To add to this point, one participant said that if he were to see a physical activity message encouraging people to participate more in sport whilst he is at a game, then he would feel persuaded to at least begin to add more physical activity into his daily routine. It was clear from the interviews that watching another person perform a specific activity had a large impact on the motivational factors of the participants to increase their own levels of physical activity. The placement of messaging within sports stadiums could have a

significant impact on an individual's message remembrance. For example a study by Lee and colleagues (2022), uncovered that individuals who visited sports stadiums had increased chances of remembering sponsors and advertisements that they had seen whilst at the stadium. This implies that having physical activity messages within sports stadiums would result in more fans taking home the displayed messages and applying them within their life. On the contrary, physical activity messaging within sports stadiums could also have a negative impact on individuals. The main reason for this being that these messages may be tailored to specific people. Messages that focus on achieving specific goals could be detrimental to those who just want to enhance their general health and well being (Greenwell *et al.,* 2024). Sports stadiums will often promote general physical activity and these messages are often not tailored to disabilities. This can have a negative effect on people with disabilities, who may feel a lack of inclusion and in turn lead these individuals to resent physical activity (Van Hoye *et al.*, 2022.)

Despite the praise for gyms, leisure centres, parks and sports stadiums there were also some negative points raised regarding the other options listed within the questionnaire. Participants relayed that displaying physical activity messages within the workplace was a bad idea because they would be fully focused on the tasks at hand in their place of work. One participant explained that he felt very tired at work most days and that a physical activity message was the last thing that he wanted to see displayed as he would not be in the mood to perform any. Comments about town centres and supermarkets were also negative, as participants stated that when they are within these environments, they would be there for a specific reason, for example, food shopping or clothes shopping. Parallel to workplaces they would be fully focused on getting their tasks completed and would not take the time to read and take in physical activity displayed here. Although all participants relaying that physical activity messages in the workplace would not be useful, it has been evidenced that workplace physical

activity messages and interventions can have a positive influence on people's physical activity behaviours (Dugdill *et al.,* 2008). Similar studies have also arrived at this conclusion (Malik *et al.,* 2014), however both studies reiterated that the overall results remain inconclusive and further research must be undertaken to verify these claims.

When it came to the frequency of physical activity messages, most participants were clear that they would like to see them every single day. Daily messages were seen as the driving factor behind the motivation to perform physical activity every single day and some participants expressed that seeing a message after deciding not to take part in physical activity on that day would lead to feelings of guilt and make them feel bad, in turn creating extra motivation to participate the next day. India also suggested "I think for me daily messages would be the best. Sometimes I am unmotivated and if I see a constant message coming through it will help me to get over that and almost make it a habit." This suggestion of habits to perform, is a great thought from India and means that she would increase the amount of physical activity she is currently performing. However, a participant was concerned that if they were to see physical activity messages daily this would be too much for them and they would end up resenting the idea of performing it. The views and preferences of the participants have been echoed in other research. One study indicated that an increased frequency of physical activity messages would lead to people taking on the message being delivered and increasing their physical activity levels (Hojjatinia *et al.,* 2021). For example, within this study messages delivered to participants throughout the day that suggested they "move more" resulted in 300 or more extra steps per day per person. Even though a higher frequency of messages has been shown to have a positive effect on a person's physical activity perceptions and habits, it has also be evidenced that young adults react best to a maximum of 2 messages per day (Yang *et al.,* 2015).

Discussions shaped around participants explaining who they believe would be the best individuals to deliver physical activity messages to disabled people were similar, with occupational therapists and general practitioners being the favoured option for all interviewees. These were highly thought of people who participants would rather speak to for many reasons. The first of these reasons was that they are trained professionals who have academic achievements within the field of physical activity, with the high level of knowledge they attained whilst in education leading to strong feelings of trust towards them. Participants also understood that trained professionals are surrounded by a network of people in similar fields who they could speak to about specific advice on certain topics that their own occupational therapist or general practitioner may not have the answers to. Participants were additionally interested in speaking to trained professionals as not only did they trust the information they would receive but also occupational therapists and general practitioners were said to have a client's best interests at heart. Daisy shared her own experience with her occupational therapist:

> The lovely lady, Janet that I speak to specifically helps me with my time management. I'm obviously working my full time job and looking after the children I experience a lot of stress that comes with that, and she helps me to deal with how I spend my time and how I load this stress. She would definitely be useful in helping me to participate in more physical activity, the time management she has really helped me out with so she would be able to tell me times when I can benefit from more physical activity, or times that I can fit it in. It is sort of like talking to a friend. It doesn't feel as formal as talking to a doctor or something like that. We have a very close relationship, which I think also helps and seeing her all the time has built up that friendship bond, so I trust what she says.

Daisy feels comfortable discussing anything with her therapist as a result of the familiarity and friend-like relationship that has flourished over time. This close bond established over time has built up the trust she places in her knowledge and rationalises why her therapist is someone whom she would be willing to seek physical activity advice from. Within previous research trustworthy and influential people within an individual's life have been found to be key influencers in delivering physical activity messages. Differing groups have specifically identified health care professionals such as general practitioners and occupational therapists as their preferred messenger of physical activity information (Nobles *et al.*, 2020). Additionally, healthcare professionals are one of the most accessible normative influencers that approve of physical activity due to most individuals having access to regular appointments with these professionals such as general practitioners (Ellis *et al.*, 2007).

Other physical activity professionals such as personal trainers, sports coaches and fitness instructors were also deemed to be individuals that all participants would trust and seek physical activity information from. Like occupational therapists and general practitioners these individuals have dedicated their time to acquiring qualifications within health and wellbeing, meaning that participants were all in agreement that their knowledge can be trusted. Participants additionally drew upon their own experiences and friend's experiences to further explain their reasoning. Harry disclosed “I have my own personal trainer that pushes me mentally and physically and when I was in a rough patch of not wanting to do any activities, he would really push me to come into the gym.”. A similar story was echoed by a different participant who explained that her personal trainer has aided him in getting back into the best shape of her life. Personal coaches have been highlighted in previous research as being important messengers of physical activity for disabled people (Smith *et al*., 2019). They have

been evidenced to provide physical activity messages that disabled people will remember and implement into their routine (Jaarsma *et al*., 2019).

Participants indicated that other individuals such as carers or social workers were not people whom they would like to receive physical activity information from. Although they appreciated that these people were trained professionals, participants articulated that there were feelings of distrust towards the information they would share, as a result of their professional qualifications in other areas of life and not physical activity. This presumed lack of knowledge was also said to be the same for other low-ranked options within this question, with other participants such as Ethan sharing his own story where he had previously discussed physical activity with family and friends:

> When I had my incident and I was thinking about getting back into physical activity despite my disability, speaking to family members and friends, I just didn't really take on board anything they said. They were trying to tell me things that I had already heard, or perhaps I was thinking that they were saying the wrong things. They weren't the things that I wanted to hear.

The voicing of Ethan's frustrations denoted that he placed value in professional advice rather than family members or friends. These comments were reinforced by other participants who explained that conversations with family members and friends predominantly concerned other topics and that physical activity was not a priority of the discussions. Research surrounding social workers delivering physical activity messages has been positive and disabled people often see them as "better" messengers than health professionals for disabled people. This is

because they are seen as trustworthy, understanding and well informed when it comes to the needs of disabled people (Smith and Wightman, 2021). Social workers are also trained in regularly assessing the needs of disabled people and are well positioned to care to the needs of disabled people and give them the physical activity information that they need (Jaarsma *et al.*, 2019).

Chapter 5 – Conclusion and Implications

5.1 Summary of research findings

The thesis provides a thorough investigation of evidence-based physical activity message tools and techniques to improve physical activity for disabled people by utilising a mixed-methods approach. This research explored three key areas of physical activity messaging, resulting in key findings for message content, message format and message delivery concepts.

Using a questionnaire first to determine participant preferences I have identified the factors influencing physical activity among disabled adults throughout the thesis. I have then further investigated these elements through interviews to comprehend the causes of these preferences. By collecting both qualitative and quantitative data this thesis offers valuable insight into the logic behind participant preferences and highlights the importance of empirical value within this research.

The analysis offered within this research is enhanced and is placed in a wider range of knowledge by incorporating previous research from different fields of study. This meant the thesis drew upon previous physical activity, public health, disability and messaging literature to Wholistically provide critical analysis that was in depth and relevant to the research aims. All four chapters therefore created a thorough foundation for physical activity messaging for disabled people.

5.2 Conceptual Implications

This research has advanced knowledge of physical activity messaging for disabled people by analysing and taking into account the contextual flexibility of the differing disability models. Whilst the medical model has a significant impact on physical activity for disabled people, it focuses on the disability as the impairment and does not fully encapsulate the needs of disabled people (Areheart, 2008). Instead this thesis shifts its focuses onto a social relational model that considered the personal and environmental factors that disabled people face when trying to perform physical. This was shaped through discussions with disabled people, who relayed their lived experiences of disability and how this has impacted physical activity for them. This thesis evidences that the impairment is not the problem as described by the medical model, but rather social factors such as environmental and personal factors that are impacted as a result of societal influence. This implies that the medical model is non-expansive and fails to capture all aspects within physical activity and disability and therefore more expansive models such as the social relational model should be utilised instead within all research focusing on this topic area.

This thesis additionally employed the physical activity messaging framework (Williamson *et al*., 2021) to great effect. This framework shaped the understanding of physical activity preferences of disabled people and also aided in developing strategies of physical activity messages that can be applied throughout the message creation process. By utilising this framework within this thesis in conjunction with the social relational model, a holistic understanding of physical activity messages for disabled people was completed.

5.3 Practical Implications

This thesis critically informs the creation and distribution of physical activity messages for disabled people and by providing a number of useful ideas and consequences. These suggestions aim to close the gap between the use of theoretical research findings in practical settings and the development of more inclusive and successful physical activity messages. The in depth analysis of data collected throughout this thesis has lead me to present an evidenced based guide for creating physical activity messages that are tailored to the preferences of disabled people. This guide was created to support the construction of physical activity messages that are appealing and accessible for disabled people and can be seen in **Figure 12** below.

Message Guide	
Message Content	. **Disability specific information-** Barriers and how to overcome them for disabled people participating in physical activity. There is widespread agreement that there are copious amounts of physical activity information available. However, information regarding specific barriers for specific disabilities is not as widespread and would be helpful to those who have not been able to find detailed information. **- Benefits of physical activity for disabled people.** It has been made clear that the benefits of physical activity are widely available. However, it has been bought to light that individuals would like to see benefits that are tailored to them and their disability. Having this information specifically targeted at them will help individuals to

	become more motivated and reap the rewards of physical activity in a way that only they can understand.
Message Format	. **Physical –** Use a wide range of physical delivery sources including newspapers, leaflets and posters. Individuals prefer the widespread physical forms of message formats as they are easier to access and can be seen in abundance. This will lead to individuals becoming familiar with the messages and it will become engrained into their lives. . **Online** – Use social media apps and sporting apps like Strava. Social media apps are often frequently visited and specific apps like Strava not only portray positive messages but are also a great place to perform this physical activity. Seeing physical activity messages on an app where physical activity can be performed is a great motivator for individuals. . **10 -30 minutes** – Valuable and engaging information that is rich in detail but also fits within an individual's daily routine. Engaging individuals with messages that are thought out, well presented and rich in detail are crucial in physical media messaging. The length of 10-30 minutes is valuable to hit all of this criteria and will lead to increased uptake of physical activity information.
Message Delivery	. **Physical** – Older generation. Individuals who have grown up not surrounded by technology prefer their messages delivered in a way that is familiar to them. Technology is sometimes found difficult to navigate for older individuals and having a simplistic message on recognisable delivery formats appeals to this generation the most.

	. **Online** – Younger generation. With the younger generation growing up with the latest technology it has been evidenced that this is the preference of all sources of media, therefore physical activity messages are key on these platforms. . **Environments where physical activity can be performed** – Places such as gyms, leisure centre, parks and stadiums. These places have been shown to have a positive affect on message visibility, as well as encouraging individuals to increase their participation levels. . **Trained and qualified health professionals** – Occupational therapists, general practitioners, personal trainers and sports coaches. Professionals play key roles in physical activity messaging. Individuals are most likely to listen to those who are fully equipped with the knowledge about their specific disability and messages delivered by these people are more likely to be taken on board.

Figure 12- Guide for creating physical activity messages for disabled people

By implementing these suggestions, message creators can create strategies and messages that effectively encourage disabled adults to participate in physical activity. Taking into account all the factors that affect physical activity participation and disabled people's preferences will create a positive physical experience for disabled people within physical activity environments.

5.4 Limitations

Despite the various implications of this research, it must also be recognised there were also limitations. The current research project concerned physical activity messaging for disabled people. We know from the Sport England Active Lives survey and Activity Alliance Annual Disability and Physical Activity survey that disabled people are less active that non-disabled people (see introduction and literature review). As such, the current physical activity levels of the participants were not asked within the questionnaire or interview. The questionnaire was validated by experts in physical activity and disability who did not raise the lack of measuring physical activity levels of participants as an issue in light of these aims. This is likely due to the limitations of self-reported physical activity data (Pearce *et al.,* 2022). Understanding physical activity levels could have aided in the research findings, where differing types of activity may have affected an individual's opinions of physical activity messages. Furthermore, this research could have included greater stratification of the analysis. By this I mean dividing the participant data into subgroups based on their characteristics. For example, comparing the data between differing age groups or disabilities. This could have allowed for deeper analysis into links between the participants in these subgroups and could have allowed for more rich detail in how these groups compare to one another. These points are noted in the future directions section below.

There were twelve participants who performed an interview for this research and this meant that data collected was limited to just a small cohort of opinions and experiences. For research such as this it has been recommended that at least 6 participants must be interviewed (Bekele *et al.,* 2022) due to the research seeking to discover all unique opinions of participants within the study (Cobern and Adams 2020). However given the high number of people that

participated in the questionnaire procedure, it would have been preferable to have seen a higher number of people participate in the interview process. This would have contributed to the creation of more thorough quality analysis. within the data collection methods all of the participants were interviewed remotely by Microsoft Teams. It is possible that the distant format of the interviews may have introduced limitations in terms of the breadth of data collected (Knott *et al.,* 2022). It must also be noted that with this research being concerned with people who identify as disabled, individuals with severe disabilities or those without access to remote technology may have been omitted from the remote interviewing format (Cabalquinto and Ahlin, 2023).

5.5 Future Research Directions

Although this study provides valuable insight into the preferences of physical activity message content, format and delivery, there are various different avenues that future research can explore to build upon this thesis's findings. This research focused on disability as a whole and it would perhaps be beneficial to investigate whether these preferences change dependant on specific disability, age demographic or geographical location. This research was also time limited and a prolonged study was not feasible. Future research could implement the results found within this research and create physical activity messages that follow the guide provided. Participants could be shown these within a longer research study, where they are interviewed again after a set time period to determine whether the messages had a positive or negative impact on their physical activity. Further research would also be insightful to collect data that is concerned with the alignment of physical activity levels and message delivery. This would allow for an increased in depth look at whether current physical activity levels effect where individuals would like to see specific messages. For example, with different messages targeting

different people, perhaps people that do not go to the gym and are inactive would get their messages from newspapers.

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Appendices

Appendix A- Expert Recruitment Letter

Expert Recruitment Letter

Dear expert,

You have been invited to take part in a postgraduate research study concerning the physical activity promotion and messaging for the disabled population to increase physical activity participation. This research will explore how the promotion of physical activity specifically targeted towards the disabled population by the favoured messengers can increase the amount of disabled people participating in physical activity. This will be done by establishing what information should be promoted and by whom, in addition to how and where this promotion of physical activity should take place. The reason as to why this is being researched is because disabled people participate in less regular physical activity than non-disabled people. This is due to the physical activity not being promoted enough for this population in addition to these messages not being promoted by the appropriate messengers.

This study will utilise a questionnaire to gain knowledge from disabled people on message content and message format and delivery in relation to physical activity promotion specifically targeted towards the disabled population. As an expert you have been asked to evaluate the content validity of the questionnaire using a 4 point relevancy scale below, before it is sent out disabled people, who will be answering the questionnaire. This is to ensure that the questionnaire asks questions that are relevant to the research topic and answer the proposed research questions.

Degree of relevance:

1 = the item is not relevant to the measured domain

2 = the item is somewhat relevant to the measured domain

3 = the item is quite relevant to the measured domain

4 = the item is highly relevant to the measured domain

If you wish to be a part of this project, please take time to read the privacy notice and information sheet attached below. Alongside this please, find and complete the consent form attached below before sending it back to james.r.barry@durham.ac.uk.

Kind regards,

James Barry

Appendix B- Interview Guide

Interview Guide

The interview stage that will commence following the collection and analysis of the ranking question data from the questionnaire using descriptive statistics. The descriptive statistics will utilise a scoring system to quantify an overall score achieved for each individual response of the question. Examples of the possible interview questions are given below, however these are subject to change dependant on the questionnaires results.

Q8. This question asked you to rank the physical activity knowledge you most like to gain and the answer that scored the highest score was "physical activity clubs or classes near you." Why do you think that participants ranked this option the highest?

Q9. This question asked you to rank the best ways to gain physical activity information from physical resources and "leaflets" scored the highest. Why do you think that you and other participants scored leaflets as a better way to gain this information than the other options available?

Q10. This question asked you to rank the best ways to gain physical activity information from online resources and "podcasts" scored the highest. Why do you think that you and other participants scored podcasts as a better way to gain this information than the other options available?

Q11. When it came to the best way to gain physical activity information "online" resources scored higher than "physical" resources. Why do you think that online resources are a better way to gain information than physical resources?

Q12. This question asked you to rank where the best places to gain physical activity information would be. "Gyms/ leisure centres" was by far the most popular option and why do you think these places are best to gain physical activity information in comparison to the other potential options?

Q14. "Weekly" scored the highest on the question concerning how often participants would like to hear physical activity promotional messages. Why do you think that weekly messages would be a better option that "daily" or "monthly"?

Q15. This question asked you to rank the best people to speak to about getting more physically active and "peers with disabilities" scored the highest. Why do you think that peers with disabilities are the best people to speak to about this topic rather than other options such as family members or GP's?

Q16. The last question on the questionnaire asked you to rank the length of physical activity messages and one to two minutes achieved the highest overall score. Why do you think that this option scored the best in comparison to the other longer and shorter time durations?

Appendix C- Expert Information Sheet

Participant Information Sheet

You are invited to participate in an inquiry regarding the content validity of a questionnaire. This questionnaire concerns the physical activity communication resources for the disabled population. Before you agree to participate, it is important that you understand why this inquiry is happening and what your involvement in the inquiry will consist of. Please take your time to read the information content below and if there is anything that you would like more clarity over, please contact me before deciding to participate.

Title of Project: Physical activity promotion and messaging for the disabled population to increase physical activity participation

What is the purpose of the research?
This research will aim to explore how the promotion of physical activity specifically targeted towards the disabled population by the favoured messengers can increase the amount of disabled people participating in physical activity. This will be done by establishing how and where this promotion of physical activity should take place and who the messenger should be. The reason as to why this is being researched is because disabled people face more barriers when trying to participate in regular physical activity than non-disabled people.

Why have I been invited to take part?
You have been asked to take part in this evaluation of the content validity of the questionnaire due to you possessing knowledge relating to physical activity messaging and it is believed that your opinion will be a valuable contribution towards this study.

Do I have to take part?
This study is completely voluntary and the decision is 100% down to you as to whether you take part. You are free to withdraw from this study at any time, without giving a reason. If you wish to withdraw from this study, you can contact the lead researcher, whose contact details can be found at the bottom of this sheet. However, the data will be anonymised 2 weeks after collection, so if you request to withdraw this data after this 2 week period, this will not be possible.

What will be involved if I decide to take part in the research?
If you do agree to take part, you will be asked to complete the evaluation of the questionnaire regarding the content validity of the proposed questions that have been created for this study. The questionnaire will take no longer than 30 minutes to assess and you will have a period of 1 week to do so.

What are the benefits and risks of taking part?
If you do agree to take part, your contribution to the study will aid in enhancing knowledge within the area of promotion and participation of physical activity within the disabled population.

The questionnaire you are being asked to assess will only take between 30 minutes – 1 hour to complete, making it a time-efficient task. Other than the small amount of time you are being asked to give to the study, there are no other disadvantages or risks of taking part.

How will confidentiality be assured?
Confidentiality can be assured throughout the whole research project, as all data collected will be placed in a secure university OneDrive storage, which only the researcher has access too. Anonymity of the participant throughout the research will also be ensured, as participant names and any other personal information will not be used at any point and will remain anonymous. If any extra information is needed about this, please refer to the privacy notice also attached.

What will happen to the results of the research?
The results of this research will be used for an postgraduate dissertation.

If you have any questions related to the project, please contact the lead researcher:

James Barry

Emails: James.r.barry@durham.ac.uk

Supervisor name: Toni Williams

Email address: Toni.Williams@durham.ac.uk

If you would like to take part and are happy with the answers to your questions, please complete and sign the enclosed Informed Consent Form.

Appendix D- Privacy Notice

Privacy Notice

This notice provides you with the privacy information that you need to know before you provide personal data for the particular purpose(s) stated below. Additional information about the University's responsibilities for data protection and your rights in relation to personal data can be found in the University's generic privacy notice, available at https://www.dur.ac.uk/research.innovation/governance/privacynotice/generic/.

Title of project: Physical activity promotion and messaging for disabled people to determine message content and delivery preferences.

Type(s) of personal data collected and held by the researcher and method of collection:
Personal data will be collected through consent form and questionnaires and this will include name, date of birth. It will also include your background about any current disabilities and your experience of promotion and messaging of physical activity and experiences relating to participation in physical activity. The questionnaire answers will be stored throughout this research process on a laptop, which will be placed immediately into a secure OneDrive storage, whom only the researcher can access.

Lawful basis:
Your data will be processed in accordance with the consent you give for the use of your data, should you agree to participate in the project.

How personal data is stored:
The personal data will be stored on a secure OneDrive storage folder by the researcher who together with the supervisor are the only people who may have access to any of this information. Confidentially will be ensured through anonymisation. All consent forms and questionnaire details containing this personal information will be kept within the OneDrive storage folder, again with only the researcher being able to access this information. No data will ever be available for anyone other than the researcher and supervisor.

How personal data is processed:
Personal data collected will be used to analyse responses according to certain criteria set out for this research study. Information will be entered into the OneDrive storage folder for analysis. When the research project begins to utilise this data, it will be completely anonymised immediately. After completion of the study, any information that can identify you personally will be destroyed.

Withdrawal of data

Data will be anonymised after two weeks and you can request the withdrawal of your data until it has been fully anonymised. Once this has happened it will not be possible to identify you from any of the data we hold, so it will still be included in the research.

Who the researcher shares personal data with:
The personal data used within this project, will never be shared with anyone by the researcher, as this research study will be conducted by only one person.

How long personal data is held for:
Personal data will be anonymised within all areas of the research study and will be held for six months after the research study is complete.

How to object to the processing of your personal data:
If you have any concerns regarding the processing of your personal data, or you wish to withdraw your data from the project, contact the researcher, who's contact information can be seen below.

If you require further information please contact:

Researcher: James Barry

Email: James.r.barry@durham.ac.uk

Supervisor: Dr Toni Williams

Email: Toni.Williams@durham.ac.uk

Appendix E- Consent Form

Consent Form

Project title: Physical activity promotion and messaging for disabled people to determine message content and delivery preferences
Researcher(s): James Barry
Department: Sport and Exercise Science
Contact details: James.r.barry@durham.ac.uk

Supervisor name: Dr Toni Williams
Supervisor contact details: Toni.Williams@durham.ac.uk

This form is to confirm that you understand the purposes of the project, what is involved and that you are happy to take part. Please tick each box to indicate your agreement:

I confirm that I have read and understand the Information Sheet and the Privacy Notice for the above project.	
I have thought about the information and asked any questions I might have. I am satisfied with the answers I have been given.	
I understand who will have access to my data, how the data will be stored and what will happen to the data at the end of the project.	
I understand that my participation is voluntary and that I can withdraw from the project two weeks following the completion of the questionnaire.	
I understand my questionnaire answers will be used in research outputs.	
I am over the age of 18.	
I understand that I have two weeks upon completion of the questionnaire to withdraw my answers and I understand that after this two week period my data will be anonymised and will no longer be able to be withdrawn.	
I agree to take part in the above project.	
I am happy to be contacted to participate in an interview following questionnaire completion.	

Participant's Signature:_____ Date:_____

(NAME IN BLOCK LETTERS)_____

Researcher's Signature: James Barry Date:

(NAME IN BLOCK LETTERS) JAMES BARRY

Appendix F- Participant Information Sheet

Participant Information Sheet

You are invited to take part in a postgraduate student research project. Before you decide if you would like to take part, please read this information sheet carefully. You can also ask the researcher James Barry if you have any questions (please see contact details at the end of this sheet).

Title of Project: Physical activity promotion and messaging for disabled people to determine message content and delivery preferences

What is the purpose of the research?
This research will aim to assess the preferred messengers and message content regarding physical activity promotion and participation for disabled people. It will also explore how the promotion of physical activity specifically targeted towards disabled people by the favoured messengers can increase the amount of disabled people participating in physical activity. This will be done by establishing how and where this promotion of physical activity should take place and who the messenger should be.

Why have I been invited to take part?
You have been invited to take part because you identify as disabled and you are over the age of 18.

Do I have to take part?
This study is completely voluntary and the decision is 100% down to you as to whether you take part. You are free to withdraw from this study two weeks following the completion of the questionnaire, without giving a reason. Once the questionnaire data is anonymised it will not be possible to withdraw as individual participants will not be identifiable. If you wish to withdraw from this study, you can contact the lead researcher, whose contact details can be found at the end of this section.

What will be involved if I decide to take part in the research?
You will be asked to complete a consent form (which includes some screening questions) and take part in a questionnaire which will take between five to ten minutes to complete. This questionnaire is attached at the end of the Microsoft Form and does not have to be taken in person with the researcher. The questionnaire will ask you to rank the choices given to you for each question from favourite to least favourite and will ask questions about concerning your preferences to specific physical activity message content, format and delivery.

The questionnaire that you will be asked to complete as part of this research will ask you questions about your personal details and other questions regarding physical activity message content and format. Before this questionnaire was sent out to participants, it was checked over by experts working within the field of disability and physical to make sure that these questions are relevant and appropriate to ask disabled participants.

You will also be asked if you would like to participate in an interview with the researcher, discussing the answers to the questionnaire in more detail and this will take between ten minutes to twenty minutes to complete. The interview will explore the overall results and explore certain topics further, such as the importance of key messengers and the importance of key message delivery locations.

What are the benefits and risks of taking part?
There are no risks to taking part in this study. However, if you begin to feel distressed in any way, you do not have to complete the questionnaire and you can access the appropriate disability support services provided at the end of this section.

The benefits of taking part in this study are contributing useful knowledge about disabled peoples preferred physical activity content and what information is most useful for disabled people participating in physical activity. Furthermore you will be providing essential information about who the preferred messengers of this physical activity

information and messages are for the disabled people. These key research answers will inform future physical activity promotion. More benefits of participating in this research is the chance to win Amazon vouchers. If you participate in the questionnaire only, then you will be placed into a draw with a chance to win a £25 voucher for Amazon. There are two of these £25 vouchers, so you will have 2 chances to win. Moreover, if you participate in the questionnaire and the interview then not only will you be entered into the draw for the two £25 vouchers, but you will also be entered into the draw for a £50 Amazon voucher.

How will confidentiality be assured?
Confidentiality can be assured throughout the whole research project, as all data collected will be placed in a secure university iCloud storage, which only the researcher has access too. Anonymity of the participant throughout the research will also be ensured, as participant names and any other personal information will not be used at any point and will remain anonymous. If any extra information is needed about this, please refer to the privacy notice also attached.

All research answers will be completely anonymised within two weeks and after that there will be no way to trace any answers given back to you. However, this means that if you will not be able to withdraw your answers after this two week period has ended, as it will not be possible to tell your answers apart from the other participants. Furthermore, upon completion of the project all research answers will be destroyed.

What will happen to the results of the research?
The results of this research will be used for a postgraduate research study, that will provide answers to the following research questions:

What physical activity information would disabled people want to see within physical activity messages?
Who would disabled people want to deliver physical activity messages?
Where would disabled people want to see physical activity messages delivered?

By collecting information from disabled people regarding these questions, this research hopes to make long term changes in the participation rates of disabled people in physical activity. It also hopes to provide useful answers to disabled peoples preferences in regard to physical activity messages, so that these can be implemented into future plans to help increase participation rates for disabled people.

Disability support services: www.unitedresponse.org.uk/getting-advice-phone-helplines/

If you have any questions related to the project, please contact the lead researcher:

Researcher name: James Barry

Emails: James.r.barry@durham.ac.uk

Supervisor name: Dr Toni Williams

Email address: Toni.Williams@durham.ac.uk

If you would like to take part and are happy with the answers to your questions, please complete and sign the enclosed Informed Consent Form.

Appendix G- Questionnaire

Questionnaire Items	Answers
Demographic Information	
Q1. Age?	
Q2. Gender?	
Q3. Type of impairment?	
Q4. Occupation?	
Q5. Marital status?	
Q6. Religion?	
Message Content	
Q7. Would you like to gain a deeper understanding on how to get and stay physically active*? (Scale 1-3) (1= Yes) (2= Neutral) (3= No)	
Q8. What knowledge about getting and staying physically active would you like to gain most? (Please rank all of these options from most useful (1) to least useful (10).) . Benefits of physical activity . Barriers of physical activity for disabled people and how to overcome them . Physical activity information tailored to disabled people . Risks of not partaking in physical activity . Where to find the physical activity guidelines . How to start performing physical activity . Physical activity clubs or classes near you . Suggestions for monitoring physical activity adherence . Success stories of disabled people participating in physical activity . Links to physical activity opportunities for disabled people within the community	
Message Format & Delivery	
Q9. What would you consider the best way to gain information from **physical resources** be? (Please rank all of these options from most useful (1) to least useful (5).) . Newspapers . Magazines . Leaflets . Posters . Books	
Q10. What would you consider the best way to gain information from **online resources** be? (Please rank all of these options from most useful (1) to least useful (9).) . Podcasts . Social media (i.e Snapchat, Instagram, TikTok) . Youtube . Blogs . Reddit . Email . Newsletters	

. Text messages .Online chatbot	
Q11. What way would you consider the best to gain physical activity information? . Online .Physical	
Q12. Where would you consider the best places to gain information be? (Please rank all of these options from most useful (1) to least useful (7).) . Hospitals or GP's . Gyms/ leisure centre's . Workplace . Town centre . Supermarkets . Schools, colleges or universities . Other	
Q13. Please clarify other places you would like to see physical activity information displayed.	
Q14. How often would you like to hear messages promoting physical activity? (Please rank all of these options from most useful (1) to least useful (5).) . Daily . Few times a week . Weekly . Fortnightly . Monthly	
Q15. Who do you think would be best to speak to disabled people about getting more physically active? (Please rank all of these options from most useful (1) to least useful (8).) . Occupational therapists . General Practitioners (GP) . Social workers . Single based community organisations . Carers . Family members/ friends . Peers with disabilities . National disability organisations	
Q16. How long would you like these messages to be? (Please rank all of these options from most useful (1) to least useful (7).) . Under 1 minute . 1-2 minutes . 2-5 minutes . 5-10 minutes . 10-30 minutes . 30-60 minutes . 60+ minutes	