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University of **HUDDERSFIELD**

A Natural Experiment that Explored the Beliefs and Perceptions of a School Community Towards Physical Activity, and the Impact of Prompts on these Beliefs and Perceptions.

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A thesis submitted to the University of Huddersfield in partial fulfilment of the requirements
for the degree of Masters by Research.

The University of Huddersfield in collaboration with CP Active.

October 2017

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Abstract

Physical inactivity is a major public health concern in the UK, placing strain on the health and well-being of individuals, and also on the economy. Research has shown how the environment we live in can shape our physical activity behaviour, and by changing these it may contribute to increased levels of physical activity being undertaken by both adults and adolescents. The Nudge Theory proposes that individual behaviour can be changed by making subliminal changes to the environment, such as altering the choice architecture and using point-of-decision prompts, however there is limited evidence to date which has established the effectiveness of such interventions. The aim of this research was to explore the beliefs and perceptions of a school community towards physical activity, and the impact of environmental prompts on these beliefs and perceptions.

This study was a natural experiment and involved placing prompts around a secondary school, to explore their impact on the physical activity beliefs and perceptions of students and their teachers. The study utilised a mixed methods approach. Qualitative data was gathered using focus groups with eight year eleven (15/16 year old) female students and seven teachers (male and female) from a secondary school, in a socially and economically deprived area in the North West of England. Quantitative data was gathered using questionnaires, which were administered to measure physical activity beliefs and perceptions before and after prompts were placed around the school.

The findings from this study suggest that prompts may have a positive influence on the physical activity beliefs and perceptions of some adults, as they encouraged them to think about ways in which they could incorporate physical activity into their busy, daily lives. For the other teachers, the prompts had little influence on their beliefs and perceptions towards physical activity. However, they were more engaged as professionals in relation to the prompts impacting on their students. The students, whilst not expressing negatively towards the prompts, appeared to be disengaged with physical activity, and the prompts failed to influence their beliefs and perceptions of physical activity. What was clear in this study was how the school environment was heavily focused around academic achievement, with little attention being given to physical activity. The 'whole school' environment seemed to have a negative impact upon physical activity. The findings from this study suggest that school-based interventions are needed which address the school's physical, social, policy and cultural environment to promote positive physical activity beliefs and perceptions. Qualitative data from this study provided an insight into how prompts may have a positive impact on the physical activity beliefs and perceptions of some individuals, but may be ineffective for others. However, further research is needed to establish the effectiveness of nudging interventions and their influence on beliefs and perceptions towards physical activity.

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Chapter 1: Introduction and Background

Physical activity is defined as '*any bodily movement produced by skeletal muscles that requires energy expenditure*' (WHO, 2016). Current government guidelines recommend that adults (aged 19-64 years) should take part in at least 150 minutes of moderate intensity activity, in bouts of ten minutes or more, or 75 minutes of vigorous intensity physical activity each week (Department of Health, 2011). For children and young people (5-18 years) it is recommended that they should engage in at least 60 minutes of moderate to vigorous intensity physical activity daily (Department of Health, 2011). Examples of moderate intensity physical activity that meet these guidelines include cycling and walking, which can be incorporated into daily life. Example of vigorous intensity physical activity include running, swimming and playing sports. As well as meeting these guidelines, it is recommended that all individuals reduce their time spent being sedentary for extended periods. For example, reducing time spent watching TV and playing video games and swapping a long car or bus journey for walking part of the way (Public Health England, 2016).

1.1 The benefits of being physically active

The health benefits of physical activity are vast but some of these include; reducing the risk of cardiovascular disease, some cancers and type 2 diabetes (Warburton et al, 2006). Being physically active also helps to maintain a healthy weight and reduces the risk of obesity in both adults and children (NHS, 2015). Psychological benefits of physical activity include improved self-confidence and self-esteem; reduces feelings of stress, depression and anxiety and improves sleep (Sharma et al, 2006). Additional benefits for children and adolescents include; developing new social skills, increasing concentration and improving academic achievement (NHS, 2015). It is essential for young people to develop positive physical activity behaviours as research indicates that inactive children and adolescents are likely to become inactive adults (Telama et al, 2005). This makes physical inactivity among young people a risk for developing health related conditions, such as cardiovascular disease, in later life (WHO, 2016).

1.2 Inactivity levels in the UK

Despite the well-established benefits of physical activity, figures from The Physical Inactivity and Sedentary Behaviour Report (British Heart Foundation, 2017) show that more than 20 million UK adults are failing to meet the government's physical activity guidelines. Physical inactivity is high in all regions across England, but it's particularly worse in the North West which has the highest rates of people who are failing to meet the governments guidelines (47% of the adult population) compared with the South East which has 34% (British Heart Foundation, 2017). Physical inactivity rates are also high in children and adolescents; however activity levels in children tend to decrease even more as they get older and move into adolescence, this is especially noticeable in girls. For example, in England, only 8% of girls aged 13-16 years old met the recommended amounts of physical activity in 2015, compared to 14% of boys the same age (British Heart Foundation, 2017).

These low physical activity levels are contributing greatly to the health burden in the UK with inactivity being a major risk factor for developing chronic illnesses, causing 17% of premature deaths each year in the UK and shortening the lifespan by up to five years (UK Active, 2014). Not only does physical inactivity have detrimental health risks for the individual, it is also detrimental for the economy and places a huge burden upon the National Health Service (NHS). Statistics show that the national cost of physical inactivity in England is around £8.2 billion, this includes the direct cost of treating those individuals with diseases which are caused by inactivity and also the indirect costs caused by sickness absence (UK Active, 2014). According to statistics from UK Active (2014) the total public health funding in 2013/14 due to physical inactivity was over £30 million and local authorities spent around 2.4% of their public health budgets on programmes and initiatives to encourage individuals to become more active.

1.3 Current government policies to tackle inactivity

Whilst recognising that societal and economic factors contribute to the lack of physical activity being undertaken by individuals, many reports, policies and interventions have placed the emphasis on individual responsibility. The Foresight Report – 'Tackling Obesity: Future Choices' (Government Office for Science, 2007) reported how obesity is a complex problem, which has increased as a result of modern day life and is not solely down to individual responsibility. Yet, policies and interventions developed after The Foresight Report have focused on individualistic approaches. For example, Change4Life, Public Health

England's 'One You Campaign' and the 2010 to 2015 adult government obesity policy: 'Obesity and healthy eating' (Department of Health, 2015) have all been centred around 'helping people to make healthier choices' by providing information and advice with regards to physical activity and healthy eating. These campaigns and policies are suggesting that the main interventions for tackling the health burden in England lies solely with the individual and the lifestyle choices they make, therefore diverting attention away from the responsibility that society and the environment has in preventing physically active lifestyles (Ulijaszek & McLennan, 2016).

The current UK childhood obesity strategy: 'a plan for action', whilst similar to the adults strategy by supporting and encouraging children to make healthier lifestyle choice, this policy does propose a more collaborative approach of communities, schools and families working together to increase physical activity. One way in which they aim to significantly reduce childhood obesity is by introducing a soft drinks levy, the money from this levy will be spent on high quality programmes to increase physical activity in schools. As part of this policy, Sport England's strategy 'Towards an Active Nation' (2016) has introduced a project which offers new ideas and opportunities for families and children to be active together. This strategy also aims to help children acquire a basic level of competence in physical activity and sport, and encourages children to take part for enjoyment, regardless of their ability. This strategy is useful as it intends on making changes to the way physical activity is delivered in schools and involves local and national bodies working together with schools and families to increase physical activity levels in children. However, ultimately it's still an individualistic approach as the main focus is supporting and encouraging children to be active, again shifting responsibility away from the environment.

Whilst physical activity is clearly part of a national health strategy, physical inactivity levels in the UK are still on the rise, and many of the policies and interventions are centred around supporting individuals to take responsibility for their health and to lead healthy and active lifestyles. However, changing individual beliefs and behaviours to physical activity is complex and isn't always directly influenced by policy initiatives.

1.4 Current theoretical frameworks underpinning physical activity

1.4.1 The Transtheoretical Model

As physical activity behaviour change and the factors influencing participation are very complex, models are used to provide a framework for understanding these factors that act as barriers or facilitators of physical activity. These models are used to influence the design, implementation and evaluation of interventions to increase physical activity. One model that is used widely in influencing physical activity behaviour change interventions is The Transtheoretical Model (Prochaska & DiClemente, 1984). This model has been described as an integrative and comprehensive model of behaviour change drawn from all major theories of psychotherapy (Prochaska & Norcross, 1999). The Transtheoretical Model (TTM) posits that physical activity behaviour change occurs through five stages. These are; precontemplation (sedentary, no intention); contemplation (sedentary and six month intention); preparation (irregularly active and intention); action (regularly active for the last six months) and maintenance (regularly active for longer than six months) (Nigg et al, 2011). Ten processes of change are present in this model, these include cognitive, affective, evaluative and behavioural strategies, that individuals may use to progress to the maintenance stage of physical activity behaviour (Nigg et al, 2011). Other constructs of The Transtheoretical Model include self-efficacy (confidence and belief that one can continue the physical activity behaviour and overcome temptations) and decisional balance (pros vs. cons of becoming physically active) (Nigg et al, 2011). The importance of self-efficacy for initiating and maintaining the physical activity behaviour derives from social-cognitive theories of behaviour (Bandura, 1977). Research has consistently found positive correlations between self-efficacy and stages of change, in that self-efficacy will increase as the individual moves through the stages (Nigg et al, 2011). Similarly, the pros (gains) of changing and becoming physically active increases as the individual moves through the stages, and conversely, cons (losses) should decrease (Marshall & Biddle, 2001).

The TTM focuses entirely on the individual and the psychological influences on the physical activity behaviour. While this model continues to be useful in the development and implementation of physical activity interventions (Kahn et al, 2002; Marshall & Biddle, 2001), it does not address wider influences on physical activity participation, such as the physical and social environment and public policy (Sallis et al, 2006). Research indicates that behaviour change interventions are more likely to be successful when they take into account these multiple levels of influence on physical activity behaviour (Sallis et al, 2006).

1.4.2 Ecological Model of Health Behaviour

Ecological models are used by researchers to study these wider influences on physical activity behaviour, and they focus specifically on people's interactions with their environments (Stokols, 1992). Sallis and colleagues (2006) created a multilevel, ecological model specific to physical activity participation and active living. At the centre of the model are the intrapersonal factors such as demographics, biological and psychological factors. The next layer of the model is the individual's perceived environment including accessibility and perceived crime. Surrounding these factors are the four domains of active living including; active transport, occupational activities, household activities and active recreation, these reflect the principle of ecological models in that they should be behaviour specific (Glanz et al, 2015). The next part of the model is behaviour settings which includes the access and characteristics of the individual's neighbourhood, workplace, school and home environment. The next layer of the model is the policy environment such as health care policies and incentives. Outside of the model is the natural environment, information environment and sociocultural environment as these are not tied to specific behaviour settings. For example, information can be present in most behaviour settings including counselling in health care settings, advertising and in the media (Sallis et al, 2006). This ecological model provides a comprehensive framework for understanding complex physical activity behaviour, and thus, can be used in the design and implementation of comprehensive interventions to increase physical activity (Sallis et al, 2006). It is now suggested that physical activity interventions will be most effective when they operate on multiple levels. Sallis et al (2006) recommended that, based on ecological models, interventions should;

'ensure safe, attractive, and convenient places for physical activity; implement motivational and educational programmes to encourage use of those places; and use mass media and community organisation to change social norms and culture' (p.299).

Physical activity participation is thought to be increased when an individual's environment and public policies supports the healthy behaviour (Glanz et al, 2008). It is still of importance that individuals are educated on the benefits of physical activity, and that psychological influences are taken into account, yet if the environments are not supportive, physical activity behaviour change interventions will not be as effective (Glanz et al, 2008). Ecological models are advantageous as they take into account the combination of individual level factors and environmental/policy factors on physical activity behaviours when designing interventions and strategies (Humpel et al, 2002).

1.5 Changing the environment to increase physical activity

As the environment we live in can shape our individual behaviour, and can act as a barrier to being physically active, changing aspects of these environments may contribute to increased levels of physical activity being undertaken by both children and adults (Sallis et al, 2006). One way in which researchers have attempted to change individual physical activity behaviour is by making subliminal changes to the environment, based on The Nudge Theory (Thaler & Sunstein, 2008). One way of changing the environment to ‘nudge’ individuals to more healthy behaviours is by altering the choice architecture. Choice architecture is defined as *‘the environments within which people make choices’* (Thaler & Sunstein, 2008). The Nudge Theory holds three main beliefs; choice architecture greatly influences how people make choices; choice architecture is unavoidable – so why not design in ways that improve health and well-being, and, individuals can be nudged without having to restrict their freedom of choice (Thaler & Sunstein, 2008). ‘Nudging’, in contrast to paternalism which restricts freedom of choice (by command and control regulation), aims to guide individuals to a particular behaviour, but always leaves open the option for the individual to choose another course (Leonard, 2008). Thaler and Sunstein (2008) proposed the following definition:

“A nudge is any aspect of the choice architecture that alters behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. A nudge must be easy and cheap to avoid”

According to Thaler and Sunstein (2009), nudges can be implemented by anyone (governments, businesses, individuals), they come in a wide range of forms (e.g. financial incentives, providing relevant information, by blocking an inappropriate choice) and they seek to achieve a wide range of outcomes (e.g. to prompt a single response or a long-lasting behavioural change). The idea of ‘nudging’ individuals to certain behaviours, for example to become more active, by changing aspects of the environment has been found to be effective in some studies, and will be discussed in more detail in the next section.

The current study is part of a wider project, using Nudge Theory, initiated by CP Active. CP Active is an organisation which aims to tackle wider social health issues, such as physical inactivity, at a community level rather than focusing simply on individual level approaches. The ‘Environmental Nudges’ project involved placing prompts in and around communities and workplaces in the North of England, and exploring their impact on individual’s physical activity beliefs and perceptions. The ‘Environmental Nudges’ project took place in three sites

around the North of England including; a council office, a secondary school and an academic institution. However, the current study was one element of this wider project as it explored the impact of the prompts within the secondary school only. The prompts included wall posters, stickers and banners, which aimed to get people to think about leading more active lifestyles. The prompts were then evaluated using both qualitative and quantitative research methods.

Chapter 2: Literature review

2.1 Barriers and facilitators of being physically active

The existing research on barriers and facilitators to physical activity is extensive and not limited to the ones outlined in this literature review. This study has included the most common barriers and facilitators to physical activity which have been reported across a number of studies and reviews on adolescent girls and adults. These factors will be discussed in relation to categories taken from an ecological model which are; demographic, psychological, behavioural, social and environmental. Barriers and facilitators specific to adolescent girls and adults will be discussed separately where appropriate.

Demographic factors

Studies have consistently found relationships between socioeconomic status (SES) and physical activity in adults, the research indicates that those individuals with higher SES are more likely to be physically active than those with lower SES (Breuer et al, 2010; Gidlow et al, 2006). A person's occupation and income may determine whether they can participate in regular physical activity as some may not have the physical or financial resources to be physically active (Farrell et al, 2014).

A review into SES and physical activity in adolescents found similar results, as more than half of the studies (58%) reported that adolescents with higher SES were more physically active than those of lower SES (Stalsberg & Pedersen, 2010). One reason for this is due to financial reasons as taking part in organised sports can be expensive such as sports equipment and clothing, memberships and transport to and from facilities (Stalsberg & Pedersen, 2010).

Housing markets mean that low-income individuals usually live near other low-income individuals and so these areas may have low tax bases to finance recreational facilities for

physical activity (Moore et al, 2008) and so this means having to travel longer distances to physical activity facilities (Gordon-Larsen et al, 2006). Low SES neighbourhoods also tend to have higher rates of crime which prevents some people from taking part in physical activity outside, especially at night (Gomez et al, 2004; Holt et al, 2009). The review by Stalsberg and Pedersen (2010) also found that low-income families may have unfavourable shift patterns, such as evenings, which often leaves 'real spare time' to take part in physical activity. This often leaves the oldest child babysitting younger siblings and helping with housework, again leaving little time for physical activity (Dagkas & Stathi, 2007; Macdonald et al, 2004). However, research into this topic has found inconsistent results as 26 studies included in this review (Stalsberg & Pedersen, 2010) reported either an opposite or no relationship between SES and physical activity in adolescents. The authors proposed this could be down to adolescents being independent and making their own choices, based on motivation and interest to be physically active, and so socioeconomic background becomes less relevant.

Gender can also have an influence on physical activity participation. Research has found that psychosocial factors such as self-efficacy, attitudes, motivation, enjoyment and perceived barriers and benefits (decisional balance) to physical activity are lower in females than in males (Kim et al, 2010; Edwards & Sackett, 2016; Robbins et al, 2004).

Psychological factors

Self-efficacy refers to an individual's belief in his/her ability to perform behaviours necessary to produce specific performance attainments, and reflects confidence in the ability to exert control over one's own motivation, behaviour, and social environment (Bandura, 1997). Self-efficacy has consistently been found to predict physical activity in healthy adults (Sharma et al, 2005, Ayotte et al, 2010). In the most recent reviews on correlates of physical activity participation among adults, self-efficacy was the clearest correlate (Choi et al, 2017; Bauman et al, 2012). However, the research on self-efficacy and adolescents is mixed, a review by Biddle et al (2011) found self-efficacy and enjoyment was positively associated with physical activity in adolescent girls. While earlier reviews by Sallis et al (2000) and van der Horst (2007), found that self-efficacy and enjoyment was inconsistently associated with physical activity in adolescents.

Other common psychological barriers to physical activity for adolescent girls include; perceived competence, perceived lack of time, lack of interest and motivation,

disengagement, issues surrounding body image and appearance, and the effort required (Biddle et al, 2011).

Some of the most common psychological barriers for adults include, but are not limited to; lack of time and motivation, high job strain, stress, fatigue and low energy (Justine et al, 2013; Schutzer & Graves, 2004; Reichert et al, 2007; Choi et al, 2017; Kirk & Rhodes, 2011). Insufficient time to be active was one of the most reported barriers by adults, across a number of studies (Fletcher et al, 2008; Phipps et al, 2010; Justine et al, 2013). This supports the view that many individuals see taking part in physical activity as time consuming (Pham et al, 2007) and often value it as the lowest priority in their lives (Justine et al, 2013; Schutzer & Graves, 2004).

Behavioural attributes

Marshall et al (2004) found that the most common sedentary behaviour among adolescents was TV/video viewing; however this behaviour was inconsistently associated with physical activity. Biddle et al (2005, 2011) reported similar results, whilst van der Horst (2007) found no associations between sedentary behaviours and physical activity. However, after school and during weekends may be the times when adolescents choose to engage in these sedentary behaviours over physical activity, and this may have been missed if researchers did not analyse the data within these specific time periods (Biddle et al, 2011).

Negative health behaviours, such as drinking alcohol and unhealthy dietary habits, were found to act as barriers for adults' participation in physical activity (Choi et al, 2017).

Social and cultural influences

Parental support was consistently positively associated with physical activity in adolescents across a number of studies (Sterdt et al, 2014). Studies have also reported positive associations between physical activity and support from peers (Voorhees et al, 2005; Van der Horst, 2007; Zhang et al, 2012). Belanger et al (2011) found that lower levels of physical activity in adolescent girls is associated with poor social support from friends and negative social validation (conforming to behaviours of others in the group). In line with these findings, a review of qualitative studies also found positive relationships between support from family and peers and physical activity (Allender et al, 2006).

The influence of the PE teacher has also been found to be of importance on adolescents physical activity participation as Hagger et al (2009) found forming positive relationships

with PE teachers increased participation. Similarly, lack of teacher support and encouragement acted as barriers for adolescent girls (Allender et al, 2006). Another important influence which has been found to increase adolescent girl's participation in physical activity was having same sex PE teachers/sports leaders (Mitchell et al, 2015). Researchers have also identified positive associations between having positive role models and a reduction in the likelihood of risky health behaviours and an increase in the likelihood of positive health behaviours e.g. physical activity (Strunin et al, 2015, Yancey et al, 2011).

Studies on adolescent girl's physical activity behaviours have consistently found that having male peers in PE classes can discourage some girls from taking part as they are too competitive; dominate PE classes; they are stronger than girls and have different levels of ability (Allender et al, 2006; Eime et al, 2013; Mitchell et al, 2015; Flintoff & Scraton, 2001).

Similar social influences on physical activity behaviour have also been found on studies with adults. Some of these positive influences on physical activity participation included; receiving social support from friends and family (Choi et al, 2017).

Environmental influences

Sallis et al (2006) believe that physical activity is not just a matter of personal choice and motivation, but also a function of the built environment. The built environment refers broadly to the availability of footpaths, parks, recreational facilities, traffic safety and other neighbourhood characteristics that promote recreational physical activity, as well as active transport (Ferdinand et al, 2012). A review by Sallis et al (2012) found that the availability of, and proximity to recreational facilities have been consistently associated with greater physical activity among adolescents and adults. This review also found that having bus and train stops nearby and a variety of destinations (e.g. shops, work, education) close by was positively associated with physical activity. Other aspects of the built environment which were found to be positively associated with physical activity, in both adults and adolescents, were low traffic areas, safe footpaths, cycle lanes and street lighting (Sallis et al, 2012). However, all studies included in this review utilised quantitative research methods, thus the findings may not accurately represent individual's thoughts and other environmental barriers they face with regards to physical activity.

Nevertheless, a recent systematic review of qualitative studies into the relationship between the environment and physical activity (Moran et al, 2014) found similar results to that of the

quantitative review (Sallis et al, 2012). This review identified five main themes that were prominent across a number of studies. These were; pedestrian infrastructure (e.g. quality and safety of footpaths); safety/crime related (such as a lack of street lighting and police); access to exercise opportunities (e.g. recreational facilities, green space and daily destinations); aesthetics (nice scenery) and environmental conditions (weather). These findings are useful as they support the quantitative findings on what aspects of the environment promote or discourage physical activity, but they also provide researchers with a more comprehensive understanding of the 'how' and 'why' the environment has an impact.

A lack of sports/leisure facilities within the local area was found to be an important barrier, for adolescents, across a number of studies (Powell et al, 2006; Humbert et al, 2006; Dagkas & Stathi, 2007). Whereas, living close to leisure facilities, the countryside, tennis courts etc. was found to increase physical activity (Dagkas & Stathi, 2007). However, in areas of low SES adolescents often report that there is 'not much to do' and tend to just 'hang around' with friends in their free time (Dagkas & Stathi, 2007).

The school environment

Research on physical activity in children and adolescents has found how the school and PE environment can inhibit physical activity (Moore et al, 2010; Pawlowski et al, 2014; Mitchell et al, 2015). Physical school environment barriers that have been identified include; lack of physical activity facilities; poor changing facilities; and a lack of outdoor space and equipment to be active (Morton et al, 2016). This review also found how the school social environment can have an impact on physical activity participation; perceived PE teacher support and positive PE teacher behaviour was consistently positively associated with physical activity (Morton et al, 2016). The most prominent school barrier to physical activity participation, for girls, across a number of studies was the negative influence of a competitive ethos and a desire to raise the profile of the school (Morton et al, 2016). Whilst boys reported the competitive element of PE as a motivator, girls reported negatively stating that it removed the fun (Dwyer et al, 2006).

Morton et al (2016) also found how the wider school culture surrounding physical activity, and how the school approaches physical activity has an impact on how active the students are. For example the following factors lead to a 'negative culture' of physical activity in schools; PE was seen as a low priority compared to other academic subjects; physical activity

in general was undervalued and a lack of staff volunteering to support extra-curricular activities as they were unwilling to give up the little time they have (Morton et al, 2016).

Wider school policies that were found to create barriers included; PE uniforms (this was specific to girls and linked to body image concerns); homework and school scheduling that leaves students too tired or busy for physical activity (Morton et al, 2016). Another factor that inhibited participation in girls was having PE classes in the middle of the day due to worries about their appearance (Kirby et al, 2013, Hannay et al, 2013). School policies that allow exemptions for PE may be an additional barrier as this provides students with a reason to opt out, and thus encourages disengagement (Morton et al, 2016). Across the quantitative and qualitative studies included within the review by Morton et al (2016) consistent support was found for (a) the importance of activity settings within school for physical activity, (b) the creation of a ‘culture’ of physical activity within the school, (c) positive teaching behaviours and (d) availability of intramural opportunities for all students. As this review utilised a mixed-studies approach and an inclusive definition of the school environment it has been able to provide a comprehensive understanding of how the whole school environment can inhibit participation, particularly for adolescent girls, and lead to school-based interventions to increase physical activity.

2.2 The Transtheoretical Model and physical activity

Many interventions to increase physical activity to date have been underpinned by individual-level theoretical frameworks (Buchan et al, 2012). The model which has been used most widely to inform interventions is the TTM (Prochaska & DiClemente, 1984). This model is useful as it provides a framework to categorise individuals into a stage of change, but it also suggests how to encourage individuals to change their physical activity behaviour and move through the stages (Buchan et al, 2012). The existing literature on the effectiveness of interventions that have utilised the TTM is mixed. Adams and White (2003) reviewed the literature and found that 73% of short term (<6 month) studies reported a positive effect compared to control. Whilst only 29% of long term studies (>6 months) reported positive effects, suggesting the TTM may not be an effective framework for promoting long-term maintenance of physical activity behaviour change. In other systematic reviews, no evidence of using TTM was advantageous in increasing physical activity behaviour as oppose to using other models (Riemsma et al, 2002; van Sluijs et al, 2006).

However, a more recent review found that all of the studies based on TTM reported positive results, compared to ones that were based on The Theory of Planned Behaviour (Ajzen, 1991) which wasn't found to be effective in increasing physical activity (Abdi et al, 2015). The treatment groups made significant progress through the stages of change and TTM constructs, compared to individuals in the control groups. Some of the studies within this review used quasi-experimental studies, which may have led to more accurate findings than studies which had used RCT's and cross-sectional studies.

The inconsistency in findings as to whether the TTM can be successfully applied to health behaviour change interventions could be due to the fact that some behaviours are more suitable to stage-based interventions than others (Biddle et al, 2005). Researchers and practitioners that use models which solely focus on the individual, like the TTM, may be underestimating the fact that physical activity is a complex phenomenon with multiple factors influencing one's decision to being physically active (Buchan et al, 2012). As outlined within this literature review, external and social factors such as SES and social support, contribute greatly to physical activity behaviour, which the TTM fails to take into account. Other reasons for these inconsistencies could be down to methodological flaws in the research as most studies had used randomised controlled trials (RCT), others had no control group and utilised cross-sectional studies (Buchan et al, 2012). Due to these inconsistencies, there is a need for future studies to utilise the TTM to assess whether it is in fact applicable to physical activity behaviour change.

2.3 Understanding behaviour and behaviour change

In recent years, a more comprehensive approach to understanding individual behaviour change has been adopted, with the dual-process model of cognition and behaviour (Marteau, 2011). The dual-process model suggests that human behaviour is shaped by two systems. The first system is goal-orientated and is driven by individual's values, motivations and intentions. This system involves reflective, conscious and rational thoughts, requiring cognitive capacity – which is limited (Marteau, 2011). Traditional policies and interventions aimed at improving health behaviours have targeted this system by providing individuals with new information and different incentives in order to alter their beliefs and attitudes towards their behaviour, and therefore ultimately change their behaviour (Vlaev et al, 2016). However these approaches have been modestly effective in changing health behaviours (WHO, 2008),

they are also not cost effective and do not reach large amounts of the population (Wu et al, 2011).

In contrast, the second system involves unconscious, automatic and uncontrolled thoughts (Vlaev et al, 2016) and requires little or no cognitive engagement as its driven by our immediate feelings and can be triggered by the environment (Marteau, 2011). This dual process model helps to understand complex aspects of human behaviour such as why individuals behave in ways that are detrimental to their health, even though they are aware of the effects and may actually have good intentions to be healthy. For example, a person may be aware of the benefits of taking the stairs but may be running late and so may choose to use the lift as it is closer instead, to 'save time'. These environmental cues combined with immediate pleasures (e.g. getting somewhere faster) override more distant rewards (e.g. better physical health in the future from stair use) leading to individuals displaying unhealthy behaviours. Choice architecture and 'nudging' interventions, such as point-of-decision prompts (PODP's), act on this automatic, affective system by altering aspects of the social or physical environment in order to trigger individual's automatic thoughts to lead to an increase of healthy behaviours.

2.4 Choice architecture and nudge interventions

The Nudge Theory, which has mainly been used within quantitative research, attempts to explore individual changes in behaviour by altering aspects of the environment. Because of its focus on individual behaviour and behavioural change, it is significant in this study where the researcher will explore using this approach as a qualitative method. The Nudge Theory proposes that individual behaviour can be altered by making subliminal changes to the environment e.g. by making stairs more attractive and accessible in buildings, than lifts, can unconsciously influence people to use the stairs more (Thaler & Sunstein, 2008). However, empirical evidence to support the claim that 'nudging' interventions are effective in changing behaviour and improving population health is limited and more research is needed to assess whether 'nudging' is successful in changing behaviours in the long-term (Marteau, 2011). It is suggested that the limited evidence to date was actually due to a lack of a clear definition of choice architecture interventions applicable to the public health field (Hollands et al, 2013). Hollands et al (2013) proposed a new definition;

'Interventions that involve altering the properties or placement of objects or stimuli within micro-environments with the intention of changing health-related behaviour. Such

interventions are implemented within the same micro-environment as that in which the target behaviour is performed, typically require minimal conscious engagement, can in principle influence the behaviour of many people simultaneously, and are not targeted or tailored to specific individuals’ (page 1220).

One way of ‘nudging’ individuals to more healthy behaviours is by altering the choice architecture. However, this has most commonly been applied to changing diet-related behaviour. One study made changes in a school canteen with the intention of encouraging adolescents to pick more healthy food items (fruit, sandwiches containing salad and freshly prepared vegetarian daily specials). This intervention involved putting labels, stickers and posters on and around the healthier food items. These stickers included smiley faces and lines such as “*GOOD for YOU*” and “*Make a fresh choice*” as a way of nudging people to choose these options. The results from this study revealed that there was a significant increase in the students selecting these healthier options during the intervention and also post-intervention (Ensaff et al, 2015). The intervention was only implemented for six weeks during the summer term and the follow up was only conducted three weeks after the intervention and so it is not known whether the intervention was effective in influencing healthier food choices in the long term.

Some other school-based interventions have altered the design or made adaptations to the physical environment in order to ‘nudge’ pupils to become more active, regardless of their demographic characteristics and motivation (Benden et al, 2011; Lanningham-Foster et al, 2008). As part of these interventions, traditional desks were replaced with standing desks to encourage activity and reduce sedentary behaviour. The results from these studies revealed that these interventions were effective in increasing calorie expenditure and reducing sedentary behaviour. However, these interventions have only been tested in primary school settings, thus future research is needed to explore whether they are effective with adolescents, in secondary school settings.

Another way of altering the choice architecture to ‘nudge’ individuals to certain behaviours is by using point-of-decision prompts (PODP’s), these are placed near staircases, lifts and escalators. They are designed to motivate people to take the stairs and generally make more active choices by providing information e.g. ‘taking the stairs burns more calories’ (Soler et al, 2010). Other ways of encouraging people to use the stairs is by changing the aesthetics and making them look more appealing. Encouraging people to take the stairs more has health

benefits, although perhaps only small ones, stair use is associated with improvements in cardiovascular fitness, cholesterol levels, bone mineral density, strokes (Sloan et al, 2013) and contributes to weight control (Boreham et al, 2000). Ayabe et al (2012) found that even short bouts of physical activity from 30 seconds to 5 minutes can improve levels of blood lipids. Therefore, although these health benefits are only small at individual level, at population level they can significant positive health outcomes.

A study in Berlin placed PODP's in three underground train stations. These posters had messages which aimed to encourage individuals to take the stairs. The results revealed that these posters were successful in significantly increasing stair use in women but not men (Muller-Riemenschneider et al, 2010). However, a similar study conducted in Japan found that placing stair-riser banners with messages such as 'Take the stairs', 'For the prevention of disease' increased stair use in both males and females (Nomura et al, 2009). A more recent study in Singapore also found that using colourful stair-riser PODP's in an underground train station were effective in increasing stair use by 48.5% (Sloan et al, 2013). Stair use dropped to slightly below baseline levels once the prompts were removed, showing that these PODP's are effective in increasing stair use, yet only when they were present suggesting that they perhaps do not have lasting effects on individual's behaviour.

A recent systematic review of the 'stair climbing' literature looked at interventions to increase stair use that were published between 1990 and 2015 (Jennings et al, 2017). This review found that the most effective interventions were the ones that used a combination of both text and images on their signs; used time and fitness-based messages and used stair banners when using a simple strategy. The findings from this review highlighted the importance of considering the intervention settings when choosing the strategies, materials and the content e.g. motivational messages, in order to produce the most effective intervention.

However, point-of-decision prompts have been criticised for primarily only influencing those individuals that are already active (Kerr et al, 2000). People not actually considering to change (pre-contemplators) were unlikely to even notice the posters and remained unmotivated (Kerr et al, 2000; Cohen, 2013). Eves et al (2012) suggests this is due to individual's only being exposed to prompts for a few seconds, and this brief exposure is not enough to alter beliefs, perceptions and behaviour. These types of studies on point-of-decision prompts have also been criticised for only looking at an immediate effect, in the

majority of studies either no follow up was conducted or only a follow up of a few weeks (Pillay et al, 2009; Boen et al, 2010; Bellicha et al, 2015). Future studies should identify whether these interventions are effective in the long term as individuals will only gain any health benefits if stair use is maintained (Van Hoecke et al, 2017).

The nudge theory does not aim to replace traditional behaviour change approaches but complement existing work. The idea of ‘nudging’ individuals to certain behaviours has been found to be effective as the environment is constantly shaping the way we act – yet usually to more unhealthy behaviours (Sallis et al, 2009). Policy makers should therefore be creating ‘leptogenic’ environments that encourage individuals to make choices that are beneficial rather than detrimental to their health (Vlaev et al, 2016). It has been suggested that population approaches, such as nudging interventions, may be effective in reducing health inequalities (Capewell et al, 2010). Individual level approaches, such as health education programmes are generally unavailable for those individuals with lower incomes, lower education levels and there may also be language barriers (Swinburn et al, 1999). These ‘nudging’ approaches may also be more cost-effective than traditional approaches and lead to maintained changes in behaviour as they become integrated into policies, systems and sociocultural norms (Swinburn et al, 1999).

However, The Nudge Theory has been criticised for taking away individual freedom of choice. According to some researchers, under a nudge scheme individuals are not able to make their own choice, but are ‘nudged’ in to making the ‘right choice’ (Bradbury et al, 2013; Brown, 2012). The desired behavioural choice depends on the choice architect’s personal opinion as to what is ‘the right choice’, which may be subject to personal bias and motivations (Baldwin et al, 2011). A further criticism is that many nudging interventions, to date, have been added to existing government strategies and because of this researchers and policy makers are unable to distinguish whether nudging is more effective than current government strategies or whether nudging only works alongside other strategies (Kosters & Heijden, 2015). Additionally, the effectiveness of nudge interventions appears to be highly context dependent (Willis, 2013; Michie & West, 2013). Thaler (2012) agrees with this point in that nudges that work in one setting, with one group of people, may not work in a different setting with different groups. This point highlights the need for more research to be carried out in different contexts to establish the effectiveness of nudging interventions.

2.5 Using natural experiments in health research

Most studies in the field of physical activity and the environment have used cross-sectional designs; this research only assesses association and therefore does not provide evidence of a causal relationship between physical activity and the built environment (Bauman et al, 2012). Experimental studies such as randomised controlled trials (RCT) are seen as producing ‘the best available evidence’ when it comes to testing drug treatments. However, in many public health settings, such as aiming to increase physical activity, this is not the case as they can be difficult to achieve (Petticrew et al, 2005). The use of cross-sectional studies with regards to physical activity, brings about many issues such as self-selection bias, this is when individuals who like to walk choose to live in a ‘walkable’ neighbourhood (Glanz et al, 2015).

To combat such issues, researchers in this field are now beginning to use natural experiments to identify causal relationships between the built environment and physical activity (Veitch et al, 2012). It is suggested that natural experiments may produce the best available public health evidence to tackle the issue of physical inactivity. Natural experiments are defined as *‘observational studies that resemble true experiments but lack random assignment of participants to intervention groups’* (Benton et al, 2016, p.2). The researcher usually cannot manipulate the intervention as it is naturally occurring or unplanned (Craig et al, 2012). Natural experiments lead to stronger inferences about causality than cross-sectional studies and therefore they may be a more appropriate design to use within health research.

To date, the findings from natural experiments on the built environment and physical activity have provided inconsistent results. Veitch et al (2012) found that park use and the number of people walking significantly increased after the park underwent major improvements, including playgrounds, picnic areas and areas for dogs. In line with this, Cohen et al (2012) found that following the installation of outdoor family gyms in 12 parks, park use increased by 11%, compared to the control parks. However, five studies carried out from 2009-2014 showed no significant impact on park use and physical activity following interventions that involved changes to the built environment only (Cohen et al, 2009; West & Shores, 2011; Cohen et al, 2012; Bohn-Goldhaum et al, 2013; Cohen et al, 2014). One study found that in parks that underwent improvements (e.g. playgrounds and picnic areas), park use and physical activity levels declined (Cohen et al, 2009). However, it was suggested that this could have been a result of reduced programming and fewer scheduled organised activities

due to budget cuts to the Department of Recreation and Parks, and perhaps not a true representation of the effectiveness of the park intervention.

A recent systematic review by Mayne et al (2015) found that natural experiments support the findings from traditional study methods in that living near parks and recreational facilities increased physical activity. This review also confirmed from natural experiments that people use public transport, and other forms of active transport (walking, cycling) when it was made accessible to them, as identified from cross-sectional studies (Mayne et al, 2015). Similarly, other reviews into this area have found that natural experiments confirm evidence from cross-sectional studies with regards to the built environment and physical activity (McCormack & Shiell, 2011; Hunter et al, 2015).

The review by Hunter et al (2015) found that interventions were more effective when they combined environmental changes with physical activity programmes. One study found that cycling significantly increased as a result of a newly constructed trail, as well as promotion of the campaign in the media (newspapers, local radio) and leaflets distributed to schools and workplaces (Merom et al, 2003). Tester and Baker (2009) found that by making improvements to playing fields, combined with providing park and recreation staff with training and skills development, it significantly increased park usage and overall physical activity. However, none of these studies took into account the effect of the social environment on physical activity. Future research within this topic should take this into account as social support, for example, has been found to play an important role in whether interventions to increase physical activity have been effective (Broyles et al, 2011).

The use of natural experiments within this topic area provide advantages over cross-sectional studies as they provide evidence of causality and ‘real-world’ efficacy (Mayne et al, 2015). However, natural experiments are not without limitations. Benton et al (2016) assessed the risk of bias in natural experiments and found that all studies included in the review had an overall critical or serious risk of bias. These findings highlight the need for researchers to conduct better natural experiments on how the built environment influences physical activity. Suggestions for how natural experiments can be improved in the future included; better reporting of samples and interventions, sample size calculations and measuring exposure to the intervention at the individual level (Benton et al, 2016; Hunter et al, 2015).

It is also important to note that many of these studies have been conducted in the US. This is an issue as there are variations in climate, population density, obesity rates and physical

activity patterns between the US and Europe (Benton et al, 2016). Therefore, whilst natural experiments offer higher external validity compared to cross-sectional studies, more natural experiments need to be conducted in the UK to establish how the environment impacts upon physical activity.

Additionally, many of the natural experiments included in this section have been measured by using quantitative research methods. It has been suggested that gaining information about intermediate variables, such as psychosocial influences, may provide researchers with a better understanding of how the built environment influences physical activity (Hunter et al, 2015). Within quantitative research complex issues such as physical activity behaviour and ‘real life’ problems are simply reduced down to a limited number of variables, it may not take into account other variables which may play a role and may not have been thought of by the researcher (Eysenck, 2004). Therefore, when conducting natural experiments, researchers should employ qualitative data collection methods in order to assess the effectiveness of the interventions and to gain a deeper understanding as to *why* and *how* the built environment influences physical activity (Mahoney, 2001).

2.6 A qualitative perspective

As discussed, the majority of previous research conducted into the area of physical activity and the environment has been heavily based on using quantitative research methods (McCormack et al, 2004). Whilst this is useful, Eyre et al (2015) comments on the need for qualitative research into this area in order to develop an understanding of individuals lived experiences, and their interactions with the environment, with regards to physical activity. Using qualitative methods is useful as the researcher can gain a deeper and more meaningful insight into how the built environment and socio-economic influences can impact upon individual’s physical activity participation. However, to date there is limited qualitative research into this topic and particularly, on individual’s perceptions about physical activity interventions. This research is needed to lead to the design of effective interventions to increase physical activity (Leischow et al, 2008).

One study in the UK explored residents’ and community leaders’ perceptions of physical activity interventions and issues regarding their implementations (Cleland et al, 2014). The physical activity interventions and programmes included; ‘one-off’ walking and cycling events, indoor activities, organised local walking groups and leisure-centre based schemes for children. Data collection methods were semi-structured individual interviews and focus

groups. The findings from this study suggest that a) individuals will fail to engage with physical activity which they perceive as irrelevant to them; b) members of the community should be involved in the planning of interventions, and c) it's important to target the 'right people' and ensure interventions address people's needs. This study also explored barriers people face which affects the successfulness of physical activity interventions. One barrier that was identified was apathy, which was linked to poor self-esteem. It was suggested that specific programmes are needed to support the development of personal skills and self-esteem. Respondents within this study stated how facilities are needed within their local area in order to promote long term participation in physical activity. This study is valuable as its focus was on informing the development of successful interventions to tackle physical inactivity, which is sparse, rather than adding to the existing literature on personal barriers and facilitators to physical activity.

Recent qualitative studies have attempted to understand how changing the PE environment may increase girl's physical activity levels and enjoyment of school based PE (Mitchell et al, 2015; Enright & O'Sullivan, 2010; Fiset, 2011). A recent study, in Scotland, explored whether a physical activity intervention programme 'Fit for Girls' was effective in increasing the enjoyment and participation in PE of 'disengaged girls', aged 15/16 years old (Mitchell et al, 2015). As part of this intervention, PE staff and Active School co-ordinators were given training in order to facilitate and support them to make sustainable changes to the way PE is delivered in schools. One change the school made to the PE curriculum was consulting with the girls and giving them choice as to what physical activities they would like to do.

Following the consultations, the girls chose activities such as fitness-based activities, dance-based and indoor games e.g. dodge-ball, as oppose to traditional forms of PE which were previously being offered such as netball and hockey. The students were also given a choice as to which activities they took part in each lesson, this led to single-sex classes and friends choosing the same activities as each other. As a result of this intervention, the girls commented on how they valued being able to make decisions and being listened to. The girls also expressed how they liked having the freedom to choose the activity and who they would work with. Being able to participate in single-sex classes increased the girls' participation. This intervention led to the girls feeling more confident and comfortable; increased their enjoyment; improved relationships with PE teachers, and, ultimately increased their participation. These findings support that of previous research which has also found how giving adolescent girls' empowerment with regards to PE lessons increases their confidence

and enjoyment, and therefore their participation (Enright & O’Sullivan, 2010; Fiset, 2011; Brooks & Magnusson, 2006). These studies provide an insight into *how* and *why* the school environment facilitates or hinders girl’s engagement in PA. This highlights the need for in-depth, qualitative studies which reflects detailed and meaningful accounts of adolescent girl’s experiences in PE.

Chapter 3: Aims of the study

To date, there has been limited research carried out, in the UK, on the effectiveness of ‘nudge’ interventions on influencing physical activity. There is also a need for more studies that explore the effectiveness of physical activity interventions from a qualitative perspective, as much of the research to date has utilised quantitative methods. Additionally, as the existing research on natural experiments has provided inconsistent results, there is a need for further research to establish whether altering aspects of the environment is an effective way of increasing physical activity. Due to these gaps in the literature and limitations of existing research outlined within the literature review, the aim of this study was to explore the beliefs and perceptions of a school community towards physical activity and the impact of prompts on these beliefs and perceptions.

Beliefs refer to thoughts and assumptions that an individual or group trusts to be true. Strength of the belief may influence the attitudes towards the stimuli involved (Emmanuel & Delaney, 2014). Within this study, existing physical activity beliefs of students and their teachers were explored before prompts were placed around the school, and then again after the prompts had been in place. The purpose of this was to see if the prompts had impacted upon their existing physical activity beliefs. Perceptions are when an individual is confronted with a situation/stimuli, and interprets the stimuli into something meaningful to him/her based on prior experiences. A person’s awareness and acceptance of the stimuli plays an important role in the perception process – receptiveness to the stimuli may be limited by an individual’s existing beliefs, attitudes, motivations and personality (Assael, 1995). For example, within this study it will be explored how members of the school taking part in the study react, or not, to the stimuli (prompts) based upon their prior experience or beliefs surrounding physical activity. Physical activity beliefs and perceptions explored, with the use of both quantitative and qualitative methods, within this study included; self-efficacy,

decisional balance, perceived barriers and motivators and positive and negative attitudes towards physical activity.

Chapter 4: Methodology and Methods

4.1 Philosophical influences

Philosophic realism in general is defined as *'the view that entities exist independently of being perceived, or independently of our theories about them'* (Phillips, 1987, p.205). This research is underpinned by a 'subtle realist' philosophical stance. This position accepts that the data in social research can never be free from the researcher's own perspective, as researchers cannot escape the social world to examine it (Hammersley & Atkinson, 1995). Therefore, subtle realists assume that we can only know reality from our own perspective of it. The subtle realist perspective retains a belief in phenomena that are independent of the researcher and knowable through the research process, unlike radical relativist approaches such as social constructionism, that deny that there is any other reality other than their own construction of it (Maxwell, 2012). The subtle realist approach therefore accepts that other perspectives on the phenomenon are possible and all research involves subjective perceptions and observations, meaning different methods will produce different representations of the participants (Duncan & Nicol, 2004). This position also acknowledges that people have different views and it is possible to gain different yet equally valid descriptions of the same phenomenon, this reflects the complex nature of social reality (Snape & Spencer, 2003).

The researcher has adapted this position as it is compatible with the idea of combining both quantitative and qualitative research methods in order to address the complex multiple realities of a research question (Hammersley, 1992). Researchers such as Silverman (1993) and Miller and Crabtree (2000) have criticised the idea of the two methods as conflicting and are encouraging the use of mixed methodologies within health research to ensure that the best possible findings emerge from the research. Additionally, this type of research is usually conducted in more natural settings and the researcher will aim to collect more contextual or situational data (Hammersley & Atkinson 2007). Although, subtle realists are aware that they can't claim to have absolute certainty, their aim within research is to *'search for knowledge about which we can be reasonably confident'* (Murphy et al, 1998, p.69).

4.2 A mixed methods approach

As the study is exploring beliefs and perceptions towards physical activity with the use of prompts, the researcher thought it would be valuable to use a variety of research methods to gain the best possible insight into the topic. Therefore, this study utilised a mixed methods approach, which involves the collection and analysis of both quantitative and qualitative data (Creswell et al, 2003). The use of mixed methods is particularly useful in health research as stakeholders; practitioners etc. need to be provided with sufficient evidence as to whether an intervention is effective in reducing unhealthy behaviours and/or increasing more healthy behaviours, before they implement these interventions into practice or new policies.

The use of quantitative research methods provides the objective, statistical evidence as to whether an intervention is effective. Questionnaires are a useful method of data collection as they are quick and relatively easy to distribute, therefore they can be used to reach large amounts of the population to generate lots of data (Denscombe, 2007). However, participants are limited to a certain amount of answers and there is often no option for participants to expand on how they really feel about the issue. Therefore, qualitative methods, such as interviews, are useful as they allow the researcher to gain a deeper insight into the individual's opinions, thoughts, feelings and experiences surrounding the particular topic. Therefore, enabling the researcher to understand the issue from a more personal and subjective perspective (Lakshman et al, 2000). Therefore, a mixed methods approach was used in this study in order to enhance the credibility of the findings and to gain a fuller understanding of whether environmental prompts are an effective way of increasing physical activity.

4.3 Design

The study used a concurrent triangulation design (Creswell et al, 2003). This type of mixed methods design involves collecting both quantitative and qualitative data at the same time during the research process and then analysing the data from the two types of methods independently, using the traditional techniques associated with each data type (Creswell & Plano Clark, 2011). The researcher used this design “*to obtain different but complementary data on the same topic*” (Morse, 1991, p.122) to best understand the research problem.

This study was a natural experiment and involved placing prompts (wall stickers) around a school where they were clearly visible, such as on walls, doors and staircases. The first phase

(subliminal) included a picture of someone sat watching TV with text saying '*All night?*' The purpose of this was to get participants thinking about the amount of time they spend on sedentary activities. The second phase (call to action) included a picture of someone walking away from the TV with the text '*Ad break, TV break*'. The purpose of this phase was to get participants thinking about being more physically active and how this could be incorporated into their daily lives. See below for images of these prompts and refer to Appendix 1 for more examples of prompts used in the intervention.

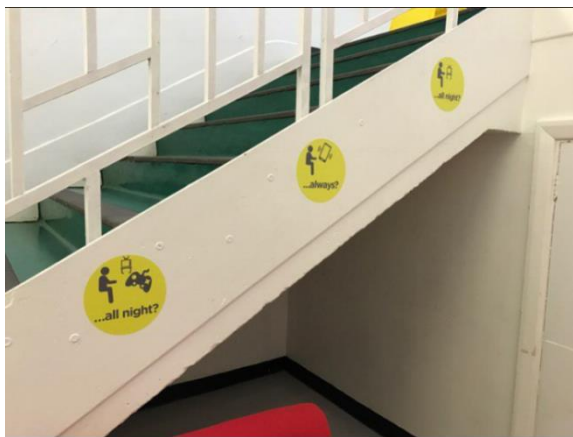


Image 1: Phase 1 prompt



Image 2: Phase 2 prompt

The first stage of the research was to collect pre-intervention (before prompts) data to identify existing physical activity beliefs, perceptions and behaviours. Following this, the first phase of prompts (subliminal phase) were placed around the school for 10 weeks. These were then replaced with the second phase of prompts (call to action phase), which were left around the school for six weeks. The final stages of data collection were then carried out (post-intervention) to identify whether the prompts had an impact on the participant's physical activity beliefs and perceptions.

4.4 Setting

The study took place in a secondary school in the North West of England. The school is located in an area where the total deprivation is very high in all areas including income deprivation, employment, health, education, crime, living environment and barriers to housing and services (Department for Communities and Local Government, 2015). This school was selected for the study as research indicates that socio-economic status has a great influence on physical activity participation.

4.5 Recruitment, sampling and participants

A number of schools, in areas of socio-economic deprivation, were contacted to see if they would be involved in the research, and this school came forward to take part. Participants were year 11 students (15/16 year olds) and teachers (all aged 30 or above) from the secondary school. The teachers were recruited on a volunteer basis, an email was sent to all individuals who worked within the school. The email asked if they would be willing to participate in two focus groups, and as an incentive they would receive a £10 voucher. It was also stated that participants should be inactive. Those who responded were included in the focus groups and were sent a participant information sheet (see Appendix 2) and consent form (Appendix 3). With regards to the students, 15/16 year old girls were selected to participate in the focus groups as physical activity levels in adolescent girls declines more significantly, than in boys. The students for the focus groups were also selected on a volunteer basis. A teacher at the school asked a number of year 11 girls to participate (also stated they should be inactive), and the ones who responded were sent the same information sheet and consent form as the teachers. Questionnaires were handed out to all staff working within in the school and all year 11 students; these were then completed if the participant was happy to take part in the study.

4.6 Qualitative data collection methods

Focus groups were conducted pre-intervention (before the prompts were placed around the school) and post-intervention (a few weeks after both phases of the prompts had been in place). One focus group consisted of seven members of staff (five females and 2 males) and the other focus group consisted of eight year 11 students (all females). The pre-intervention focus groups looked at existing physical activity beliefs, perceptions and behaviours. The post-intervention focus groups were used to explore the impact of a variety of subliminal, environmental prompts on physical activity beliefs and perceptions.

Focus groups were judged as the most appropriate method for qualitative data collection in this study as the researcher wanted to gain collective views and opinions on the topic of interest rather than exploring in-depth individual experiences, in which case individual interviews would have been more appropriate (Gill et al, 2008). Focus groups were also used as opposed to individual interviews as the interactions and communications between participants during the focus groups could perhaps bring about new discussions and ideas that

are of use to the research question but had not been pre-determined by the researcher (Forrester, 2010).

Due to the study being conducted in a school, and the staff having demanding workloads, it was easier to organise one focus group, during the lunch hour or after school, rather than having to organise many individual interviews at different times. The interview schedule for the focus group consisted of a few pre-determined, open-ended questions that were relevant to the research question (see Appendix 4 for interview schedule). The researcher had to remain neutral and avoid giving personal opinions throughout the focus group to ensure the participant's answers were not influenced in any way (Krueger & Casey, 2014).

4.7 Quantitative data collection methods

The questionnaires were administered to 85 members of staff and 87 year 11 students (15/16 year olds) both pre and post intervention. Participants were given The Stages of Change Instrument (Nigg & Riebe, 2002). The answers provided were used to identify which stage of The Transtheoretical Model each participant was in before and after the prompts were placed around the school. This is a well validated scale which has been recommended as a suitable measure by researchers in this field (Burbank et al, 2002; Greaney et al 2008).

Participants were also given the Barrier Self-Efficacy Questionnaire (Nigg et al, 2001). This measure has been reported as having a high internal reliability estimate of Cronbach alpha (α) = .85 (Paxton et al, 2008). Participants were also given a revised form (Paxton et al, 2008) of the Decisional Balance questionnaire originally developed by Nigg and Courneya (1998). This questionnaire was reported to have good internal consistency (Cronbach's α = .83 (*pros*) and .71 (*cons*)).

Within the questionnaire, questions measured positive and negative attitudes towards physical activity by using six statements regarding their positive attitudes (Motl et al, 2000) and eight statements regarding their negative attitudes (Nelson et al, 2010). This questionnaire has been reported to have high concurrent validity and also demonstrated high internal reliability of α = .82 (Nelson et al, 2010).

The final part of the questionnaire used The Processes of Change Questionnaire (Nigg et al, 2001). This questionnaire has been reported to have moderate to high reliability estimates ranging from α = .72 to .88 for experiential processes and α = .76 to .85 for the behavioural processes (Paxton et al, 2008). Please see Appendix 5 for full version of the questionnaire.

These questionnaires measured self-efficacy, decisional balance, processes of change and overall positive and negative attitudes to physical activity to gain an understanding of the physical activity beliefs and perceptions of the students and teachers in this school, before and after the prompts were placed. However, only 31 people completed the pre-intervention questionnaires and 10 people completed the post-intervention. One reason for this low response rate could be due to the length of the questionnaires. The setting of the study could also have played a role as the teachers and students at this school were busy with many things including OFSTED inspections and preparing for GCSE exams. Additionally, there were problems with identifying who had completed each questionnaire. As students were under 16 years old, they were asked to provide a false name (as advised by The School Research Ethics Panel), for anonymity, and many of them had forgotten what false name they had previously used as there was a long gap (six months) between them completing each one.

4.8 Data analysis

Due to the low response rate of questionnaires (31 pre-intervention questionnaires and 10 post-intervention questionnaires returned), the researcher was unable to run a statistical analysis to compare differences in individual responses before and after the prompts were placed around the school. Descriptive statistics (means and standard deviations) from the pre-intervention questionnaires were calculated, to see if there were any differences in responses between males and females. For example, to see whether males or females scored higher on the self-efficacy and decisional balance questionnaire. The researcher was unable to calculate the descriptive statistics from the post-intervention questionnaires as only 10 were completed.

All of the focus groups were audio recorded and transcribed verbatim. The data was then analysed using a form of thematic analysis; template analysis (King, 2004). This approach involves organising themes that are identified in the data into hierarchical clusters. Broad themes are sub-divided into several levels of more specific themes. Four templates were created; two for the pre-intervention focus groups and two for the post-intervention focus groups as the teachers and students data were analysed separately. Development of the templates allowed the researcher to look at patterns across the data. Template analysis can involve the use of *a priori* themes, which are identified prior to the analysis and are based on previous literature. These *a priori* themes are not fixed and can be modified during the analysis.

It is important to note that the role of the researcher could have influenced participant's answers as this was the first time the researcher had conducted focus groups. When transcribing and analysing the data from the focus groups there were times when the participants went slightly off subject and the researcher could have done more to bring them back to the desired subject, for example when the teaching staff went on to discussing the students physical activity beliefs and behaviours instead of their own. The researcher could have also prompted them more and asked additional questions as it was clear when analysing the data there were times when more information was needed.

4.9 Ethics

As it was a school setting, the study was approved by the School of Human and Health Sciences Research Ethics Panel before any of the participants were approached. An information sheet and consent form (Appendices 2 & 3) was given to each participant prior to the research being carried out, which included a contact email address in case anyone had further questions regarding the study. Participants were made aware that they could withdraw themselves from the study at any time and their data up until a certain date. Participants were also made aware that pseudo names would be used within the report in order to maintain their anonymity. No other personal details were taken which could lead to participants being identified. It was established that parental consent was not needed as the students were only responding to visual prompts placed around the school, therefore the school consent and student consent (as aged 15+) was sufficient. As the study took place with under 16 year olds, the researcher was required to get a DBS check before the research could be carried out.

Chapter 5: Findings

5.1 Quantitative analysis

Tables 1 and 2 below provide descriptive data on the pre-intervention questionnaires. Decisional balance scores greater than 0 show that respondent's report more benefits than barriers to being active. A score less than 0 shows that respondent's report more barriers than benefits to being active. As can be seen from the table, males scored higher than females on the decisional balance and positive attitudes towards physical activity questionnaires, showing that they reported more benefits than barriers of being physically active. Males also scored higher, than females, on the processes of change questionnaire. Additionally, females

scored higher, than males, on the negative attitudes towards physical activity questionnaire. With regards to self-efficacy, most respondent's rated themselves within an average range on the scale (possible range of scores was between 6 and 30), with the females (M=16.62) scoring slightly higher than males (M=15.5). The questionnaires were obtained from both staff and students. However, only 1 male member of staff and 3 female members of staff completed the questionnaires, and so the researcher was unable to see whether different results emerged from the questionnaires between staff and students.

Table 1. Female mean scores and standard deviations from the pre-intervention questionnaires (N=21)

Variable	Mean	SD	Range
Self-efficacy	16.62	6.22	6-30
Decisional balance	-0.2	1.37	-4-4
Positive attitudes	19.76	5.89	6-30
Negative attitudes	24.86	10.13	8-40
Processes of change	2.14	0.8	1-5

Table 2. Male mean scores and standard deviations from the pre-intervention questionnaires (N=10)

Variable	Mean	SD	Range
Self-efficacy	15.5	4.45	6-30
Decisional balance	1.14	1.09	-4-4
Positive attitudes	23.4	2.46	6-30
Negative attitudes	19	8.37	8-40
Processes of change	2.84	0.5	1-5

The pre-intervention stages of change questionnaire identified that 9 females and 2 males were in the pre-contemplation stage of the TTM. 7 females and 8 males were in the maintenance stage and 4 females and 1 male were in the action stage of the TTM.

There was a low response for the quantitative data with 31 completed pre-intervention questionnaires and only 10 completed post-intervention questionnaires. With such a low response rate, the researcher was unable to run a statistical analysis to see if individual responses changed post-intervention (after the prompts had been in place). Possible reasons for the low response rate could be due to time constraints of students and teachers and

perhaps a questionnaire was not the most appropriate for this setting. This suggests the unreliability of data collected using questionnaires in a small-scale study with this particular age group, in this setting. It highlights the importance of a qualitative approach which reflects more accurately beliefs and perceptions of the participants in this study.

5.2 Qualitative analysis

Pre-intervention - Staff

The focus groups were conducted before the prompts were placed around the school, and then again six months after the prompts had been in place. The focus groups with the teaching staff consisted of 5 females and 2 males, all aged 30 years old or above. The data was transcribed and analysed using Template Analysis. The aim of the pre-interventions focus groups was to explore the teachers existing beliefs and perceptions towards physical activity, and to gain an insight into their existing physical activity behaviours. The main themes that were identified from the pre-intervention focus groups with the teaching staff were; physical ailments, the daily struggle and time constraints, self-efficacy and self-belief and facilitators of physical activity. See below for the final template of themes that were identified within the pre-intervention focus group with the teachers.

1. Physical ailments

- 1.1 Discomfort
- 1.2 Aggravating condition
- 1.3 Acknowledge that PA would improve condition

2. The Daily Struggle and time constraints

- 2.1 Mood is low
- 2.2 People only have so much willpower (which they use in daily life...so exercise needs to be sold as not a chore)
- 2.3 Life is all filled with responsibilities (children, cleaning, chores)
- 2.4 Demanding workload as teachers
 - 2.4.1 Tiredness after work/lethargy
 - 2.4.2 The need to relax and switch off after work (exercise not associated with switching off)
 - 2.4.3 Associating identity as apathetic/lazy – the 'laziness factor'
- 2.5 Personal time limited and physical activity seen as low priority in life

3. Self-efficacy and self-belief

- 3.1 What is the point? Will I see a result?
- 3.2 People do what they enjoy....you can't enjoy something you don't think you are good at...or that you are not sure you can do
- 3.3 Low self-efficacy and self-belief to overcome negative health habits
 - 3.3.1 Difficult for positive health habits to stick

4. Facilitators of physical activity

- 4.1 Social/community aspects
- 4.2 Neighbourhood/local aesthetics

Figure 1: Final template of themes from the adult pre-intervention focus group

Physical ailments

One of the main themes identified that were preventing the adults being physically active were physical ailments. Half of the teachers in the focus group had a condition or injury which prevented them from being active due to pain during activity, or afterwards;

'I don't exercise very much these days because I've got a really bad back that's that bad it's inoperable. So if I do anything that's intensive that enables me to lose weight I can't do it because I'm in pain. I can't walk the next day.'

'I've injured my back so I'm undergoing physio'

Another participant commented on how joint pain prevents her from being active in daily life due to discomfort;

'Because my knees are bad I can't walk that far anyway, or do that much so it does impact on my school life, the stairs that we have. Sometimes I'll stay in my lab thinking 'I'm not walking down two flights of stairs just to get this, I'll wait'...it makes me quite sad as

well, I'd like to be able to walk and do all this but physically I can't do it until the bones of my knees have got fixed.'

On the other hand, for some participants their condition was a motivator to participate in physical activity;

'I have rheumatoid arthritis and I've had that since I was diagnosed when I was twenty-six... so I do Pilates regularly... basically if your muscles are stronger around the joints it helps protect the joints which was the first piece of advice I was given when I was diagnosed... I was much more sedentary in my twenties until I got diagnosed and then had to start picking some things up and losing weight'

The daily struggle and time constraints

Another important theme that was identified as a barrier to physical activity for these teachers was their 'daily struggle'. It is evident from the data that these participants daily lives are filled with many different responsibilities such as their job, having children, household chores etc. The participants all expressed how teaching can be very demanding and they all have busy workloads;

'Permanently switched on...which is why alcohol plays a big part for teachers particularly... because it's like being on stage. It's a performance, teaching is like being on stage for five hours'

'Five hours and you're bang bang bang, next kids come in... bang bang bang, end of the day'

The teachers only get a thirty minute lunch break and this acted as a barrier for them to participate in any physical activity. One teacher commented on how she has to eat at her desk as well as running a club due to time constraints;

'It's work and eat. I eat at my desk... run a club and eat.'

Another teacher acknowledges how she could use the gym available at the school during lunch but she would rather get her work done so that she has more 'free time' for herself after work;

'I do think, because they've got a multi gym here...maybe I could spend half an hour in the gym here and then a quick shower and lunch, but then I just thought 'hold on... if you go bang bang through the day, you finish early you've got that time at the end of the day'

It was clear from the focus group that these teachers described being physically and mentally drained at the end of the school day and so when they get home they want to relax and take their mind away from work. As mentioned earlier, individuals often associate taking part in physical activity as too tiring, hard work and perhaps see it as an ‘extra chore’ that they have to do after work. This was also evident in this study:

‘And sometimes you miss that moment of exercise, you get home, I want to exercise but I just need to do this, need to do that’

‘When you were saying about the stress release what I’ve noticed is when you come home you’re tired, you’re knackered, you’ve been marking you’re stressed out, the easiest option is to sit, chill, relax, do nothing, Netflix, and that’s the easiest thing and it makes you feel that instant good, but what I’ve found is if you force yourself out the door you get the exercise and you feel so much better... it’s that battle of just getting out that door’

‘I find it a huge effort to get my backside out the door’

The teachers in this focus group also had parental responsibilities, they have to get their children ready for school and take them before getting to work themselves. Some of them also have to take their children to clubs after school;

‘I mean I guess I could cycle but I’m a single mum so it’s in a morning getting my daughter to school and then getting here’

‘A lot of the things that I do, she dances (daughter) for like 8 hours a week so a lot of it is me taking her to places and then watching her dancing’

‘I get my daughter to bed which is now getting later and by the time she’s gone to bed I do, I want to sit on the sofa, I want to watch something that takes my mind away completely from anything to do with work...trying to find myself the energy at that point to do – and that’s what I was finding, I couldn’t make myself do anything in the evening because I was just too tired’ (single parent).

‘When I’m at home with the three children I find that much more tiring’

As the teachers lives were filled with many responsibilities both at home and in work, this acted as a barrier to taking part in regular physical activity. Personal time was an issue so exercising/taking part in physical activity was often a low priority. However, for one person the fact that his children participate in clubs meant that he was more active;

'I probably do more now that we've got children because they've got after school clubs, football, cricket, so I find myself getting involved in that a bit as well'

Feeling tired/lethargic after work and the need to relax emerged as common reasons for why these teachers do not engage in regular physical activity after work. One reported;

'I drive to work, I'm lazy, I only live a mile away so I should walk'

Another teacher said;

'Now what I find is it's time and energy, I've either got time and no energy or I've got energy and no time.'

One participant also mentioned that she lives within walking distance of a new leisure centre but is 'too lazy' to use it. In this focus group the participants admit that they could make more active choices but they don't actually want to and use the fact that they have limited time and energy as a reason for not doing so. Other common reasons for not being physically active that emerged from the data were tiredness after work and the need to switch off. As mentioned earlier, individuals often do not associate physical activity with 'switching off' and 'unwinding' from their day at work and tend to take part in sedentary activities such as watching TV as a way to relax after work;

'Yes it's nice to watch some mindless TV and not have to think about anything, do what you want'.

Self-efficacy and self-belief

Another theme that emerged from the data was self-efficacy and self-belief to being physically active. One teacher in this study expressed how she is not able to take part in high-intensity physical activity that could enable her to lose any weight and therefore she did not see the point;

'I would like to but I can't. Well I can to a certain degree but not enough that will enable me to lose enough weight'

'I can't do the intensity to lose any weight.'

Although in the first focus group the teachers reported being aware of the benefits of physical activity, they acknowledged they had 'negative health habits'/routines such as drinking alcohol and watching TV. These were seen as coping strategies for managing their professional and home life. Their managing strategies acted as a barrier to having the self-

belief and motivation to increase physical activity and improve their health. For example one teacher said;

‘It consists of pretty much sitting on the sofa watching TV or going out shopping. I don’t walk anywhere, I drive everywhere and that’s about it really’

Another teacher commented;

‘Make tea, tidy around, bottle of wine, feet up in front of the telly’.

Whilst another explained her change in behaviour at the weekends when the pressure of school work is less;

‘The weekend is when I do the drinking... I don’t drink in the week but I do catch up with it at the weekend which is bad but that’s the pattern because you can... you let yourself do it. Friday, Saturday, bad food, bad drink.’

Again, the teachers overwhelmingly reported being aware of the link between physical activity and healthy eating to their overall health, yet many explained the difficulty they experienced in actually continuing a healthy lifestyle. Their awareness did not translate into self-efficacy and self-belief to become physically active. For example, one teacher said;

‘I have bad eating habits as well so I’m in a constant flux of exercise, injury, bad eating, doing a bit, so I probably exercise on a good week about four times a week, on a bad week zero times a week’.

Another teacher said;

‘Slowly bad habits creep back in and I’ve probably put another twenty kilos back on’

‘I’ll go and do a two mile run and come back going “Awesome, can’t wait to do it tomorrow night” but five minute before tomorrow night, stay in, bottle of wine, eat chocolate, so it’s that getting out of the door’

Although the teachers were in the same physical school environment as the students their comments were more about the adult pressures of managing home and work and this impact on their health, whereas the students commented more on how the whole school environment acted as a barrier to physical activity. Unlike the students, the teachers were more aware and more able to discuss how their beliefs and behaviour acted on their health. However, similar to the students, this did not encourage them to increase their physical activity.

Facilitators of physical activity

While generally throughout the focus group, more barriers to physical activity were reported than facilitators, the teachers did make comments as to what does motivate them to participate in physical activity. Similar to the students, one teacher commented on the social aspect to physical activity, and how that motivated him;

‘My mate has just started getting fit and doing exercise at the gym...he helped me with the gym a bit and then park runs...I joined that to get fit and met such a good group of people... it was a community thing which is brilliant and I never looked back.’

Another teacher commented on how having nice places to walk in their local area acted as a motivator to be active;

‘I try and walk everywhere around the village and stuff, and then I try and walk as well on weekends because we’ve got some nice walks around where we live, so I do purposely try and get out.’

Post-intervention – Staff

Six months after the first focus group and after the prompt-intervention, the teachers were invited to participate in a second focus group. The purpose of the post-intervention focus groups was to explore whether environmental prompts (nudges) had an influence on the teachers beliefs and perceptions towards physical activity. The main themes that were identified from the post-intervention focus groups with the staff were nudging to increasing awareness, teacher response to the prompts and teacher insights into students engagement with physical activity. See below for final template of these themes.

1. Nudging to increase awareness

1.1 Prompts act as reminders for those already active or contemplating

1.1.2 Making individuals more aware of incorporating physical activity into daily life

1.2 There is a need for additional interventions to change behaviour

2. Teacher response to the prompts

2.1 Uncertain of the purpose/message of the prompts

2.2 Prompts age inappropriate – teachers thought they were for students only

2.3 Suggestions made for improvement of prompts

2.3.1 Categorise posters into fear or motivational

2.3.2 Make prompts age specific – target audience important when designing prompts

2.3.3 Make health benefits of PA clear

3. Teacher insights into student engagement with PA

3.1 Suggests it's easier to discuss PA and health as an issue rather than discuss own health

3.2 Students spend too long on sedentary activities

3.2.1 Technology culture being reinforced by their parents

3.2.2 Acknowledgement that media can have a positive effect on PA

3.3 Students disengaged with PA

3.3.1 PA seen as a chore/punishment

3.3.2 Attitudes towards PA need changing

3.3.3 Prompts alone are not enough to change attitudes

3.4 Emphasis with PA needs to be based on praise

3.5 Students need to be made aware of different ways to be active

3.6 Economic factors need to be addressed (cost of taking part in some PA is high)

Figure 2: Final template of themes from the adult post-intervention focus group

Nudging to increase awareness

One finding that emerged from the data was that the prompts were effective in increasing awareness about physical activity. For one individual the prompts were effective as they made her more aware of being active and made her think about small changes she could make in her daily life to become more physically active;

'I'm trying to be a bit more aware of how much I'm walking and kind of thinking...instead of taking the car to go to the cash machine, I walked to the cash machine and back, little things like that that have definitely helped...making the most of the time I've got'

'It does make you think about things definitely, as you're walking around you look and think oh actually instead of checking Facebook at an advert break... I actually at that point could, even just tidying that stuff up now, I'm trying to break it up, making sure there's a bit more activity so you're not sat for too long, it's made me think about making the most out of the time that I've got.'

'I'm a single mum, and you find yourself constrained with all the things that you're doing there, and the thing that it did make me think about... little things you can add in that don't necessarily take away the precious time that you've got but make the most of the time that you have, it just makes me a little bit more aware I guess.'

Here this teacher repeatedly mentions how the prompts made her aware of making the most out of the time she has and so she tries to fit activity in wherever she can. The prompts acted to nudge this busy individual who reported 'lack of time' as a barrier to physical activity to incorporate activity into her daily life by making small changes e.g. walking instead of driving short distances. She also stated how she had recently bought a pedometer in order to keep track of her activity; although it is not known whether this was a direct result of the prompts, it shows that direct action was taken to increase her physical activity for improved health.

Another teacher stated how the prompts were effective in raising his awareness to become more active. He said;

'I mean it's done the job it's brought awareness up I'd say for quite a lot of people, it's just whether it's been enough to get them to do something about it.'

He did feel however, that the prompts alone were not enough for him to change his behaviour;

'Did it make me think about it? Yes. Did it make me go and do anything? Probably no.'

The prompts appeared to nudge existing behaviour rather than to form new behaviours. The prompts appeared to rely on existing beliefs, perceptions and knowledge to change behaviour.

Teacher response to the prompts

However, for the rest of the participants in the focus group, although they all noticed the prompts, they had no effect on their physical activity beliefs and perceptions.

'I've noticed these things around school but to be honest I've not paid much attention.'

'I did notice the prompts, they had no effect on me I just kind of saw new stickers on the wall.'

'Well I do a bit of walking I don't think I do any more than I did if I'm being honest and I do know what you're on about with the prompts but I'm not sure what they were supposed to do.'

The lack of success of the prompts does not appear to be through apathy. The prompts were criticised by some of the teachers, for having no clear message as they stated how they weren't sure what the prompts were telling them to do. Rather than not seeing the prompts, some of the teachers reported being unsure and uncertain of their purpose.

'I know it says ad break, well ad breaks are like two minutes long... what do you do in two minutes? I'm not sure'

'By the time you've got your shoes on its time to sit back down'

'That's right, I didn't know what it was telling me to do'

Clearly the teachers felt the prompts were age inappropriate as they thought they were for the students. With one teacher commenting;

'In some ways the cartoon nature of it might have taken away some of the seriousness of it.'

And another teaching stating;

'I saw them in school and I thought people would click on, but again I thought it was more for the kids, but I didn't think they'd get it.'

Suggestions were made by the teachers on ways the posters could be improved to encourage people to exercise;

'Well you've either got encouragement or fear haven't you...you can do motivational posters with people going out for a run, people going out walking kind of like you can do it one step at a time or are you going to do 'this is what will happen if you don't' ...'

As teachers they responded to the issue of how to make information clear, accessible and to engage the reader. Another teacher suggested;

'I think the idea of actually making it clear to people that they don't have to be going out running marathons... but the idea of having something with actual pictures and you know 'did you know if you walk for an extra ten minutes a day it will cause these benefits' ... it

could actually make people go ‘oh I can do that’ ... if you kind of make people realise that these tiny little changes could help and then it’s just about building on that.’

The data suggests that prompts need to be age specific so that individuals can relate subliminally to the messages contained. In the focus group the teachers felt that the prompts used in this study did not relate to them and they made concrete suggestions for improving the prompts for future use. The fact that the prompts had limited impact on the teachers could be seen to be a matter of age inappropriate prompts rather than a measure of the responsiveness of the teachers to improving their physical activity.

Teacher insights into student engagement with physical activity

Following their professional interest in how to engage the students by using prompts, the teachers discussed the physical activity beliefs and behaviours of their students. They were more engaged in discussing the student’s physical activity beliefs and behaviours than their own. It suggests it is easier to discuss physical activity and the health benefits as an issue rather than explore how to change one’s own behaviour. The teachers commented on how much time the students spend on sedentary activities such as playing on video games, on social media and watching TV;

‘The biggest problem is that the pool of electronic games is massive...’

‘Kids having all this flash bangy stuff at home and they couldn’t sit in a two hour maths lesson and it’s not flash bangy so they just switch off they’ve got a low boredom threshold, I’ve got a Frisbee or I can play on this, movies and blowing stuff up... it’s also about attention span as well.’

This technology culture could be being reinforced by their parents as the teachers report many of them spend their free time on these sedentary activities;

‘And now we’re getting the kids of the electronic age kids having kids so it’s multiplying the effect’

‘It’s the parents in the local community as well because to be honest quite a lot of parents of the kids at this school are thirty years old and that’s the reason why our kids end up playing Grand Theft Auto and things like that because their parents are playing it...’

The teachers also state how parents may discourage their children from taking part in activity outside of school as they would rather them be at home where they know they are safe;

'There's the safe thing the idea that they think they're safe and if they're in the house and they're on the games they know where they are and they're not getting into trouble and if they go outside... what if they get hurt, what if they get into trouble... they've been brought up to think that going outside has its dangers so that's why it needs to be group things they they're doing where they feel safe and their families feel safe.'

In contrast, the teachers also acknowledge how media can have a positive influence on physical activity participation;

'Last year there were however many kids going around during their breaks and lunchtimes doing Pokémon Go and stuff, girls doing it...it's the first time I'd even seen them outside during break time.'

'Maybe if it was advertised on social media for them because that's where they spend most of their time.'

This suggests that prompts to increase activity may be more effective if they pop up on social media/TV rather than posters on walls as we have found that adolescents spend the majority of their time on phones, laptops etc. Suggestions were also made as to how the media can be used to entice children and adolescents to participate in physical activity;

'Capitalise on the social events as well cos' whenever there's a London marathon there's a huge intake and so maybe adjust to what's happening in the media... when we have the Olympics or when there's the rugby seven nations on maybe rotate the posters and link to what's happening in the media and news.'

This is a useful point as we have found that these adolescents spend the majority of their time on social media or watching TV and so linking PE and sports in schools and communities to the events in the media may be an effective way to encourage adolescents to try new sports and physical activities.

The teachers also support what the students said in their focus groups with regards to their lack of interest in PE and physical activities as they have noticed a decline in the uptake of extra-curricular activities;

'Kids are just not interested these days unfortunately... it's all about wanting to go home and do this.'

'We are finding that in PE the uptake on extra-curricular is massively changing, we used to have 30-40 to Netball practice, you're lucky if you get five or six now.'

It was also commented on how exercise can be perceived as chore or a punishment for children and adolescents;

'The kids want to play on the DVD's, the Xbox and then it becomes almost a chore or it's a telling off or a punishment when the mother says 'you need to go outside'... mentally already it's a punishment, sanction...so we need to reverse that.'

This participant is suggesting how perceptions of physical activity need changing and here his quotes indicate that posters alone are not enough. One participant also commented on how adolescents might not see the point of taking part in physical activity;

'In the teens you've got the girls that are still slim because of their metabolism and it's when you get to your twenties that you suddenly realise that not being active starts to have an impact on your figure and that's when they start to care about it.'

Adolescents may not think about the health benefits associated with physical activity (unlike adults) as young people usually experience fewer health problems (Pan et al, 2009). The teachers also stated how emphasis needs to be based on praise and rewarding individuals for their participation in physical activity;

'Praise is three times more effective than criticism and so it's based on what have you done today.'

'The things that work with me are, the very first time that I met a target, mines connected to my phone (Fibit), I got a free audio book and I was like brilliant!'

'Sometimes we're so focused on the negative and not actually focused on the little things that they are doing and if we keep saying 'oh they won't do it', they don't do it.'

Another finding that emerged from the data was education and providing information about physical activity to students. It was suggested that both parents and students need educating on the benefits of physical activity and the consequences of being sedentary;

'I think it's an education factor that you know our level of education has the understanding of you need to be getting out, you need to be doing exercise.'

The teachers also stated how the students need to be made aware of different ways in which they can be active. They should also be provided with information such as what clubs/facilities are available to them locally so they know where and how they can participate in physical activity;

‘Tie it to something that’s specific, something local where you can give them numbers, website addresses, Facebook pages that say... did you know there is a session that you could go to that’s training in the park or there’s this...’

‘Maybe they think that activity is going out for a jog or going to the gym...if we actually had posters around that kept reminding them that there’s different ways of being active.’

Another important aspect that impacted on student participation was economic factors. As the teachers point out, things like gym memberships, sports equipment and clothing can be expensive and some parents may not be able to afford to pay for their child to take part;

‘It’s the parents who can afford it as well, it’s not cheap.’

‘It’s about bringing it to them, particularly to under privileged kids and making sure that they are actually able to do it.’

‘If it was able to make it that they have free access to rackets and things like that and they didn’t have to actually pay to engage in it....’

The post-intervention focus group showed clearly the teachers were more willing and able to discuss the physical activity beliefs, perceptions and behaviours of their students rather than discuss their own beliefs, perceptions and behaviour. They showed a clear understanding of the health benefits of improved physical activity however pointed out how their work and home life prevented them turning this understanding into action. There was indication of where an individual had already begun changing her behaviour to incorporate physical activity into her daily life; therefore her response to the prompts was positive. Where there was little or no change in beliefs, perceptions and behaviour the prompts were ineffective and were seen as age inappropriate and not relevant. The teachers were however very engaged in the wider issue of their student’s physical activity and health and had many suggestions on how to engage them in ways other than using prompts.

Pre-intervention – Students

The second part of the qualitative data looked at eight year 11 students (all females), again using pre-prompt intervention focus groups and post intervention focus groups. These were six months apart and the post-intervention focus groups took place after the visual prompts had been placed around the school, in the same way as for the teachers. In the pre-intervention focus group the students were asked about their existing physical activity beliefs, perceptions and behaviour. The main themes that were identified from the pre-intervention focus groups with the students was the whole school environment, self-efficacy, social influences, competing factors and a lack of physical activity facilities in the local area. See below for final template of themes from the pre-intervention focus group.

1. Whole school environment and student physical self-efficacy

1.1 School policy environment (short breaks, timetable, PE uniforms, phones allowed)

1.2 School cultural environment (exam pressure, low status of PE)

1.3 School physical environment (lack of privacy in changing rooms, lack of space to be active)

2. Self-efficacy and PA

2.1 Lack of self-efficacy when taking part in organised PA at school

2.1.1 Linked to being judged negatively by peers

3. Social influence

3.1 Role models

3.1.1 Relationships with PE teachers

3.1.2 Same sex leaders – important for girls

3.2 Peer influence (can have a positive or negative effect)

3.2.1 Girls prefer single sex PE classes

4. Competing factors to PA

4.1 Sedentary activities (TV, social media)

4.2 Students want to go home and relax/switch off after school

4.2.1 This is linked to being too tired from the school day

4.3 Socialising with friends

4.4 Homework

4.5 Looking after siblings

4.6 Chores

5. Lack of PA facilities in local area

Figure 3: Final template of themes from the student pre-intervention focus group

Whole school environment and student physical self-efficacy

One of the main themes that emerged from the data was the school policy and cultural environment. This includes the timetable, short breaks, focus on exams and sitting at desks all day. What emerged was how difficult students found organising their own physical activity within the school environment and timetable. The school policy environment acted to inhibit

physical self-efficacy as in this particular school the students only have a very short lunch hour of thirty minutes which doesn't allow much time for them to eat and to also take part in extra-curricular activities such as sports clubs. One student said;

'You just waste half your lunch just to get to your lunch and then by the time you get your lunch and then you get to the stairs and then you've got about five minutes to eat it... and then you've got to go to lesson again.'

With another student stating;

'I go to the canteen and then I get my lunch, I have to wait for like half my lunch and then I go to the stairs'

The students often stated how they got more time at break/lunch times in primary school. When discussing what they did in their break time the students described sitting and talking to friends, chatting and sitting on the stairs. Whilst social, this activity is mainly physically inactive. The students described activities such as using phones out of lessons, connecting to Facebook and meeting friends. Again these are social activities but with limited physical activity. This appeared to respond to school timetable where break time was seen as a social time where students could use phones or occupy space like stairways to meet friends. All of the students in the focus group said that they spend their break and lunch times sitting by the stairs talking to each other or on their mobile phones;

'I sit and talk with them guys on the stairs'

'I just sit and talk to my friends'

'I just chat with friends'

'Sometimes we go get food and then take it to the stairs'

'We're not allowed phones in lesson but at break and lunch that's our time so we can do what we want and go on our phones and stuff'

'Every person I walk past they're always like this...food in one hand, phone in the other'

As PE is not a core curriculum subject students are allowed to opt out of PE lessons giving it a low status within the school. For example, one student said;

'I don't do it, I don't really do it'

Another student explained;

'But if I don't want to do it I just bring a note in'.

The students described how they find PE lessons and after school clubs *'boring'*, some of them stated that they opt out of lessons and when asked whether they like PE lessons half of the students in the focus group said they disliked it. The students also stated that they would only stay behind to take part in clubs if it was something that they enjoyed doing. One student commented;

'If there were after school clubs I wouldn't go anyway, cos' they just don't do anything good'

'If there was a trampolining club I'd do it, but there isn't.

As we see above, the school policy and cultural environment makes it difficult for students to have any physical self-efficacy. When the students were asked if they would prefer to have a longer lunch hour so they could attend a club at lunch time they all reported being embarrassed with one expressing; *'hell no, it's embarrassing'*. Another respondent's comments show how they are not in control of their timetable and when they might choose to be physically active;

'I'd rather do something like that at the end of school because you get so hot and sweaty and then you've got to do the rest of the day'.

Another school policy that came up as a barrier to the students participating in PE lessons was the PE uniforms that they are required to wear during PE. The students all stated how they disliked wearing their PE uniforms and would prefer to wear all black tops;

'We have to wear these stupid tops... we like the black t-shirts more'

The physical school environment also acted as a barrier to physical activity. There are showers in the changing rooms at the school however the students said they would not use them due to the lack of individual privacy;

'I'd never have a shower in the school, ever.'

'You'd just all be stood there together.'

'It's not really like private like when you go in there you've just got a bit of a wall.'

These quotes are showing how the whole school environment (policy, cultural and physical) has a negative impact on the physical activity beliefs and perceptions of these students and acts as a barrier for them taking part in physical activity.

Self-efficacy and physical activity

Another barrier to physical activity participation for these adolescents was their perceived physical ability and self-efficacy within peer groups at school. It was clear from this focus group that these students lacked confidence in their ability to take part in some organised sports/activities at school. One student commented;

'Cos' it's just embarrassing, people are judgemental and some of the moves are quite hard to do' (Zumba).

With another student stating;

'It's something I'd do at home, Zumba'

When asked what their favourite activity was to do during PE lessons one student said;

'Table tennis cos you just stand there... at least you're not doing stuff'

This comment suggests that this student may prefer to take part in activities, like table tennis, as it doesn't involve much physical ability and exertion. This could be linked to fear of being negatively judged by peers when taking part in more high-intensity physical activities. Or it could be because they are able to play table tennis without having to wear PE uniforms/sports clothing and then they don't have to worry about spending the rest of the day in school 'being sweaty'.

Social influence

An important influence on adolescent's participation in physical activity is the presence of positive role models and social support provided from significant others such as peers, family and teachers. It is evident from the data that the students did not have good relationships with their PE teachers. The comments from the focus group were clear in their dislike and discomfort with PE teachers. Overwhelmingly, their comments were negative such as;

'I do not like my PE teacher'

'I don't like any of them, they're all horrible'

'She doesn't like me, I don't know what it is she just doesn't like me'

The students also expressed that their ideal PE teacher or person to run a physical activity session would have to be a woman. In some instances having a male PE teacher was viewed as preventing any participation at all as one student said;

‘Depends what it is and depends who would run it as well... a woman. I’d feel more comfortable than if it was a man then forget it’.

Peer influence had a negative effect on some of the students’ physical activity participation as one student commented;

‘And it just depends who’s in there (PE lessons) cos some people are judgemental’

For another student, peer influence had a positive effect on her physical activity participation as her friends joining the gym acted as a motivator for her to do so;

‘Because a lot of my friends are doing it as well’ (going to the gym)

One student also commented on how the only club at school that works is netball as they’ve got a team for it, showing the importance of the social aspect for adolescents participating in physical activity;

‘The only thing that really works is netball because there’s been a team for a while now’

The presence of male school peers also came up as an important barrier to these students participating in PE lessons with the students expressing these comments;

‘It would have to be all girls as well’

‘Not the boys cos’ they just mess around most of them’

‘But the boys are too rough’

These quotes are showing how social support (or lack of) from significant others such as peers and teachers can have significant positive or negative impacts on the physical activity beliefs and perceptions of adolescent girls.

Competing factors to physical activity

Whilst it’s clear to see that the whole school environment limited individual physical self-efficacy, the students did not report much physical activity outside of school either. All of the students in the focus group reported that they spend their free time after school on sedentary activities such as watching television and spending time on social media on their phones and laptops, rather than spending this time being physically active. When the students were asked if they would go to after school physical activity-based clubs they all said no, with one student commenting;

'I want to go home, I'm so tired from school, I just want to go home.'

A similar comment was expressed by another student;

'I just want to go home. I don't want to stay here.'

This is further supporting how the whole school environment has a negative impact on these students as they are too tired at the end of the school day to stay and take part in any extra-curricular physical activity clubs. Similar to the teachers, other reasons that the students gave for wanting to go home straight after school included *'getting comfy'*, *'chilling out'*, sedentary activities such as watching TV and social media and to eat snacks. However, some students reported that they would spend some of their free time after school being active such as walking their dog or walking around outside with friends – although not high-intensity activities, the students are still participating in some physical activity here. In some ways media influences had a positive effect on the student's physical activity participation. For example, students commented on the Pokémon Go game and how this made them walk more;

'Tend to walk around on the Pokémon game, that's what I actually do'

'Yeah I used to stay in, it's like a hobby. I enjoy doing it its quite fun actually...it gets you walking around everywhere'

Non-physical social activity was described as important outside of school, as well as in school. One student also stated;

'The only reason I leave my house is to go to someone else's house.'

Some of the students also reported other barriers to physical activity such as having homework to do, chores and looking after their younger siblings. Many of the students reported having to drop their younger brother or sister off at school before they start school themselves. Some of these students also then have to pick their siblings up after school, take them home and look after them until their parents get home from school. With one student commenting;

'I get home, look after my brother, then have tea'.

And another stating;

'I have to take my brother to school'

These students would therefore struggle to take part in any after school clubs or attend gyms/leisure facilities after school as their time is taken up from looking after younger siblings. Some of the students also reported having homework to do after school;

'Do some chores, do my homework'

'I either sit on the settee or do my homework'

Lack of physical activity facilities in local area

Another barrier mentioned to being physically active by these students was a lack of facilities in their local area. The students reported a lack of age appropriate sports/physical activity within their local area;

'If we had stuff to do outside of school I'd probably go but there's not much to do.'

'I do have time after school but there's never anything interesting to do... well they do but it's all older people.'

In the pre-intervention focus group, whilst the whole school environment limited physical self-efficacy, the students did not appear to be motivated outside of school to increase their physical activity either. Competing factors such as socialising with friends and media influences took priority over taking part in physical activity. Out of school constraints such as, home responsibilities and homework also acted to limit physical activity.

Post-intervention – Students

Like with the teachers, the purpose of the post-intervention focus groups was to explore the impact of environmental prompts (nudges) on the student's physical activity beliefs and perceptions. Overall, the second focus group data showed little change in response to the prompts. The prompts did not appear to engage the students or increase their physical activity at school. The main themes that emerged from the post-intervention focus groups with the students were disengagement from physical activity, prioritising academic achievement over physical activity and issues with the prompt intervention. See below for final template of themes identified from the post-intervention focus group.

1. Disengagement from PA

1.1 Lack of interest

1.2 Lack of physical self-efficacy

1.3 Prompts not enough to change attitudes

1.4 Schools need to do more to engage girls in PA – whole school environment needs to promote PA

1.5 Adolescents need to be given choice with regards to PA

2. Prioritising academic achievement over PA

2.1 Exam pressure and worries of getting into college

2.2 Prompts not enough to overcome barriers of whole school environment and disengagement from PA

3. Issues with the prompt intervention

3.1 Students uncertain of the purpose/message of the prompts

3.2 Intervention setting (school) may have influenced the successfulness of prompts

3.3 Age group of students difficult to engage in research

Figure 4: Final template of themes from the student post-intervention focus group

Disengagement from physical activity

One of the main themes that emerged from the data was the student's disengagement from physical activity. It was clear from the data that these prompts were not effective in influencing their beliefs and perceptions towards physical activity as the student's reported not paying much attention to them;

'I've seen them but not paid much attention' (this was repeated by four of the girls).

As we found in the pre-intervention focus groups the students interviewed had a lack of interest towards physical activity and lacked physical self-efficacy. These factors were still evident in the post-intervention focus groups as the students showed no enthusiasm towards taking part in most physical activity. All of the students mentioned numerous times throughout the focus groups that they would like to take part in trampolining;

'They just don't do anything good...they used to do trampolining and stuff but they can't even do that anymore'

'We always used to ask to do trampolining in PE but we never get to do it because the person that used to do it isn't here.'

'Every time I want to do trampolining she says you can't do it'

'They've got the certificates for it but it's ran out...and they don't have the qualifications to do that kinda stuff'

'The PE teacher we've got said that she needs to update it and needs training and we're never allowed to go on them'

This reinforces how the school policy environment acts to limit choice as, even though all of the students expressed an interest, trampolining was not offered as a PE curriculum subject. This could have led to the students' enjoyment in PE and enhanced their physical self-efficacy; yet the school was not able to respond as there was not a qualified teacher available.

Where students were motivated and saw physical activity as fun they reported enjoying the social aspects rather than the health benefits;

'Well sometimes I used to play football or we just kick a ball about... I still do it I went out the other day and there was like a group of us and it was fun...'

Where motivated the students enjoyed some physical activity. It can be seen from the data that the students like walking if they are walking for a reason;

'Sometimes I'll walk to get a coffee.'

'Yeah I'd go to the shop or something.'

'Sometimes I'll go out and talk with friends instead of just sitting down having a talk we'd be walking around.'

This suggests that students in the study where motivated and saw the point they would take part in physical activity, this was often linked to social and leisure pursuit.

Prioritising academic achievement over physical activity

Another reason why the girls may not have noticed the prompts in the school setting could be because they were preoccupied with achieving their exams, as the research took place at the same time as the students were preparing for their GCSE exams. The students commented on how their exams were coming up soon and many of them wanted to go to college afterwards. Therefore, they may have been more concerned about revising to get the grades they need to get into college. Taking part in physical activity could be seen as a waste of their time, especially when it is not seen as being important;

'It depends sometimes I just don't see the point or I just can't be bothered.'

The 'culture' of the school also appeared to prioritise academic achievement. With the focus on revising and exams the student's stated how there was nothing to do after school apart from revision;

'It's all like revision classes, there's not really much to do for year eleven.'

It was evident from the data that the pressure from school work impacted on their energy or motivation to do anything after school;

'Maybe if it was summer then maybe yeah, if it was on a weekend I would but not after school.' (Go swimming)

'After school I don't really do much, on the weekends I'll go out but that's about it cos' nobody does anything after school.'

'During the week I just don't really do much I just go home and on the odd occasion I'll go out if I can be bothered.'

'Sometimes I'll watch YouTube and I'll talk to people like at the same time, but then sometimes I just don't wana talk to anyone so...'

The immediate pressure of school work, particularly preparing for exams, limited the influence of the prompts to increase positive physical activity beliefs and perceptions for the students. The prompts were not significant enough to overcome the barriers produced by the whole school environment and their disengagement from physical activity.

Issues with the prompt intervention

Another reason why the prompts may not have been effective for the students could be because some of them reported not understanding the prompts;

'I've been aware of them but I've not understood what they've meant.'

The prompts were noticed by all students in the focus group, however their answers when asked if they could describe the prompts suggests that they were not memorable or that the students had not understood the purpose of the prompts;

'I've seen them, I've read them... but it just goes...'

'Is it that walk and somet else...'

'One had a black TV and a person sat watching it or somet'

'TV break, Ad break or somet like that, I don't know'

'I can't remember to be honest'

'I don't really remember ...I remember one of them had like a car on'

The intervention setting, as in a school, could have had an impact on the successfulness of the prompts as one student commented;

'But I've also seen more posters about school concerts and stuff'

This suggests that the prompts could have been getting lost with other posters and messages on the wall as the school walls were full with posters and students work etc. The age of the students in the study (15 and 16 year olds) could also have influenced their responses as some students stated how they *'had not paid much attention'* to the prompts and one student stated;

'I don't really pay attention to things.'

This highlights the difficulties of engaging this age group in research, especially in discussions around topics which they are disengaged with or see as a low priority, such as in this case, physical activity.

Chapter 6: Discussion

This study extends what is known on perceived barriers and motivators to being physically active for students (adolescent girls) and teachers. Both the students and teachers in this study reported physical, psychological, social and environmental barriers and motivators to physical activity participation, which will be discussed below in more detail. The findings from this study show how an individual's physical activity is influenced by a number of factors at multiple levels and therefore provides support for the importance of an ecological model (Sallis et al, 2006) when designing and implementing interventions to increase physical activity.

Similar to previous findings, the whole school environment and policies, such as having limited activities during PE lessons, PE uniforms and short breaks, were reported by the students as main barriers to taking part in physical activity (Moore et al, 2010; Morton et al, 2016; Pawlowski et al, 2014). As adolescents spend around six/seven hours each day (during term time) in school, school is a central part of their lives. Changing the school environments

and policies that act as barriers for these students may be an effective way of increasing their physical activity beliefs and perceptions.

Consistent with previous research, psychological factors to physical activity participation reported by the students in this study included; physical self-efficacy, ability, feeling self-conscious when wearing PE uniforms and lack of enjoyment (Biddle et al, 2011). Many of these psychological barriers were linked to fears of being negatively judged by peers with one student stating; *'Cos' it's just embarrassing, people are judgemental and some of the moves are quite hard to do' (Zumba)* and with another student stating that they would only take part in activities, like Zumba, at home.

The descriptive statistics from the pre-intervention questionnaires support previous research in that males have more positive and less negative attitudes to physical activity than females (Edwards & Sackett, 2016). The males in this study also scored higher on the decisional balance questionnaire. This also supports previous findings in that males see fewer cons and more pros to taking part in physical activity, than females (Kim et al, 2010; Edwards & Sackett, 2016; Robbins et al, 2004). However, with regards to the self-efficacy questionnaire, females scored slightly higher than males. This contradicts previous research which suggests that generally, males have higher physical self-efficacy, than females (Edwards & Sackett, 2016). However, these results could be skewed as more females (21) completed the questionnaires compared to only 10 males. There were also two outliers as two females scored a lot higher than the others on the questionnaire, which would have affected the mean score. This highlights the limitations of using quantitative measures, such as questionnaires, as the results may not accurately reflect individual's thoughts and beliefs.

The findings from this study, as in Hagger et al (2009), highlighted the importance positive role models and having good relationships with PE teachers has on adolescents' beliefs and perceptions towards physical activity. The role of the PE teacher was of particular importance in this study as the students expressed negative comments, such as *'I don't like any of them, they're all horrible'* about their PE teachers and how they wouldn't even consider taking part if they had a male teacher; *'if it was a man then forget it'*. These findings are similar to that of Mitchell et al (2015) who found having same sex leaders made adolescent girls feel more comfortable taking part in PE, and increased their willingness to take part. Increasing feelings of social support during PE lessons could therefore be an effective way of increasing these adolescents' self-efficacy beliefs, enjoyment and ultimately their participation. Policies could

be put into place in schools to encourage teachers to increase the social support they give to their students during PE lessons.

Another important factor affecting these students physical activity participation was the presence of their male peers. These students commented a number of times on how some of their peers are '*judgemental*' during PE lessons and how they would prefer to take part in physical activity if it was '*all girls, as the boys are too rough*'. This is a common theme across many studies where girls have stated that they would prefer PE lessons if they had single sex classes due to boys being too competitive, being stronger and having different levels of ability to girls (Allender et al, 2006; Eime et al, 2013; Mitchell et al, 2015).

Peer influence and support, as in Zhang et al (2012) was also of importance when discussing reasons why these students may or not be active. The students in this study commented on how they would be more likely to take part in physical activities in the presence of 'non-judgemental' peers and when with their friends, for example one student stated how she would only go for a walk with a friend and another student joined the gym with her friend. However, the students in this study also reported sitting together on the stairs during their break/lunch times. As Voorhees et al (2005) found, adolescent girls who have more active friends tend to be more physically active than those adolescents with inactive friends. Therefore, peer influence is having a negative effect on these students physical activity participation as they all take part in sedentary behaviours together. This is supported by Belanger et al (2011) who found that lower levels of physical activity participation in adolescents is associated with poor social support and negative social validation. This is evident from the data as all students conform to the same 'sedentary' behavior during break and lunch times. This could be because of the perception that taking part in physical activity/sports is "uncool" for adolescent girls (Slater & Tiggeman, 2010) and because of this none of the students want to suggest taking part in a club at lunch time as not to appear 'different' from the group. Schools could try to encourage students to exercise or take part in group physical activities together in order to increase the fun and social element of physical activity. The school could do this by providing opportunities for them to be active during break times and after school, if the students enjoy social physical activities during school time it may increase the likelihood of them engaging in social physical activity during leisure time.

The students also reported a lack of sports/leisure facilities in their local area as a barrier to being physically active with them reporting *'there's not much to do.'* This has been supported by previous research which has found how adolescent's physical activity levels are largely influenced by the area they live in (Powell et al, 2006; Humbert et al, 2006; Dagkas & Stathi, 2007). The fact that there are a limited choice of physical activity and fewer opportunities available for these students to be active within their local area could be down to the area being of a low SES, which means lower tax bases to finance facilities in the area (Moore et al, 2008).

Another common barrier to physical activity participation reported by these students was that they had to look after their younger siblings before and after school. This was also found in a study conducted by Dagkas and Stathi (2007) who found that adolescents from low SES backgrounds often take on the 'carer role' of younger siblings as their parents have to work longer hours and can't afford to pay for childcare. These adolescents therefore have limited time to be physically active as their time is taken up looking after their younger siblings. This was also evident in a study by Macdonald et al (2004) who suggests that changing household structures could have significant positive impacts on children and adolescent's lifestyle and physical activity habits. These barriers reported by the students, that are preventing them from participating in physical activity outside of school, highlights the importance of schools delivering a wide range of quality PE lessons and extra-curricular activities. This is particularly important in schools located in areas of low SES as school may be the only opportunity for some students to be physically active. It has been suggested that schools establish good links with sports/community clubs as a way to support and encourage the students to be physically active outside of school (Kirk, 2005).

Half of the teachers in this focus group reported having a physical condition or injury that caused them pain or discomfort and acted as a barrier to physical activity participation. This has been supported by previous research which has found how pain, due to a physical condition or injury, prevents many adults from being physically active (Belza et al, 2004; Grossman & Stewart, 2003; Newson & Kemps, 2007). However, for one teacher, the awareness that regular physical activity will improve her arthritis acted as a motivator to exercise. This has been found in many studies where individuals with arthritis have reported taking part in physical activity as a way to manage their symptoms and improve their condition (Der Ananian et al, 2006; Wilcox et al, 2006; Henchoz et al, 2013; Loeppenthin et al, 2014).

One of the main barriers to being physically active for the teachers was ‘the daily struggle’ and time constraints. The teachers in this study reported having demanding home and work lives, which often left them with little time, energy and motivation to take part in physical activity. These findings are in line with previous studies which have found that major barriers to physical activity for adults include ‘not having enough time’, ‘being too lazy’, lack of motivation and tiredness (Justine et al, 2013; Reichert et al, 2007; Kirk & Rhodes, 2011; Choi et al, 2017). These findings from the present study suggests that for these teachers, taking part in physical activity is seen as a low priority, even though they are aware of the health benefits of being active, as work and home-life responsibilities tend to come first for them. This was also evident in other studies where individuals see physical activity as the lowest priority in their life and reported taking part in exercise as a waste of their time (Justine et al, 2013; Schutzer & Graves, 2004). As in this study, insufficient time to be active was one the most reported barriers, by adults, across a number of studies (Fletcher et al, 2008; Phipps et al, 2010; Justine et al, 2013). This supports the view that many individuals have that taking part in physical activity is time consuming (Pham et al, 2007).

In line with previous research, lack of self-efficacy and self-belief to participating in physical activity also came up as a barrier for some of the teachers in this study (Ayotte et al, 2010; Bauman et al, 2012; Choi et al, 2017). One teacher in the current study did not have the confidence and self-belief that she could do high-intensity exercise which would help her lose weight; therefore she did not see the point in taking part in regular exercise as she didn’t think she’d see a result. The teachers in this study also reported having negative health habits such as drinking alcohol and watching TV in their free time. Some of the teachers expressed how they try to adopt more healthy and active lifestyles but they end up reverting back to their negative health habits. The reason for this could be due to, as we found, these teachers lack physical self-efficacy and self-belief and along with a low motivation to physical activity, lack of time, energy and tiredness, these teachers find it difficult to stick to positive health habits. Physical activity interventions should therefore aim to increase self-efficacy and self-belief in order to increase participation. Individuals also need to be made aware that they don’t need to be taking part in high-intensity physical activity in order to lose weight as it is recommended that all adults should take part in 150 minutes moderate-intensity activity, such as walking, in order to gain health benefits (Department of Health, 2011).

It is important to note that the barriers to participating in physical activity reported by the teachers in this study may not apply to all adults and occupations as various studies on work-

related stress have consistently found that teachers are amongst the most stressed workers in Britain, with 83% of teachers reporting that they had work-place stress (Precey, 2015). Stress has a negative impact on physical activity and usually causes people to take part in unhealthy behaviours (Stults-Kolehmainen & Sinha, 2014). Some of the main causes of teachers stress included; excessive workload, working hours and pressures of assessment targets and inspections e.g. OFSTED. Therefore, some of the barriers reported in the current study, such as '*not having enough time and energy*' and being '*too tired*' to take part in any physical activity may not apply to individuals with less demanding occupations.

The post-intervention findings from this study suggest that prompts are not effective, in influencing adolescent's physical activity beliefs and perceptions, within a school setting. This is not to say that prompts would not be effective in other settings, for this age group, and future research would be needed to explore this. It was evident throughout both the pre-intervention and post-intervention focus groups that these students lacked interest in physical activity and had completely disengaged, and this could be one of the reasons why the prompts didn't have an impact on them. These findings suggest that the prompts alone are not enough to change this and highlights the need for interventions that aim to engage adolescent girls in PE classes and physical activity within school. Studies have shown that an effective way of doing this is by giving adolescents control, such as allowing them to choose their activities and designing their PE uniform, and this resulted in increased physical activity enjoyment and participation (Brooks & Magnusson, 2006; Enright & O'Sullivan, 2010; Fisette, 2011; Mitchell et al, 2015). The findings from the current study suggest that changes need to be made to the way PE and extra-curricular activities are being delivered in this school to increase adolescents' enjoyment in physical activity, as prompts alone are not enough to do this. A link has been found between positive experiences of PE in school and increased participation in physical activities outside of school, as those positive experiences of PE provide students with high physical self-efficacy and confidence (Brooks & Magnusson, 2006). Again, this shows the importance of schools providing quality PE and physical activity clubs to all students.

The findings from this study provide us with an insight into how the 'whole school' environment negatively impacts upon physical activity beliefs and perceptions, and could help to explain why the prompts were ineffective, for the students, within this setting. It was clear from the focus groups that the whole school environment, as expected, is heavily focused on academic achievement. This creates a pressured environment for the students as

we found that they are highly motivated to get good grades to get into college. The students reported in this study that their time after school is mostly spent doing homework or revising, which was also found to be a common barrier across many studies (Morton et al, 2016). This doesn't leave the students with much time to take part in physical activity as they reported that when not in school or revising, they want to spend their 'free time' by relaxing, switching off from school work and socialising with friends. It is therefore not a lack of motivation, as these students are highly motivated to do well at exams but it is that the school environment does not provide much time and support for these students to engage in physical activity. Moore et al (2010) suggests that adolescent girls need help to overcome negative feelings associated with hard days at school by being provided with fun and preferred activities. Whilst Duncan et al (2011) found that an effective way of increasing students' physical activity levels outside of school is by providing physical activity-based homework schedules. Schools are then placing focus on physical activity and health so that the importance is not solely based on academic achievement.

Non-participation in physical activity does not necessarily mean that the students are not interested. As we can see from the data, the students were keen to engage in trampolining; *'If there was a trampolining club I'd do it'*, but this activity was no longer offered at the school. This shows that the students were willing to take part in physical activity when it was an activity of their choice, which they enjoyed doing, and the prompts alone are not providing the students with this opportunity.

A further reason why the prompts may not have been effective in increasing physical activity could be because they were not understood by some of the respondents. This can be seen in the data when one student commented *'I've been aware of them but I've not understood what they've meant.'* The teachers also expressed some confusion over the message of the prompts with one teacher commenting; *'I know it says ad break, well ad breaks are like two minutes long, what do you do in two minutes?... I didn't know what it was telling me to do.'* This suggests that it could be the design of the prompts in this study that are at fault and not the concept of using prompts as a way to change individual behaviour. It could be that perhaps the messages on these prompts were too subliminal and slightly more direct prompts with a clearer message may be more effective in increasing physical activity behaviours. Prompts that promote the fun and social aspects of physical activity may have been more effective for the students, as we discovered from the data that these students like to spend their time socialising and would only want to take part in physical activity for enjoyment. Prompts with

more specific, time and fitness based messages, as found in Jennings et al (2017), may have been more effective for the teachers as many of them wanted to lead more active lifestyles, but reported having limited time due to demanding work and home lives. Studies have found that the most effective prompts in increasing physical activity, in adults, explicitly stated the associated health benefits, such as ‘exercises your heart’ and ‘works your legs’ (Jennings et al, 2017).

Some of the teachers commented on how they thought the prompts were for the students *‘I saw them in school...but again I thought it was more for the kids’*. This supports what was found by Cleland et al (2014) in that individuals will fail to engage with interventions which they perceive as being irrelevant to them. This suggests that members of the school (staff and students) should be involved in planning the interventions to ensure they are targeting the ‘right people’ and meeting everyone’s needs (Cleland et al, 2014).

As this is the first qualitative study, to the researchers knowledge, that has explored whether environmental prompts are effective in nudging people to become more active, it is difficult to make any direct links from the findings of this study to previous research. However, the quantitative studies into this area, whilst providing useful data, have been criticised for mainly only influencing those individuals that are already physically active and people not considering to change (pre-contemplators) are less likely to take notice of the prompts (Kerr et al, 2000, Cohen, 2013). This criticism is supported within this study as the teachers that didn’t take much notice of the prompts also reported that they didn’t take part in much physical activity in the pre-intervention focus groups. Additionally, the teachers who found the prompts to be effective in altering either their awareness and/or physical activity behaviours reported taking part in the most physical activity in the pre-intervention focus groups. As Eves et al (2012) points out, exposure to point-of-decision prompts is only brief, this brief exposure of a few seconds is not enough to change individual’s beliefs and perceptions of physical activity. Therefore, PODP’s act as reminders for those individuals that already have existing intentions to be active. This highlights the need for an additional intervention that targets beliefs and perceptions towards physical activity, as well as PODP’s to remind individuals to carry out the behaviour. These findings highlight the problems with national strategies trying to engage all individuals in the same interventions to increase physical activity as we have found, the same interventions, such as prompts, may not be effective for everyone.

6.1 Limitations

Because this study sample was only drawn from one school, in one area of low SES in the North West of England, the study should be replicated with a larger sample size drawn from a number of schools in different settings, across the UK, to ensure the findings are representative of the whole population. Due to the study being conducted in a school, the researcher was required to get a DBS check before any of the research could be carried out. This took a while, and because of the time constraints of the study, the researcher's supervisor had to conduct the pre-intervention focus groups. This could have influenced the findings from the post-intervention focus groups as the researcher had not had chance to build up a relationship with the respondents throughout all stages of the research.

A major limitation of this study was the low response rate of questionnaires as it meant that the researcher was unable to run statistical tests to see whether the prompts influenced the respondent's answers post-intervention. The descriptive statistics may also have been skewed as more females completed the questionnaires, than males. The researcher was unable to see if there were any differences in responses between students and teachers as only one male member of staff and 3 female members of staff completed the questionnaire. The use of 5-point likert scales also bring about limitations as respondents are limited to five responses. Central tendency bias is where respondents avoid extreme response categories and choose the middle responses (Camparo & Camparo, 2013). This could explain why the mean self-efficacy score for both the males and females was around average. This again shows the importance of conducting qualitative research where individuals are able to expand on their answers and provide more detailed, in-depth data.

It is important to comment on how the age of the students in the study, as aged 15/16 years old, may have affected the findings. It was quite difficult to engage the students in the research and at times during the focus group they were quiet and it was hard to gain in-depth answers from them. The presence of their school peers may also have influenced their responses. As noted in the analysis, there were many times when the students repeated the same answers as each other or replied with 'same'. It is not known whether these were honest answers or if they were just agreeing with each other, and it is a possibility that individual interviews with the students may have produced more accurate and detailed data.

A further methodological limitation of the study was the use of self-report data. The researcher had to trust and rely on the information participants gave regarding their physical

activity behaviours and effectiveness of the prompts. Due to the nature of focus groups, some people may not have voiced their personal and honest opinions due to the presence of the other participants, especially if they shared different views as some individuals may just agree with the rest of the group as to not look different. To overcome the disadvantages of using focus groups, further research into this area could employ methods such as individual interviews, observations or use objective measures of physical activity.

Despite these limitations, the findings from this study were consistent with the previous literature on individual's physical activity beliefs and perceived barriers and motivators of being physically active. These findings are useful as they may lead to the development of effective interventions to enhance physical activity levels. Additionally, this study, to the researcher's knowledge, is one of the first qualitative studies in the UK to assess the impact of environmental prompts on physical activity beliefs and perceptions. The findings are useful as they provide researchers/health promoters with an insight into how environmental prompts may or may not be effective in altering physical activity beliefs and perceptions and encouraging individuals to be physically active. The participants in this study also suggested ideas as to how physical activity levels can be increased in both adults and adolescents. Additionally, in order to check the quality of the research, the themes that emerged from the data were discussed and compared with two other researchers that are experts in the field of physical activity and health behaviour change.

Chapter 7: Implications

To promote long term participation in physical activity, for adolescent girls, the findings from this study suggests that changes need to be made in the way PE is delivered in schools. Students should be involved in discussions as to what activities they would like to take part in and on the design of their PE uniforms. As we found in this study, and in previous research, adolescent girls are bored with the traditional types of activities offered in schools e.g. football and netball. Training should therefore be provided for teachers and community leaders to enable them to deliver a variety of individual and group physical activities to keep all adolescents engaged and enjoying taking part. It is important for teachers to build up positive relationships with students and place the importance on participation, and not physical ability, for those students that are less able or lack confidence. In order to increase adolescent girl's physical activity levels schools could perhaps run 'girl only' sessions as this

would give girls an opportunity to participate in physical activity without having to worry about being judged by their male peers. It has been suggested that if adolescents enjoy physical activity in schools, it may lead to them developing positive physical activity habits during leisure time and in later life. It is particularly important for schools in low SES areas to offer a wide range of quality physical activities, during and after school, that all students enjoy and want to take part in as for some young people this is the only chance they get to take part in organised physical activities. Free or cheap transport could also be provided for adolescents after school to leisure facilities/clubs to ensure they are safe getting there, especially for those students whose parents are too busy to take them.

The findings from this study also suggest that a way to increase the physical activity levels in this school would be to make the lunch hour longer so that students and teachers have time to take part in physical activity and then have time to get ready for their next lessons. The whole school environment needs to promote physical activity by providing clubs and spaces to be active during break times and by making physical activity and health a priority, along with academic achievement. The school also needs to provide a positive and enthusiastic atmosphere with regards to physical activity to encourage both the students and teachers to increase their participation.

As a way to overcome feelings of tiredness and lack of energy after their school/working day, for both the students and the teachers, schools could offer sessions such as yoga and Pilates during break/lunch times or before/after school as a way to relieve stress as well as being active. Combining stress management programming with exercise interventions may also be an effective way to reduce reductions in physical activity due to stress. As self-efficacy came up as a barrier to physical activity participation for both the students and the teachers in this study, interventions are needed that aim to enhance individual's self-efficacy beliefs regarding physical activity.

Chapter 8: Conclusion

Due to rising physical inactivity rates and associated health problems, this study sought to explore the physical activity beliefs and perceptions of students and their teachers, and the impact of environmental prompts (nudges) on these beliefs and perceptions. The findings from this study suggest that environmental prompts are effective for some adults, in terms of increasing their awareness about leading a more active lifestyle. For one teacher in particular,

the prompts led to her making small changes in her daily life to become more physically active. However, for the other teachers in the study, although they were all aware of the prompts, they had no influence on their physical activity beliefs and perceptions. This was also the case with the students, although they all reported being aware of the prompts, the prompts did not seem to have any influence on their physical activity beliefs and perceptions. Reasons for the prompts having little influence on the students and teachers in this study can be explained by their busy lives, including demanding workloads at school/work and home-life responsibilities and physical activity being their lowest priority. The students also appeared to have disengaged from physical activity and were preoccupied with socialising with friends and their academic achievement, and so it is not surprising that the prompts had little influence. The findings from this study highlight the need for changes to be made to the way PE is delivered in schools, and how the ‘whole school environment’ approaches physical activity.

Due to the methodological limitations of this study, further research is needed to explore whether environmental prompts are an effective way to influence physical activity beliefs and perceptions. As the teachers were fully engaged in discussing their student’s physical activity behaviours, further research could involve working with teachers on the design of future prompts. Students could also be involved in the design of prompts, or with the design of additional interventions to increase physical activity as a way of giving them choice and empowerment with regards to physical activity.

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Appendix

Appendix 1 – Images of prompts

Examples of phase 1 prompts:



Examples of phase 2 prompts:





Appendix 2 – Participant information sheet

Environmental Nudges into Physical Activity

You are being invited to take part in an intervention around health behaviour, physical activity and the environment we live in.

Before you decide to take part it is important that you understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with the researcher if you wish. Please do not hesitate to ask if there is anything that is not clear or if you would like more information.

What is the study about?

The purpose of this study is to find out whether changing our surroundings with prompts (e.g signs) can help us to make positive health behaviour choices. The data and research from this study will be used in a report which will include comments and views from participants involved in the research (names will not be used as all research is anonymous and identity of participants is not disclosed)

Why I have been approached?

You have been asked to participate as we are recruiting a range of individuals from around Kirklees to get a wide perspective of opinions and experiences. We have selected three areas in Kirklees: Huddersfield University; Kirklees Council; Netherhall Learning Academy. You have been invited as a member of one of these organisations.

Do I have to take part?

It is your decision whether or not you take part. If you take part you will be asked to sign a consent form, and you are free to withdraw at any time and without giving a reason.

What will I need to do?

If you agree to take part in the research you will be asked to take part in two focus groups across a period of around three months (this is really just a discussion with four or five people like yourself and a researcher). Each focus group will be around 45 minutes long. Each focus group will be recorded and then used for research purposes. This will only be used by researchers on the project.

Following the focus groups you *may* be asked if you would also take part in an interview lasting between 30 and 45 minutes to talk in more depth about exercise behaviour and experience. This is entirely voluntarily and you are able to participate in the focus groups only if this is preferred.

Will my identity be disclosed and what will happen to the information?

Your participation in the focus groups will be anonymised. That is your name will not be disclosed in any way following the focus group. All information collected from you during this research will be kept secure. It is anticipated that the research will be published in articles and report. In these false names will be used and your identity will not be disclosed. Your words in the presentation of the findings and your permission for this is included in the consent form. No-one other than the researcher/s and facilitator/s will have access to the personal and identifiable information provided, unless the interviewee indicates that s/he or anyone else is at risk of serious harm. In this case the interviewer would approach the safeguarding lead identified within each host organisation.

The information will be used to present a report and academic papers to communicate the findings of the study to the wider public. These publications will include anonymised comments and views expressed by participants as well as stories created by the researcher to reflect the experiences of participants.

Who can I contact for further information?

If you require any further information about the research, please contact me on:

Dr. Nicola Eccles

NicolaEccles@communitypartners.co.uk

Appendix 3 – Consent form

Environmental Nudges

It is important that you read, understand and sign the consent form. Your contribution to this research is entirely voluntary and you are not obliged in any way to participate, if you require any further details please contact your researcher.

I have been fully informed of the nature and aims of this research as outlined in the ☐
information sheet

I consent to taking part in it ☐

I understand that I have the right to withdraw from the focus group or interviews at
any time. I also understand that I have the right to withdraw my data up until

August 2016 without giving any reason. ☐

I give permission for my words to be quoted (by use of pseudonym/false name) ☐

I understand that the information collected will be kept in secure conditions ☐
for a period of 10 years at the University of Huddersfield

I understand that no person other than the researcher/s and facilitator/s will ☐
have access to the personal and identifiable information provided.

I understand that my identity will be protected by the use of a false name in the ☐
report and that no written information that could lead to my being identified will
be included in any report.

If you are satisfied that you understand the information and are happy to take part in this project please
put a tick in the box aligned to each sentence and print and sign below.

Signature of Participant:	Signature of Researcher:
---------------------------	--------------------------

<hr/> Print: <hr/> Date: <hr/>	<hr/> Print: <hr/> Date: <hr/>
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(one copy to be retained by Participant / one copy to be retained by Researcher)

Appendix 4 – Focus group questions

Focus groups overview – (The following acts as a guide only. It is expected that conversation will naturally veer away from the prescribed bullet points below and these avenues of discussion will be fully explored by the researcher):

Pre intervention

Researcher: Explains general information about the concept of behaviour change and prompts. Reiterates that participation is voluntary and that participants are free to withdraw at any time.

Prompts (purpose is to find out about daily living... about how and where people could fit in exercise...about the choices they make in terms of daily movement):

- Tell me about your lives... how much 'free time' do you have (based on the general concept that 'free time' is when people exercise
- Tell me how you travel to work/school
- What do you do at the weekends
- Let's talk about daily living activities... parking next to the entrance at Tesco, taking the lift instead of the stairs etc... how do you make those decisions?

Post intervention

Prompts (the purpose here is to find out whether they have seen and taken on board the media. Has it altered any behaviour or choices?)

- Have you been aware of any media in your work/school environment and surrounds (two phase)?
- Can you describe this to me?
- Do you consider that you have changed any behaviour in response to these?
- Why or why not?
- How could this be improved in order to activate greater change?
- What are the things that would bring about regular exercise?

Appendix 5 – Questionnaires



Environmental Nudges



Your responses to this questionnaire will contribute to an on-going project by CP Active, a not-for-profit health organisation titled 'Environmental Nudges', this study looks at how our environment affects health behaviour, specifically physical activity.

The questionnaire will take no longer than fifteen minutes to complete. If you wish to opt out of this study please leave the questionnaire blank and hand it back to the researcher.

There will be a second questionnaire in a few weeks' time which we will also ask you to complete. You are asked to provide a false name or code so that we can see if there are any changes to your responses. This is to ensure that all your data will remain anonymous. You will need to use the same false name/code the next time you complete this questionnaire so please write it down somewhere so you can remember.

Please circle whether you are:

Staff / Student

Male / Female

False Name / Code _____

Thank you for taking part in the study.

Stages of Change Instrument

Regular Physical Activity:

The current UK guidelines recommend that children should take part in **60 minutes of physical activity each day** (or more) and for **adults it is 150 minutes a week** (or more). Examples of physical activity include: walking briskly, cycling, swimming, playing sports and dancing. Your heart rate and/or breathing should increase, but there is no need to exhaust yourself. Please answer all questions by circling Yes or No.

According to the definition above:

1. Do you currently engage in regular physical activity?

Yes / No

2. Do you intend to engage in regular physical activity in the next 6 months?

Yes / No

3. Do you intend to engage in regular physical activity in the next 30 days?

Yes / No

4. Have you been regularly physically active for the past 6 months?

Yes / No

Self-efficacy Questionnaire

This part looks at how confident you are to exercise when other things get in the way. Read the following items and fill in the circle that best expresses how each item relates to you in your leisure time. Please answer using the following 5-point scale

1	2	3	4	5
Not at all confident	Somewhat confident	Moderately confident	Very confident	Completely confident

I am confident I can participate in regular exercise when:

1. It is raining or snowing or icy.....1 2 3 4 5
2. I am under a lot of stress.....1 2 3 4 5
3. I feel I don't have the time.....1 2 3 4 5
4. I have to exercise alone.....1 2 3 4 5
5. I don't have access to a place for exercise.....1 2 3 4 5
6. I am spending time with friends.....1 2 3 4

Decisional Balance

This section looks at positive and negative aspects of exercise. Read the following items and indicate how important each statement is with respect to your decision to exercise or not to exercise in your leisure time by filling in the appropriate circle. Please answer using the following 5-point scale:

1	2	3	4	5
Not important	Slightly important	Moderately important	Very important	Extremely important

1. I would have more energy for my family and friends if I exercised regularly.1 2 3 4 5
2. I would feel embarrassed if people saw me exercising.1 2 3 4 5
3. I would feel less stressed if I exercised regularly.1 2 3 4 5
4. Exercise prevents me from spending time with my friends.....1 2 3 4 5
5. Exercising puts me in a better mood for the rest of the day.1 2 3 4 5

6. I feel uncomfortable or embarrassed in exercise clothes.....1 2 3 4 5
7. I would feel more comfortable with my body if I exercised regularly. 1 2 3 4 5
8. There is too much I would have to learn to exercise.....1 2 3 4 5
9. Regular exercise would help me have a more positive outlook on life. 1 2 3 4 5

Attitudes Towards Physical Activity

Positive Attitudes Towards Physical Activity

In the table below, mark how much you agree or disagree with the following statements. Where, 1 = disagree a lot, 2 = slightly disagree, 3 = neither agree nor disagree, 4 = slightly agree and 5 = agree a lot

If I were to be physically active during my free time on most days...	Rating
1. It would help me cope with stress.	
2. It would help me make new friends.	
3. It would get or keep me in shape.	
4. It would make me more attractive.	
5. It would give me more energy.	
6. It would make me better in sports, dance, and other activities.	

Negative Attitudes Towards Physical Activity

If I were to be physically active during my free time on most days...	Rating
1. It would be painful	
2. It would be difficult	

3. It would be embarrassing	
4. It would make me feel uncomfortable	
5. It would make me tired	
6. It would make me sore	
7. It would be a hassle	
8. It would take too much time	

Processes of Change

The following experiences can affect the exercise habits of some people. Think of similar experiences you may be currently having or have had **during the past month**. Then rate how frequently the event occurs by circling the appropriate number. Please answer using the following 5-point scale:

- | | | | | |
|--------------|------------------------|---------------------|--------------|-------------------|
| 1 | 2 | 3 | 4 | 5 |
| Never | Seldom (Rarely) | Occasionally | Often | Repeatedly |
1. I read articles to learn more about exercise.1 2 3 4 5

 2. I get upset when I see people who would benefit from exercise but choose not to exercise.1 2 3 4 5

 3. I realise that if I don't exercise regularly, I may get ill and be a burden to others.1 2 3 4 5

 4. I feel more confident when I exercise regularly.1 2 3 4 5

 5. I have noticed that many people know that exercise is good for them. 1 2 3 4
5

 6. When I feel tired, I make myself exercise anyway because I know I will feel better afterwards.1 2 3 4 5

7. I have a friend who encourages me to exercise when I don't feel up to it. 1 2 3
4 5
8. One of the rewards of regular exercise is that it improves my mood. 1 2 3 4
5
9. I tell myself that I can keep exercising if I try hard enough.1 2 3 4 5
10. I keep a set of exercise clothes with me so I can exercise whenever
I get the time.1 2 3 4 5
11. I look for information related to exercise.1 2 3 4 5
12. I am afraid of the results to my health if I do not exercise.1 2 3 4 5
13. I think that by exercising regularly I will not be a burden to the
healthcare system.1 2 3 4 5
14. I believe that regular exercise will make me a healthier, happier person. 1 2 3 4
5
15. I am aware of more and more people who are making exercise a
part of their lives.....1 2 3 4 5
16. Instead of taking a nap after school/work, I exercise.1 2 3 4 5
17. I have someone who encourages me to exercise.1 2 3 4 5
18. I try to think of exercise as a time to clear my mind as well as a workout
for my body.1 2 3 4 5

19. I make commitments to exercise.1 2 3 4 5
20. I use my calendar to schedule my exercise time1 2 3 4 5
21. I find out about new methods of exercising.1 2 3 4 5
22. I get upset when I realise that people I love would have better health
if they exercised.1 2 3 4 5
23. I think that regular exercise plays a role in reducing health care costs. 1 2 3 4
5
24. I feel better about myself when I exercise.....1 2 3 4 5
25. I notice that famous people often say that they exercise regularly. 1 2 3 4 5
26. Instead of relaxing by watching TV or eating, I take a walk or exercise. 1 2 3 4
5
27. My friends encourage me to exercise.1 2 3 4 5
28. If I engage in regular exercise, I find that I get the benefit of
having more energy.1 2 3 4 5
29. I believe that I can exercise regularly.1 2 3 4 5
30. I make sure I always have a clean set of exercise clothes.1 2 3 4 5