

Development and Evaluation of Environmental Interventions on Green Space
Utilisation to Promote Health and Well-Being

by

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Intellectual property and publications

The candidate confirms that the work submitted is his/her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

The work presented in **Chapter 2** has appeared in publication as follows:

Roberts, H., McEachan, RRC., Margary, T., Conner, M., Kellar, I. (2016) Identifying effective behaviour change techniques in built environment interventions to increase use of green space: A systematic review. Environment and Behavior. 1-28.

The candidate was responsible for designing the systematic review, selecting studies, data extraction and writing the article. TM was a second reviewer and assisted with study selection and data extraction. RM and IK double coded the behaviour change techniques. RM, IK and MC provided guidance and commented on drafts.

The work presented in **Chapter 3** is currently in review:

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The candidate was responsible for all aspects of the study and drafted the article. All other authors provided advice and commented on drafts. CG and MN, among others, designed the park audit tool used in the article.

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Abstract

There is increasing recognition that the use of green space has a beneficial impact on health, and so understanding how this can be encouraged is important to maximise these benefits. The role of quality of green space in determining use has so far been under-researched. This evidence is vital for urban planners in designing health-promoting environments. In Chapter 2 of this thesis, previous environmental interventions to increase green space use were identified and the behaviour change techniques employed were described. While the results were promising, the use of multiple techniques and poor standard of reporting prevents specific effective techniques being recommended. Chapter 3 explores the relationship between park features, park satisfaction and park use, using data from a sub-sample of the Born in Bradford cohort (n= 620) and quality audit data from 41 parks in Bradford. Amenities and usability were found to be positively associated with park satisfaction, while incivilities were shown to be negatively associated with park satisfaction and park use. In Chapter 4 a qualitative study was conducted to explore preferences for park features. Differences in preference were observed between users and non-users of the park. It is recommended that interventions in green spaces are designed with input from the community in order to capture the social context and maximise acceptability. Chapter 5 therefore presents a pilot study of the early stages of the co-design of an environmental intervention in a green space whereby priorities for improvement were identified and refined with involvement from the community. The approach was deemed acceptable, and a number of recommendations for future co-design processes were made.

Contents

Intellectual property and publications	i
Acknowledgements	iii
Abstract	iv
Contents	v
List of Tables.....	1
List of Figures	2
List of Abbreviations.....	3
Chapter 1 Literature Review	5
1.1 Introduction	5
1.2 Understanding green space	6
1.2.1 Definition of green space	6
1.2.2 Measuring green space	7
1.3 Health benefits of green space	8
1.3.1 Physical health	8
1.3.2 Mental health and wellbeing	14
1.3.3 Summary of health benefits	17
1.3.4 Mechanisms to explain links between green space and health	18
1.4 Use of green space	26
1.4.1 Current use of green space	26
1.4.2 Encouraging use of green space	28
1.5 Thesis context.....	31
1.5.1 Bradford	31
1.5.2 Better Start Bradford	31
1.6 Aims and thesis outline	33
Chapter 2 Identifying Effective Behaviour Change Techniques in Built Environment Interventions to Increase Use of Green Space: A Systematic Review	36
2.1 Introduction	36
2.2 Method	37
2.2.1 Search strategy	37
2.2.2 Study selection	38

2.2.3 Data extraction	39
2.2.4 Data synthesis	39
2.3 Results	40
2.3.1 Study characteristics.....	42
2.3.2 Intervention effects.....	57
2.3.3 Intervention coding	57
2.3.4 Environmental changes	62
2.3.5 Other behaviour change techniques	63
2.3.6 Community co-design	65
2.4 Discussion	65
2.4.1 Study design	66
2.4.2 Follow-up period	67
2.4.3 Outcome measures	68
2.4.4 Population characteristics.....	69
2.4.5 Intervention content	69
2.4.6 Recommendations for researchers	70
2.4.7 Recommendations for policy makers.....	70
2.5 Concluding comments.....	71
Chapter 3 The Influence of Park Features on Park Satisfaction and Park Use	72
3.1 Introduction	72
3.2 Methods.....	74
3.2.1 Study Design	74
3.2.2 Participants.....	74
3.2.3 Variables	77
3.3 Results	81
3.3.1 Participants.....	81
3.3.2 Linear regression analysis	84
3.3.3 Multilevel modelling	85
3.4 Discussion	90
3.5 Conclusion	93
Chapter 4 Exploring Preferences for Park Features in Low and High-quality Parks by Ethnicity and Level of Use: A Qualitative Study.....	94

4.1 Introduction	94
4.2 Methods	96
4.2.1 Methodology	96
4.2.2 Participants	97
4.2.3 Setting	98
4.2.4 Procedure	98
4.2.5 Data analysis	99
4.3 Results	101
4.3.1 Participants	101
4.3.2 Thematic analysis	102
4.4 Discussion	125
4.5 Concluding Comments	130
Chapter 5 Evaluating the Early Stages of a Co-design Process to Develop an Environmental Intervention in a Green Space	131
5.1 Introduction	131
5.1.1 Background	131
5.1.2 Research context	133
5.1.3 Aim and Research Questions	135
5.2 Method	136
5.2.1 Design	136
5.2.2 Participants	141
5.2.3 Setting	141
5.2.4 Evaluation	141
5.2.5 Ethics	142
5.3 Results	142
5.3.1 Stakeholder meeting	143
5.3.2 Residents' meeting	149
5.3.3 Joint meeting	155
5.3.4 Summary of findings	162
5.4 Discussion	168
5.4.1 Recommendations	170
5.4.2 Strengths and limitations	172

5.5 Concluding Comments.....	173
Chapter 6 Discussion	174
6.1 Introduction.....	174
6.2 Summary of findings.....	175
6.3 Methodological limitations	180
6.4 Future Research.....	181
6.5 Concluding Comments.....	184
References	185
Appendix A: Search strategies	212
Appendix B: Grey literature sources.....	219
Appendix C: Interview topic guide	220
Appendix D: Stimuli materials	222
Appendix E: Feedback questionnaires	226
Appendix F: HRA Decision	233

List of Tables

Table 2.1 Study characteristics	41
Table 2.2 Intervention coding	58
Table 3.1 Park features by domain.....	78
Table 3.2 Characteristics of study participants	82
Table 3.3 Linear regression of park characteristics on park satisfaction (k=41)	84
Table 3.4 Linear regression of park quality and size on average weekly park use (mins) (n=620).....	85
Table 3.5 Multilevel models for effects of NEST domains (model 1) and socioeconomic and demographic information (model 2-5) on park satisfaction.....	86
Table 3.6 Multilevel models for effects of NEST domains (model 1) and socioeconomic and demographic information (model 2-5) on park use.....	88
Table 4.1 Interview sampling frame	97
Table 4.2 NEST Scores	98
Table 4.3 Demographics of participants	102
Table 4.4 Conceptual model of interview themes.....	103
Table 5.1 Stages of AEBCD and the adapted approach.....	137
Table 5.2 Stakeholder meeting: all issues	143
Table 5.3 Grouping of stakeholder issues	145
Table 5.4 Residents' meeting: all issues.....	150
Table 5.5 Result of residents' vote	151
Table 5.6 Joint meeting: issues and priorities for change	156

List of Figures

Figure 1.1 Mechanisms in the relationship between green space and health.....	20
Figure 2.1 PRISMA flow diagram	41
Figure 2.2 Risk of bias table and risk of bias graph.....	53
Figure 2.3 GRADEpro Summary of Findings	56
Figure 3.1 Flow diagram of participants	76
Figure 5.1 Summary of priorities	164

List of Abbreviations

AEBCD	Accelerated experience-based co-design
BiB	Born in Bradford
BCTTv1	Behaviour Change Technique Taxonomy version 1
BSB	Better Start Bradford
EBCD	Experience-based co-design
GHQ	General Health Questionnaire
GLUD	Generalised Land Use Database
GRADE	Grading of Recommendations Assessment, Development, and Evaluation
IMD	Index of Multiple Deprivation
MENE	Monitor of Engagement with the Natural Environment
MVPA	Moderate to vigorous physical activity
NGST	Neighbourhood Green Space Tool
NICE	The National Institute for Health and Care Excellence
NDVI	Normalised Difference Vegetation Index
NEST	Natural Environment Scoring Tool
ONS	Office for National Statistics
PM	Particulate matter
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
RCT	Randomised controlled trial

SOPARC System of Observing Play and Recreation in Communities

WHO World Health Organisation

Chapter 1 Literature Review

1.1 Introduction

In the last two decades, there has been increasing interest in the relationship between green space and health and well-being, largely driven by advances in research techniques to measure green space. In 2014, the World Health Organisation (WHO) recognised the importance of access to green space in Sustainable Development Goal 11.7, which aims “to provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities” by 2030 (United Nations Department of Economic and Social Affairs, 2014).

Nevertheless, with 70% of the population estimated to be living in urban areas in the next 20 to 30 years (Rydin et al., 2012), there is also growing concern for the conservation of green space in an increasingly urbanised world. This, coupled with the mounting evidence for its beneficial impact on health, has resulted in calls for the “urgent inclusion of natural space considerations in public health policies and actions” (p343, van den Bosch & Nieuwenhuijsen, 2017).

However, guidance on how to most effectively encourage green space use in order to maximise the potential health benefits remains limited. The literature review presented in this chapter covers briefly, the definition of green space, its impact on health, the suggested mechanisms for this relationship and the potential of environmental interventions to increase green space use. Lastly, based on the gaps in evidence outlined in the review, the aims and outline of this thesis are stated.

1.2 Understanding green space

1.2.1 Definition of green space

There is currently no universally accepted definition of green space (Croucher, Myers, & Bretherton, 2008; WHO Regional Office for Europe, 2016). The European Environment Agency (EEA) define green space as ‘a plot of vegetated land separating surrounding areas of intensive residential or industrial use and devoted to recreation or park uses’ (EEA, 2017).

Urban Atlas, the most up-to-date database on land use for cities in the EU, maintain a more detailed definition for their ‘green urban area’ classification, which includes:

- Public green areas for predominantly recreational use such as gardens, zoos, parks, castle parks.
- Suburban natural areas that have become and are managed as urban parks.
- Forests or green areas extending from the surroundings into urban areas are mapped as green urban areas when at least two sides are bordered by urban areas and structures, and traces of recreational use are visible.

Their definition excludes private gardens, cemeteries, buildings within parks, such as castles or museums; patches of natural vegetation or agricultural areas enclosed by built-up areas without being managed as green urban areas.

Recommendations for access to green space typically include a maximum distance and minimum size of green space, but these values vary. For example, Annerstedt van den Bosch et al. (2016) conducted a literature review and examined several case studies in response to a proposal by WHO to develop and test an urban green space indicator. They concluded a maximum 300m straight-line distance to the boundary of a green space, at least one hectare in size. However in England, the Accessible Natural

Greenspace Standard (ANGSt) (Natural England, 2010a) recommends everyone should have access to green space that is:

- At least 2 hectares in size, no more than 300 metres (5 minutes walk) from home;
- At least one accessible 20-hectare site within two kilometres of home;
- One accessible 100-hectare site within five kilometres of home; and
- One accessible 500-hectare site within ten kilometres of home; plus
- A minimum of one hectare of statutory Local Nature Reserves per thousand population.

1.2.2 Measuring green space

Objective measurements of green space can be quantified as (1) a discrete quantity or (2) a proportion of a larger defined area.

National and international open access databases exist for green space that has been mapped already e.g. OS Open Greenspace, Urban Atlas. OS Open Greenspace is UK-wide and includes, for example, allotments, bowling greens, golf courses, tennis courts, playing fields and public parks. The limitation of these datasets however is that they may miss smaller pockets of green space e.g. grass verges, which may still contribute to the green space-health relationship. This data can be used to calculate proximity or access to green space. This can be calculated using Euclidean distance (straight-line distance), or network distance (the shortest route on the road network).

The Normalised Difference Vegetation Index (NDVI) allows all green vegetation in a selected area to be measured. The index is derived from the ratio between visible and near-infrared light reflected by the land surface back up to satellite remote sensors. If there is more reflected radiation in near-infrared wavelengths than in visible

wavelengths, then the vegetation is likely to be dense. If there is little difference in the intensities, the vegetation is likely sparse. NDVI is calculated on a per pixel basis, and a point location (e.g. postcode) can be assigned an average NDVI score for the surrounding area, with a defined radius (the 'buffer zone'). This can then be compared to other locations and related to an outcome of interest. The disadvantage of NDVI is it captures all vegetation, and so it is not possible using this measure to differentiate between private and publicly owned green space. This can be important to understand in terms of green space accessibility, particularly if green space appears to be close by but is not publicly accessible.

The lack of a clear definition of green space and the multiple ways of measuring it has resulted in varied estimates of how much green space is present in the UK. The Urban Green Nation report (CABE Space, 2010a) brought together over 70 data sources and identified 16,247 individual green spaces, of which 1770 are parks. The report did not consider privately owned green spaces, but estimated a mean score for England of 1.79 hectares of green space per thousand of the population.

1.3 Health benefits of green space

In this section, the literature on beneficial effects on physical health and mental health is outlined, and then the possible mechanisms that may explain this relationship are discussed.

1.3.1 Physical health

1.3.1.1 All-cause mortality and cause-specific mortality

A recent systematic review of 34 studies that examined the relation between green space and perceived general health, perceived mental health and all-cause mortality,

concluded there was strong evidence for significant positive associations between objectively-assessed quantity of green space (objectively measured around the residence) and all-cause mortality (Van Den Berg et al., 2015). They also found strong evidence for a positive association with perceived mental health, and moderate evidence for an association with perceived general health.

Five studies examined the association between objectively assessed quantity of green space around the residence and all-cause mortality (Coutts, Horner, & Chapin, 2010; Mitchell & Popham, 2008; Mitchell, Astell-Burt, & Richardson, 2011; Richardson et al., 2012; Villeneuve et al., 2012). Four of these studies found that those living in greener areas had a lower mortality rate, compared to groups living in areas with less green space. However there was one conflicting study (Richardson et al., 2012), but this study used a different measure of quantity of green space. In terms of subgroup analysis highlighted in the review, Mitchell and Popham (2008) additionally found a significant interaction between income deprivation and exposure to green space in relation to deaths from all causes ($p=0.02$). The incidence rate ratio for all-cause mortality for the most income deprived quintile compared with the least deprived was lower in the greenest areas compared with the least green, suggesting the potential for green space to reduce health inequalities for more deprived communities.

On the other hand, a second systematic review that also examined the evidence of an association between residential natural outdoor environments and mortality in adults concluded evidence was mixed for exposure to green space and all-cause mortality (Gascon et al., 2016). Three further studies related to all-cause mortality were included in this review that were not included in the Van den Berg et al. (2015) review: two of which studied all-cause mortality due to extreme heat (Harlan, Declet-Barreto, Stefanov, & Petitti, 2013; Uejio et al., 2011), and one where the population was patients

that had suffered a stroke (Wilker et al., 2014), which affected the strength of the conclusions made. The review did, however, find that the majority of studies showed a statistically significant reduction in the risk of cardiovascular disease mortality in areas with higher residential greenness, though the authors note the reductions were small: less than 5% in most studies. No study found evidence of associations between residential greenness and lung cancer mortality, and for other specific causes of death the number of studies was too few to evaluate the evidence (respiratory disease mortality, intentional self-harm, diabetes, and motor vehicle fatality mortality).

Both of these reviews focussed on quantity of green space, either using NDVI or percentage of land cover, but this limits our understanding of what is optimal for health benefits in terms of exposure to different types of green space. Determinants such as perception and quality of green space have been underexplored. Van den Berg et al. (2015) suggest this might be addressed by carrying out audits to capture the quantitative and qualitative characteristics of green spaces that are related to the different ways people use them.

1.3.1.2 Obesity and obesity-related health outcomes

Evidence for relationships between green space and obesity is mixed: 23% of papers included in a recent systematic review (Lachowycz & Jones, 2011) reported a relationship between green space exposure and reduced BMI. For example, Ellaway, Macintyre, and Bonnefoy (2005) analysed data from 6919 people situated across eight European cities and found people were 40% less likely to be obese in the greenest areas. On the other hand, six papers found weak or no evidence, and four found none. A study published more recently has also found conflicting results (Cummins & Fagg, 2012). They used the Health Survey for England, a nationally representative sample, over two

time periods (2000-2003 (n=42,177), 2004-2007 (n=36,959)) to determine BMI, and identified green space using the Generalised Land Use Database (GLUD). In 2000-2003, residence in the greenest areas was associated with a 12% increase in risk for overweight, and a 23% increase in risk for obesity, representing a counterintuitive finding. Although, analysis for 2004-2007 was not statistically significant. Similarly to the reviews discussed in the previous section, the authors suggest that the type and quality of green space should be considered, as different types of green space may impact weight status differently, some may facilitate physical activity more than others.

Nevertheless, there is also growing evidence for obesity-related health outcomes. For example, Maas, Verheig, Groenewegen, de Vries, and Spreeuwenberg (2006) found a lower prevalence of diseases including coronary heart disease and diabetes, in areas with more greenspace; and also, Mitchell and Popham (2008) found an association between green space exposure and lower premature mortality from circulatory disease.

Evidence for the relationship between green space and obesity is difficult to demonstrate given the range of factors that contribute to obesity and the time lag between exposure to green space and effect. Furthermore, all the studies included in the Lachowycz and Jones (2011) review, and many other studies related to green space exposure and health outcomes, are cross-sectional and therefore causality cannot be established. There is no way of knowing how much green space a person has been exposed to across the life course, which might influence the results. A second key limitation here and in many studies of green space and health is the issue of a third variable such as income interacting in this relationship. A higher income might both lead to a person living in a greener area and also having improved health outcomes. Studies rarely control for income as this information is not typically publicly available, but inclusion of socioeconomic status or area deprivation might act as proxy.

1.3.1.3 Pregnancy outcomes

Several recent studies have shown a relationship between surrounding greenness, as measured by NDVI score within a buffer around maternal place of residence, and increased birthweight (Dadvand et al., 2012a; 2012b; Dadvand et al., 2014; Hystad et al., 2014; Markevych et al., 2014). It is suggested this is related to lower levels of air pollution within green areas, as high levels are known to adversely affect pregnancy outcomes, and green spaces offer opportunity for physical activity, which is associated with reduced adverse pregnancy outcomes. Dadvand et al. (2012a), Hystad et al. (2014) and Markevych et al. (2014) observed an effect across the whole birth cohort, whereas Dadvand et al. (2012b) found NDVI within 100m of residences was not associated with birth weight in the entire studied cohort (n=8246), but was associated in the group with the lowest educational attainment. Dadvand et al. (2012a) revealed a stronger association in the lower maternal education group. Similarly to the findings of Mitchell and Popham (2008) in the mortality literature, these results suggest children of mothers of lower socioeconomic status may benefit more from a green environment. This might be explained by the fact that people of a lower socioeconomic status tend to be less mobile and spend more time at home, therefore exposure to greenery in the home environment is more likely. Interestingly, Dadvand et al. (2014) also found an interaction between ethnicity and surrounding greenness insofar as for White British participants there was a positive association between birthweight and greenness, but no association was identified for participants of Pakistani origin.

All of the above studies used NDVI as a measure of green space, which means it is not possible to distinguish between public and private green space, and also use of green space was not included in the analyses, and so the suggested mechanisms are not addressed.

1.3.1.4 Self-reported health

Lastly, self-reported health outcomes have also been linked to surrounding green space. Two large Dutch studies have found a positive relationship between self-reported health and green space. First, de Vries, Groenewegen, and Spreeuwenberg (2003) combined self-reported data for 17,000 people in the Netherlands and land use data concerning the amount of green space in their living environment. The health indicators were: number of health problems in the last 14 days, perceived general health on a 5-point scale, and a score on the Dutch version of the General Health Questionnaire (GHQ) (indicating psychiatric morbidity). A greener living environment was positively related to all three indicators, after controlling for age, sex and socioeconomic status. A second Dutch study combined questionnaire data from 250,000 people including questions on perceived health with the percentage of green space within 1km and 3km of the participants' postcode (Maas et al., 2006). Analysis again controlled for age, sex and socioeconomic status. Results showed perceived general health to be better in people with a greener living environment.

A similar study to Maas et al. (2006) was carried out in the UK with conflicting results (Mitchell & Popham, 2007). Data from the GLUD and the 2001 UK census were combined. No significant associations were found between green space and health in higher income suburban or rural areas, but a greater level of green space was associated with worse health in low-income suburban areas. The authors suggest this may be explained by evidence that shows green space in lower income areas may be of poorer quality, which may be insufficient to impact on poor health status. This interpretation indicates quality may be more important in terms of health benefits rather than quantity.

1.3.2 Mental health and wellbeing

1.3.2.1 General mental health

Gascon et al. (2015) systematically reviewed the literature on the mental health benefits of long term exposure to green and blue space (i.e. all visible surface waters e.g. lakes, rivers). Included studies used objective measures for exposure and the outcome of interest. 28 studies were identified; 18 of which included adults. Of these 18, 13 studies found a reduced risk of poor mental health or related disorder with increased surrounding greenness. Overall, the review concluded limited evidence for a causal relationship between surrounding greenness and mental health and related disorders in adults. The evidence for a relationship between blue space and mental health benefits was deemed inadequate at present.

The majority of the studies were cross-sectional in design and therefore may be limited by selection effects; individuals who move into a greener area may already be the type of people who have higher levels of well-being. However, the three available longitudinal studies did report benefits of surrounding green space on mental health (Alcock, White, Wheeler, Fleming, & Depledge, 2014; Astell-Burt, Mitchell, & Hartig, 2014a; White, Alcock, Wheeler, & Depledge, 2013), with one also reporting differences by age and gender (Astell-Burt et al., 2014a). Alcock et al. (2014) examined the effect of moving to a greener or less green area. GHQ scores for 5 consecutive years were collected from the British Household Panel Survey, and participants who relocated to a different area between the second and third year (n=1064, observations = 5320) were included. The authors found individuals who moved to greener areas had significantly better mental health in all three post-move years, whereas individuals who moved to less green areas showed significantly worse mental health in the year preceding the

move, but returned to baseline in the post-move years. White et al. (2013) also showed lower mental distress and higher well-being was associated with increased greenness in urban areas using the same survey. Lastly, Astell-Burt et al. (2014a) analysed variation in the GHQ scores using the survey for 1996-2004. Interestingly, they found that when age was not included, green space was associated with better mental health among men, but not women. Furthermore, for men, the benefit of more green space emerged in early to mid-adulthood.

A more recent longitudinal study has been carried out in Sweden (Annerstedt van den Bosch, Östergren, Grahn, & Skä, 2015). Individual residences were linked to five predefined nature qualities (serene, wild, lush, spacious and culture) and mental health was captured in a survey (n=1419) in 2000 and 2005. No significant correlation was found between change in the amount of qualities within a 300m distance and mental health, although, gained access to a 'serene' environment was a significant determinant for decreased risk for women of change to mental ill-health at follow-up. This is an interesting finding as it indicates that different types of green spaces might offer different benefits. It is important to extend our understanding of this and how it relates to use and health outcomes. This is something several reviews have called for, as previously discussed in this chapter.

1.3.2.2 Stress

There is promising evidence for the beneficial effect of green space on stress, as measured by both self-report and objective methods. In terms of self-reported stress, Stigsdotter et al. (2010) found respondents living more than 1km away from a green space had 1.42 higher odds of experiencing stress than their counterparts living less than 300m away. Also, Ward Thompson, Aspinall, Roe, Robertson, and Miller, (2016)

studied four deprived communities (n=406) in Scotland, finding for the first community, access to a garden or allotment was the single best predictor of reduced stress levels, and for the three other communities, the total green space in the neighbourhood was a significant predictor of decreased stress.

This relationship is confirmed in studies that have experimentally tested the relationship between stress and surrounding greenness, albeit these remain limited in number (Roe et al., 2013; Ward Thompson et al., 2012). Ward Thompson et al. (2012) aimed to establish whether salivary cortisol could act as a biomarker for variation in stress levels which may be associated with exposure to green space. A significant positive correlation between cortisol slope (the change in cortisol concentration over the course of the day) and the percentage of green space and a significant negative correlation between self-reported stress and percentage of green space was found. The study had only 25 participants, but it was concluded that salivary cortisol measurement offers 'considerable potential' for exploring relationships between green space and well-being.

Furthermore, Roe et al. (2013) extended this work to 106 participants, aged 35-55 and living in a deprived area. The findings confirm the previous work, showing people living in areas with a higher percentage of green space exhibited lower stress as measured by salivary cortisol. An interaction effect in terms of gender was observed whereby higher levels of neighbourhood green space was associated with steeper (healthier) diurnal cortisol decline in women, but not in men.

1.3.2.3 Anxiety and depression

A large study of 345,143 people looked at 24 disease clusters from Dutch GP records and the percentage of the percentage of green space within 1km and 3km around their residence was also obtained (Maas et al., 2009). The clusters covered the full range of

the most prevalent diseases in general practice. Fifteen of the 24 clusters were reduced for those living with more green space in a 1km radius, the strongest of which was for anxiety and depressive disorders. The relationship was found to be stronger for children and people with a lower socioeconomic status. This is supported by McEachan et al. (2015), who found pregnant women in the greener quintiles in Bradford, UK were 18-23% less likely to report depressive symptoms than those in the least green quintile, and a significant interaction was observed for level of education. In the adjusted model, a significant positive relationship between green space and depression was present only in the lower education group: the greenest quintile was associated with a 26% reduction in reporting depressive symptoms.

1.3.3 Summary of health benefits

In summary, many of the above studies have demonstrated beneficial associations of green space with health outcomes. The evidence for benefits in relation to mental health appears to be more consistent, and a systematic review has concluded there is limited evidence for a causal relationship between objectively-measured green space and mental health outcomes (Gascon et al., 2015).

The evidence for the relationship between green space and physical health is promising but less consistent. Systematic reviews in relation to all-cause mortality have concluded differently; a review of green space and obesity concluded mixed evidence (Lachowycz & Jones, 2011), and one author has found conflicting findings related to birthweight in two separate studies (Dadvand et al., 2012a; Dadvand et al., 2012b).

Notably there also appears to be differential benefit of green space on health outcomes on those of lower socioeconomic status or education (Dadvand et al., 2012a, 2012b;

McEachan et al., 2015; Mitchell & Popham, 2008), and between ethnicities (Dadvand et al., 2014).

Despite the recent surge in literature on green space and health, a number of recent reviews have highlighted where gaps in evidence remain (Gascon et al., 2015; Lachowyz & Jones; van den Berg et al., 2015). A key issue is the prevalence of crude green space indicators: NDVI and percentage of green space around the home are useful but more information on how much, what type and quality is needed for urban planners and public health professionals to be able to translate research to practice. Furthermore, Nieuwenhuijsen, Khreis, Triguero-Mas, Gascon, and Dadvand (2017) also suggest a persons' satisfaction with or perception of green space is assessed, as these measures are likely to be important but are not widely used presently in epidemiological studies. Other issues include the fact exposure to green space is typically measured around the home but not work or school, and the lack of longitudinal studies – most at present are cross-sectional in design.

1.3.4 Mechanisms to explain links between green space and health

Four key mechanisms have been suggested by Hartig, Mitchell, de Vries, and Frumkin, (2014) that might explain the relationship between green space and health: improvement in air quality, increase in physical activity, increase in social contacts, and stress reduction and attention restoration. A number of possible moderators are also suggested in their model, such as distance to green space, accessibility, weather, perceived safety, gender, age, socioeconomic status and societal and cultural context. This framework is reproduced in Figure 1.1.

Nieuwenhuijsen et al. (2017) additionally suggest two newly emerging mechanisms that so far have had little testing: the 'biodiversity hypothesis' and the 'biogenics

hypothesis'. In brief, the biodiversity hypothesis suggests that reduced contact with nature may adversely affect the human microbiota (from which humans benefit) and its capacity to modify immune system functioning (Hanski et al., 2012). The 'biogenics hypothesis', suggested by Moore (2015) proposes regular exposure to low concentrations of mixtures of natural compounds and toxins in natural environments leads to health benefits by inhibiting activities of cell signalling systems that can lead to pathological processes resulting in cancers, diabetes, inflammation, immunosuppression and neurodegenerative diseases. These hypotheses are new and require much more research and evaluation. In the following sections, the evidence for the four mechanisms proposed by Hartig et al. (2014) is discussed.

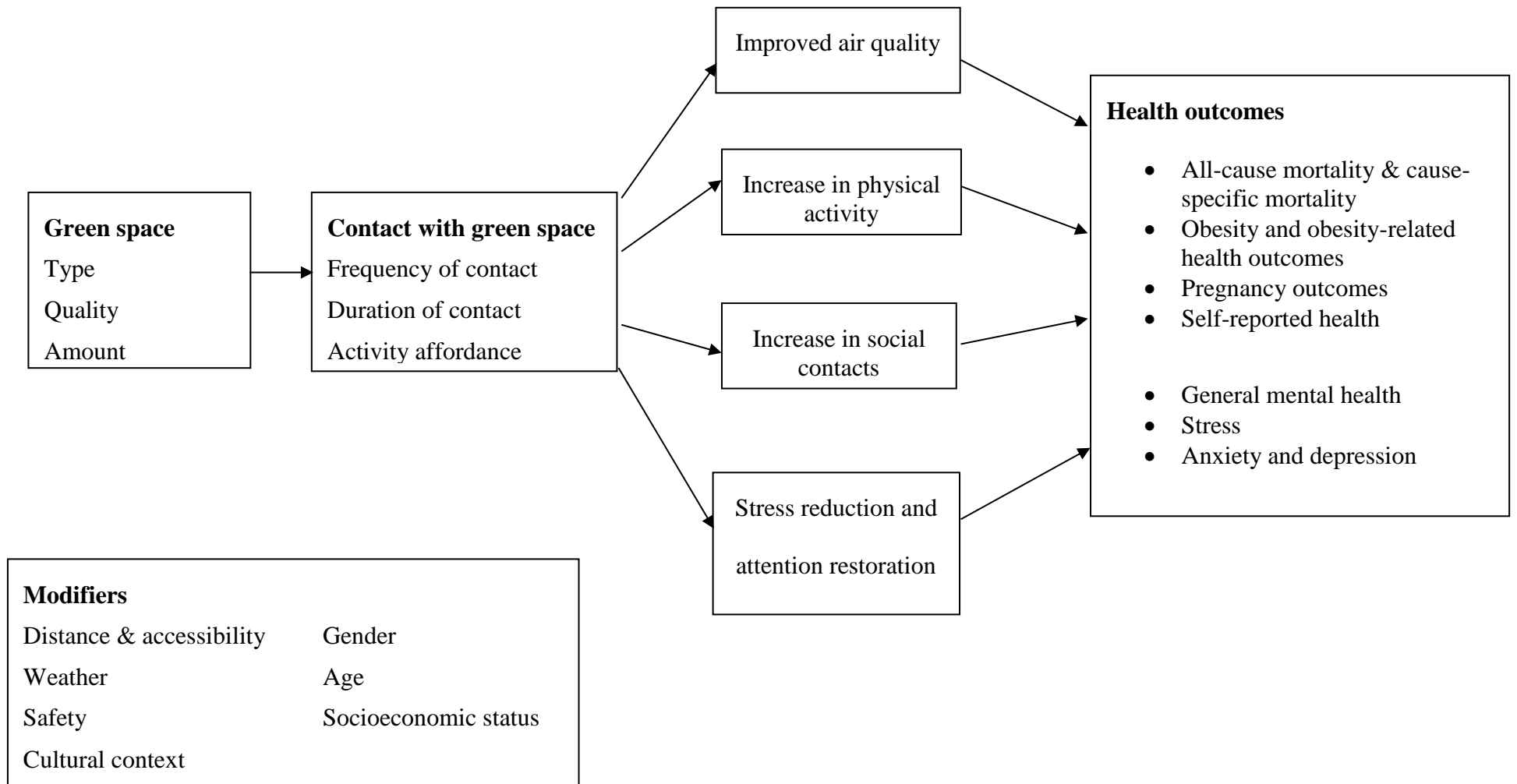


Figure 1.1 Mechanisms in the relationship between green space and health (Adapted from Hartig et al., 2014)

1.3.4.1 Air quality

Poor air quality is related to a number of serious health issues, in particular respiratory and cardiovascular diseases (Pope III et al., 2002), and exposure to particulate air pollution is estimated to cause 29,000 premature deaths in the UK annually (Gowers, Miller, & Stedman, 2014). The presence of green space in urban areas, where pollution is most concentrated, is understood to counteract this, and can lead to an improvement in air quality (Nowak, Crane, & Stevens, 2006; Selmi et al., 2016; Tallis, Taylor, Sinnett, & Freer-Smith, 2011). For example, Tallis et al. (2011) found that the tree canopy of the urban forest in the Greater London area removed between 852 and 2121 tonnes of PM10 (particulate matter of 10 micrometres or less) annually, which amounts to between a 0.7% and 1.4% air quality improvement for PM10.

Moreover, the greatest benefit to health in terms of air quality is realised when people are close to or within a green space. Research shows the largest decrease in particulates due to absorption by vegetation is within the green space themselves (Tiwary et al., 2009), and so the effect of exposures to particulate matter in the built environment might be reduced when more time is spent in green space.

1.3.4.2 Physical activity

There is irrefutable evidence for the effectiveness of regular physical activity on the prevention of many chronic diseases (e.g. cardiovascular disease, diabetes, cancer) (Warburton, Nicol, & Bredin, 2006). Green space is suggested to act as a facilitator of physical activity insofar it can be used for 'green exercise', such as walking or cycling (Thompson Coon et al., 2011). Furthermore, Bowler (2010) conducted a systematic review and meta-analysis for the 'added benefits' to health following exposure to the natural environment. Meta-analysis of data on self-reported emotions showed beneficial

effects of activity in a natural environment compared to a synthetic environment in terms of reduced anger (Hedges $g = 0.46$, 95% CI = 0.23, 0.69), fatigue (Hedges $g = 0.42$, 95% CI = 0.07, 0.76) and sadness (Hedges $g = 0.36$, 95% CI = 0.08, 0.63); a positive effect was also found for attention (Hedges $g = 0.32$, 95% CI = 0.06, 0.58). This review shows that use of the natural environment is key to achieving further benefits from physical activity otherwise achieved in the built environment.

Many studies have examined the relationship between access to green space and physical activity levels, however the results are inconsistent. For example, Astell-Burt, Feng, and Kolt (2014) investigated the relationship between surrounding green space, walking and moderate to vigorous physical activity (MVPA) in 203,883 Australian adults. Those in greener areas were significantly more likely to walk and participate in MVPA at least once a week compared to those in neighbourhoods with 0-20% green space. Conversely, Maas, Verheij, Spreeuwenberg, and Groenewegen (2008) interviewed 4899 Dutch people about their physical activity, self-perceived health and demographic and socioeconomic background, and calculated the amount of green space within 1km and 3km of their home postcode. No relationship was observed between green space and whether participants met the Dutch recommendations for physical activity.

These contrasting results were reflected overall in a recent systematic review of US-based studies that examined the relationship between access and proximity to parks and objectively-measured physical activity, identifying 20 studies for inclusion (Bancroft et al., 2015). Five reported a significant positive association, nine no association and six had mixed findings. They suggest the variation in findings may be a result of heterogeneity in exposure assessments.

There are a number of ways to measure green space as discussed earlier in this chapter (see section 1.2.2), and furthermore, measurement of physical activity can also vary: most studies in the review measured MVPA using an accelerometer worn for between 3 and 5 days, whereas some studies used pedometers and tracked steps. Moreover, one looked at MVPA only at the weekend (Scott et al., 2007) and another only during non-school hours (Cohen et al., 2006). Physical activity can also be reported as a continuous outcome (minutes of MVPA per day), a dichotomous outcome (whether or not a specified number of steps are met) or a categorical measure of sedentary, light or moderate-to-vigorous activity. The authors call for standardisation of exposure measurement and comprehensive reporting (Bancroft et al., 2015); a consistent use of standardised techniques may lead to a clearer understanding of the mechanism.

1.3.4.3 Social contacts and cohesion

The third mechanism is related to social contacts, which might refer to, for example, having a conversation or undertaking a joint activity. It is understood that social relationships can influence a variety of health outcomes (Berkman, Glass, Brissette, & Seeman, 2000; Kawachi, Kennedy, Lochner, & Prothrow-Stith, 1997). Most contact between neighbours and within communities is understood to occur in places like parks, recreation facilities, schools and churches (Kuo, Sullivan, Coley, & Brunson, 1998; Völker, Flap, & Lindenberg, 2007), yet few studies have investigated the relationship between green space and social contacts.

Kuo et al. (1998) first studied whether greener neighbourhoods produced stronger neighbourhood social ties. They found that levels of vegetation predicted both use of common spaces and the strength of neighbourhood social ties. Importantly, it was also found that use of common spaces mediated the relation between vegetation and

neighbourhood social ties. More recently, Maas, van Dillen, Verheij, and Groenewegen (2009) found those with more green space in their living environment felt less lonely and experienced less shortage of social support, but they did not have more contact with neighbours and did not receive more social support. In addition, loneliness and shortage of social support appeared to partially mediate the relation between green space and self-perceived health, number of health complaints and self-reported psychiatric morbidity.

Overall, there is evidence to suggest social contacts may be a mediator between green space and health, but the lack of studies at present prevents any robust conclusion. The findings of Kuo et al. (1998) also suggest that the use of green space is key in accessing the social contacts mechanism.

1.3.4.4 Stress reduction and attention restoration

In contrast, evidence for stress reduction and attention restoration has been more consistent (Berto, 2014). There are two theories that contribute to this mechanism: Stress Reduction Theory and Attention Restoration Theory (Kaplan, 1995; Ulrich et al., 1991). Stress Reduction Theory suggests natural environments bring about an immediate affective response as a consequence of psycho-evolutionary processes, which then reduces stress (Ulrich, 1991). Attention Restoration Theory suggests that the natural environment can support restoration following mental fatigue insofar as the stimuli present in a natural environment invokes involuntary attention (Kaplan, 1995).

The theories for this mechanism originated from a study by (Ulrich, 1984), who found that patients who had a gall bladder operation and had a view from the window with trees recovered faster than patients that faced a brick wall. This was followed by a study in 1991 by Ulrich, where participants watched a stressful film and then watched one of

six videos depicting various urban and natural environments. Stress was measured using a self-report rating and a number of physiological indicators (e.g. muscle tension, heart period (time interval between beats)), and individuals who viewed natural settings experienced more rapid recovery than those that viewed an urban setting.

The presence of this mechanism has since been supported in many further studies, for example studies examining the effects of ‘shinrin-yoku’, or forest bathing on acute stress (Park, Tsunetsugu, Kasetani, Kagawa, & Miyazaki, 2010); of surrounding green space on chronic stress (Gidlow, Randall, Gillman, Smith, & Jones, 2016; Roe et al., 2013; Ward Thompson et al., 2012); and of a virtual green environment on acute stress (Annerstedt et al., 2013).

1.3.4.5 Comparison of mechanisms

There has been little assessment done to compare the input of each mediator in the greenspace-health relationship. De Vries, van Dillen, Groenewegen, and Spreeuwenberg (2013) attempted to assess the strength of three mechanisms outlined above: physical activity, social contacts and stress reduction, in relation to streetscape greenery, perceived general health, acute health-related complaints and mental health status. Analyses revealed stress reduction and social cohesion were the strongest mediators; total physical activity was not a mediator but activity undertaken in green space was, but less so than stress and social cohesion. However, this study is limited by the fact it focussed on streetscape greenery, the quantity of which is poorly defined: it could potentially vary from flower boxes present on the street to having a view of woodland; the findings remain to be confirmed in other types of green space.

1.4 Use of green space

1.4.1 Current use of green space

Most previous research has examined the quantity of green space and its relationship to health outcomes, however, it is understood that most benefit to health is likely derived from use of green space rather than its presence alone (Lee, Jordan, & Horsley, 2015). The best estimates of national patterns of green space use in the UK comes from the Monitor of Engagement with the Natural Environment (MENE) survey. The survey has been conducted annually since 2009, with 326,755 interviews having been undertaken over the last 7 years, with a sample of at least 800 every week across at least 100 sample points (Natural England, 2017a). Data collected includes the number of visits made in the last seven days, type of destination, duration, and main activities undertaken in the park.

The number of visits to any natural environment has increased each year the survey has been conducted. The 2009/10 report found English adults participated in 2.86 billion visits in the last 12 months (Natural England, 2010). By 2013/14, 2.93 billion visits were estimated and in 2015/2016 this had increased again to 3.1 billion visits (Natural England, 2015, 2017b). Between the first and latest report, there has been a significant increase in the proportion of the population who claimed to visit the natural environment once a week or more, from 54% to 58%. However, the proportion of those who indicated they never visited the natural environment has been reported as relatively stable over the past 7 years, at around 9% (Natural England, 2017b). Parks in towns and cities were the most frequently visited destination type, accounting for 28% of visits in 2015/16.

These findings are in line with those of the State of UK Public Parks Report (Heritage Lottery Fund, 2016). Park managers (n=72, of total 418 park departments in the UK) were asked about the trend in visitors over the past three years (2013-2015), 75% reported an increasing trend, and 22% said the trend had stayed the same.

1.4.1.1 Variation within the population

Variation in patterns of use within the population are also highlighted in the MENE surveys. A review of the survey results from 2009 to 2012 (Burt, Stewart, Preston, & Costley, 2013) reported the total population average was 65 visits per person per year. Some populations were found to visit the natural environment less than the average: Black and Ethnic Minority population (27 visits per person per year), urban deprived population (40 visits per person per year), lower socioeconomic groups (50 visits per person per year), people aged 65+ (55 visits per person per year) and people with a disability or long-term illness (56 visits per person per year).

These results are supported by additional research by CABE Space (2010b) in the UK, who conducted 523 interviews with White British, Pakistani, Bangladeshi, Black African and African-Caribbean, and Indian people. In summer, almost a third of White British would visit the park most days, compared with almost one-quarter of Indian respondents and one-fifth of Pakistani respondents. Interestingly, in winter, almost 65% of Bangladeshis and over 40% of Pakistanis would never visit the park, compared with just over 20% of White British visiting once or twice a week. An earlier report also carried out in the UK (Dunnnett, Swanwick, & Woolley, 2002) conducted a telephone survey of 1588 people on their green space use; 515 of which were non-users or infrequent users (infrequent being less than once a month, non-users have used once in the last year). Of the non-users, 33% were ethnic minorities, 43% were disabled, and 48% were 65+ years old (although categories not mutually exclusive).

The variation in frequency of use and activities between subpopulations is mirrored in the findings of a European review of outdoor recreation and ethnicity (Gentin, 2011). For example, a Dutch study found activities such as ‘having a picnic or barbecue’ or ‘meeting other people’ were more important to non-Western immigrants than to native Dutch people (Peters, Elands, & Buijs, 2010). Moreover, Jay and Schraml (2009) in Germany found there were differences in recreational use patterns among Turkish, Balkan and Russian-Germans. Gentin (2011) suggests these differences might be addressed by researching further the characteristics of outdoor recreation areas that influence or affect participation or perception of minorities and the majority population. Overall, the evidence suggests there are differences in pattern of use between subpopulations such as the elderly, the disabled, those in deprived areas, and particularly different ethnic groups. Understanding why these differences occur is important in achieving equity for potential health benefits from use of green space.

1.4.2 Encouraging use of green space

A number of factors were listed by Hartig et al. (2014) in their conceptual framework of green space and health that might influence use of green space (see section 1.3.4). These included distance, accessibility, weather, perceived safety, gender, age, socioeconomic status and societal and cultural context. In order to encourage use and access the potential health benefits, it is vital to understand the influence of these moderators so that effective interventions can be designed.

It was demonstrated in the previous section how park use can vary by individual characteristics such as age, socioeconomic status, and ethnicity. Structural factors described in the framework such as proximity and accessibility have also been widely researched, but the findings are mixed (Cohen et al., 2007; Coombes, Jones, & Hillsdon,

2010; Kaczynski et al., 2014; Kaczynski, Potwarka, Smale, & Havitz, 2009; Mowen, Orsega-Smith, Payne, Ainsworth, & Godbey, 2007). Cohen et al. (2007) and Coombes et al. (2010) found that frequency of green space use decreased with increasing distance from the nearest green space, whereas park proximity was not related to park use or park-based physical activity in other studies (Mowen et al., 2007; Kaczynski et al., 2009; Kaczynski et al., 2014). One important limitation of these studies is that they do not take into account park quality: it is suggested that the inconsistencies observed in these studies may be partly explained by variation in park quality.

There is some evidence that supports the idea that the quality of a park influences use. For example, Kaczynski, Potwarka, and Saelens (2008) investigated the degree to which park size, number of features (categorised as facilities e.g. trails, paths, open space, or amenities e.g. picnic area, restroom, benches, bins) and proximity of the park were related to park-based physical activity; only number of features was a significant predictor. Assuming that the number of features is in line with the quality of the park, this suggests that greater quality may lead to increased use. Facilities and amenities were then tested separately and only facilities were significant. Within facilities, paved trails, unpaved trails and wooded areas were significantly related to physical activity.

Despite demonstrating that the number of features is predictive of park-based physical activity, there are a number of limitations to this study – only park-based physical activity was recorded, as opposed to all park use; and the quality of the features was not explored, only presence or absence. These limitations are present in other studies of park features and physical activity (Cohen et al., 2006; Kaczynski et al., 2014; Shores & West, 2008).

One further study, Giles-Corti et al. (2005), did take into account park ‘attractiveness’, which was a composite score that recorded some items not included in previous studies

such as the presence of trees, water features, lighting and quiet surrounding roads.

Distance and size were also included in the analysis. They found that after distance was accounted for, size was more important than attractiveness in encouraging use. There are a number of issues with this study: use was defined as use of a public open space for physical activity in the last two weeks, and the audit of the open spaces was undertaken in 1995-1996 whereas the survey of residents was distributed in 2002. The authors also note that their approach to weighting the attributes of attractiveness may have contributed to the result. Nevertheless, assuming that greater size leads to more park features, this may still suggest that better quality leads to increased use.

In addition, this research has been based in the US and Australia, and the samples were typically White, well-educated and of a higher socioeconomic status, and this limits the extent to which the findings can be applied to other parts of the world. More research needs to be carried out into the readily modifiable determinants of park use, such as park quality, in more disadvantaged and ethnically diverse areas.

The limitations of current research might be addressed with research that includes a more comprehensive understanding of park quality and its relation to park use. In doing so, this research would contribute to the response to numerous calls from recent reviews into the relationship between green space and health to address the current gap in the literature regarding the influence of different characteristics and types of green spaces, how they are perceived, how these characteristics differ between cultures and socioeconomic groups and how this relates to use and to subsequent health outcomes (for example, Gascon et al., 2015; Gascon et al., 2016, Lachowycz and Jones, 2011; Keniger, Gaston, Irvine, & Fuller, 2013).

1.5 Thesis context

1.5.1 Bradford

The current research is located with the city of Bradford in West Yorkshire, UK. Bradford is the 6th largest city in the UK, and 27% of the district's population live in areas classed in the top 10% most deprived areas in England (City of Bradford Metropolitan District Council, 2017). The resident population is 67.3% White British and 24.8% South Asian; this is above average compared to the rest of the England, where the resident population is 85.41% White British and 5.55% South Asian (Office for National Statistics (ONS), 2017).

The high levels of deprivation and ethnic diversity within the city make it an excellent setting to explore in further detail the reasons behind variations in use of green space by different socioeconomic and ethnic groups. Some evidence outlined in this review has shown the relationship between green space and health is moderated by ethnicity, and so this thesis is ideally placed to aid our understanding of why this might be the case.

1.5.2 Better Start Bradford

This thesis is aligned with the Better Start Bradford (BSB) programme (www.betterstartbradford.org.uk), and more specifically, with the Better Place workstream. BSB is a community-led partnership that has been allocated £49 million from the Big Lottery Fund to implement 22 interventions to improve outcomes for children aged 0-3 years in three key areas: social and emotional development; communication and language development; and nutrition and obesity. The interventions are currently being implemented in three of the most deprived inner-city wards of Bradford: Bradford Moor, Little Horton and Bowling and Barkerend. Born in Bradford's Better Start (BiBSS), a new birth cohort recruiting babies born in these

wards and their parents, will simultaneously be evaluating the impact of these interventions (Dickerson et al., 2016).

Better Place represents its environmental workstream, which aims to deliver environmental interventions to improve the health of young children in the area. This presented an opportunity for a body of evidence embedded in Bradford to be produced that would inform the development of environmental interventions in green spaces in the city.

Furthermore, central to the Better Place ethos is the involvement of the community in the design of the interventions through the use of a structured co-design process. There is evidence for community participation in the design and delivery of interventions in, for example, environmental and occupational health in the US (see Cook, 2008), and the National Institute for Health and Care Excellence (NICE) have called for greater community involvement in health and well-being initiatives in the UK (NICE, 2016). Overall, the benefit of the participatory approach is that it is intended to enhance the quality and sustainability of an intervention through building community ownership (Minkler, Glover Blackwell, Thompson, & Tamir, 2003).

There are limited examples from the US of evaluations of community involvement in interventions in green space or open space to encourage use, although they have demonstrated success (Cohen et al., 2013; King, Litt, Hale, Burniece, & Ross, 2015; Slater, Pugach, Lin, & Bontu, 2016). No equivalent studies could be found in academic literature in the UK. In addition, the level of involvement of the community varied widely, making it difficult to ascertain how effective different approaches might be. This represents a gap in the evidence, and through collaboration with Better Place, there was scope to pilot the early stages of a community co-design process and therefore address this gap.

1.6 Aims and thesis outline

The literature review thus far has outlined the definition of green space, its associated physical and mental health benefits, and explained the suggested mechanisms by which these benefits are accessed. The review also described the current pattern of green space use in the UK and how this varies between populations. Understanding how use might be encouraged is important so that the potential for accruing health benefits is maximised. The review has shown that the role of quality of a green space and its relation to use has been under researched thus far, and evidence is needed on this in order to provide sufficient guidance to urban planners on designing a health-promoting environment. Furthermore, there is evidence to suggest that community involvement in the design of a community-based intervention can be beneficial, but at present there are few evaluations of this with regard to environmental interventions in green space. There is opportunity to address this gap within this thesis.

Therefore, the overall aim of this thesis is to provide evidence to inform the design of an environmental intervention into green space use in order to promote health. There were the following objectives to achieve this aim:

- To systematically review the current literature on environmental interventions to increase the use of green space

Chapter 2 presents the findings of a systematic review of the literature on previous environmental interventions into the use of green space (recently published, see Roberts et al., 2016). The review describes the behaviour change techniques using the Behaviour Change Technique Taxonomy (BCTTv1) (Michie et al., 2013) that comprise the interventions, and examines the effectiveness of community input into the intervention design. Lastly, the quality of the evidence is evaluated. This chapter allows for the

context of the current research examining environmental interventions into green space use to be understood.

- To examine the influence of park features on park use and park satisfaction

Chapter 3 presents the results of a statistical analysis that explores the influence of park proximity, size and quality on park satisfaction and use. A mediation analysis is conducted to explore whether park satisfaction mediates the relationship between park features and use. The roles of ethnicity and socioeconomic status as potential moderators in this relationship are also examined. This chapter addresses the current understudied area of the role of park quality on park use as outlined in this review. It also answers a call from Nieuwenhuijsen et al. (2017) to consider the influence of satisfaction with green space in this relationship.

- To explore preferences for park features

Chapter 4 reports on a qualitative study into preferences for park features. Interviews were carried out in two parks in Bradford using the walkalong methodology (Kusenbach, 2003). This study complements the previous chapter; qualitative methods are invaluable to enrich our understanding of observed statistical associations.

- To pilot the co-design of an environmental intervention into green space use

Chapter 5 details a pilot study of implementing a novel co-design process to design an environmental intervention in a park in Bradford. The process involves collaboration with local stakeholders and nearby residents to the study park. The literature review has presented evidence for the benefits of involvement of the community in intervention design and delivery, however there are evaluations of this in green space interventions. The study presented in this chapter contributes to this limited research.

Lastly, Chapter 6 discusses the findings of this thesis, and offers recommendations for future research.

Chapter 2 Identifying Effective Behaviour Change Techniques in Built Environment Interventions to Increase Use of Green Space: A Systematic Review

2.1 Introduction

In Chapter 1 the numerous health benefits that have been linked to surrounding green space were discussed. Four main mechanisms have been identified: improved air quality, opportunity for physical activity, facilitation of social contact, and stress reduction and attention restoration (Hartig et al., 2014). There is also evidence that the benefits are modified by socioeconomic status, with lower socioeconomic groups seeing greater benefit (Dadvand et al., 2012; McEachan et al., 2015), and furthermore, that green space is ‘equigenic’, or it can reduce health inequalities (Mitchell & Popham 2008; Mitchell et al., 2015). These mechanisms are likely realised during use of and presence in green space. For this reason it is important to understand how a green space might be optimized in order to encourage use. This knowledge would be of particular value to those interested in modifying open space to improve health, such as public health and urban planning professionals.

At present there is little guidance for these authorities on what changes in a green space might be effective. One challenge is the degree to which intervention components are adequately described. If one wishes to replicate successful interventions it is imperative that there is a clear description of the ‘active ingredients’. Recently there have been moves to standardize the terminology associated with description of interventions. The BCTTv1 is a generalisable nomenclature of behaviour change techniques developed to specify the ‘active ingredients’ employed in complex interventions (Michie et al., 2013). Applying this taxonomy to previously conducted intervention studies may shed

some light on which techniques are particularly effective, and therefore form initial guidance on intervention design.

In conducting this review there is also opportunity to explore the role of community involvement in the design of an environmental intervention and whether this improves effectiveness. In Chapter 1 it was outlined that there is currently a lack of research into this despite calls for community involvement in intervention design and implementation from, for example, NICE and WHO. This review will therefore also consider this and contribute to this gap in research.

The aim of this review is to identify previous environmental interventions whose goal was to encourage use of green space and to describe the behaviour change techniques implemented. A secondary aim was to examine the effectiveness of community input in the intervention design process. The final aim of the review was to evaluate the quality of the evidence available.

2.2 Method

This review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009) and was registered on PROSPERO (registration number: CRD42015017665), where the protocol is detailed.

2.2.1 Search strategy

A literature search was conducted on four databases using OvidSP: PsycINFO, Medline, Global Health and Embase from inception to August 2016. Search terms were related to 'adults', 'intervention', 'use' and 'green space' (see Appendix A for search strategies). Records were downloaded to EndNote bibliography software and duplicates removed.

Reference lists of studies screened at full-text level were searched for additional studies. Appropriate websites identified between reviewers were also searched for relevant resources (see Appendix B). Where only an abstract or presentation of a potentially suitable study could be found from the databases searched or online, the authors were contacted directly for further information. Authors were also asked about other studies suitable for inclusion.

2.2.2 Study selection

Studies were eligible if: they reported an environmental green space intervention was delivered with a measure of use as an outcome, change in use of green space was compared at baseline and post-intervention and/or with a control or comparison site and; had a study population over 18-years-old. Studies with children only were excluded as children's park use is likely guided by parental preferences (Veitch, Bagley, Ball, & Salmon, 2006), and so are not responsive to environmental interventions in the same way. Abstracts and conference proceedings were excluded. No geographical area was excluded, however only studies written in English were considered. Green space was generally understood as 'amenity' green space, e.g., parks and trails. Green space with an explicit function was excluded, e.g., cemeteries, school grounds and community gardens. Interventions were understood to be environmental when the natural or built environment was altered in some way. Studies with additional intervention content beyond the environmental changes were also eligible.

A total of 1649 studies were returned following the database search. After removing duplicates, 1255 records were screened at the level of the abstract then 114 at the level of full-text by one reviewer. A second reviewer screened at random a 20% sample of the full texts for inclusion ($n = 23$), and perfect inter-rater agreement was achieved ($\kappa = 1.00$).

2.2.3 Data extraction

Key study characteristics were extracted using a standardised form by one reviewer.

The study design, method(s), outcomes and outcome measures, findings and conclusions were noted. Intervention and control group descriptions were noted verbatim for further assessment. Six studies from a total of 17 were double data extracted by two independent reviewers. The results were discussed and deemed to be consistent between reviewers.

Risk of bias was assessed using the Cochrane Risk of Bias tool (Higgins et al., 2011).

This tool was developed primarily for randomised controlled trials (RCTs), which may be difficult to carry out within this line of research. Nevertheless, the tool may be used for non-randomised studies as it demonstrates where weaknesses are present in the current literature.

Quality of evidence was assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach (GRADE Working Group, 2004).

This approach offers a standardised way of rating the quality of evidence and is applicable to both clinical and wider public health settings (Guyatt et al., 2011). This approach considers risk of bias, consistency of results, indirectness, imprecision and effect size, and publication bias. These indicators were discussed for each outcome between reviewers until consensus was reached. Papers were not excluded based on quality due to the limited number of studies eligible for inclusion in this review, but the level of quality is an aspect included in the Discussion.

2.2.4 Data synthesis

Following consideration of the outcome measures, the results were deemed too heterogeneous for a meta-analysis. Interventions were coded using Michie et al.'s BCTTv1 (2013), to facilitate comparison of behaviour change techniques employed

across studies. Three reviewers completed coding independently, and any disagreement was resolved by discussion. Studies were also coded for co-design of the intervention. Co-design was understood as whenever the local community was consulted during the design process.

2.3 Results

Of 1649 articles identified in the database search, 1255 records were abstract screened and 114 were screened at full-text level. Ten articles met the inclusion criteria and seven were retrieved through the grey literature search (Figure 2.1). One was identified after searching the reference lists of full-texts. Following a search of relevant websites, one full-text public report was found on the Natural England website, and two were found after identifying relevant presentations on the Active Living website. Lastly, three were obtained where the returned abstract was deemed appropriate but the full-text could not be found and the author was contacted.

In total, 17 papers reporting 15 studies were identified for review. Two studies were reported in both a peer-reviewed journal and a public report; the peer-reviewed article is referenced throughout this review (Mowen, Hickerson, & Kaczynski, 2013; Veitch, Ball, Crawford, Abbott, & Salmon, 2012).

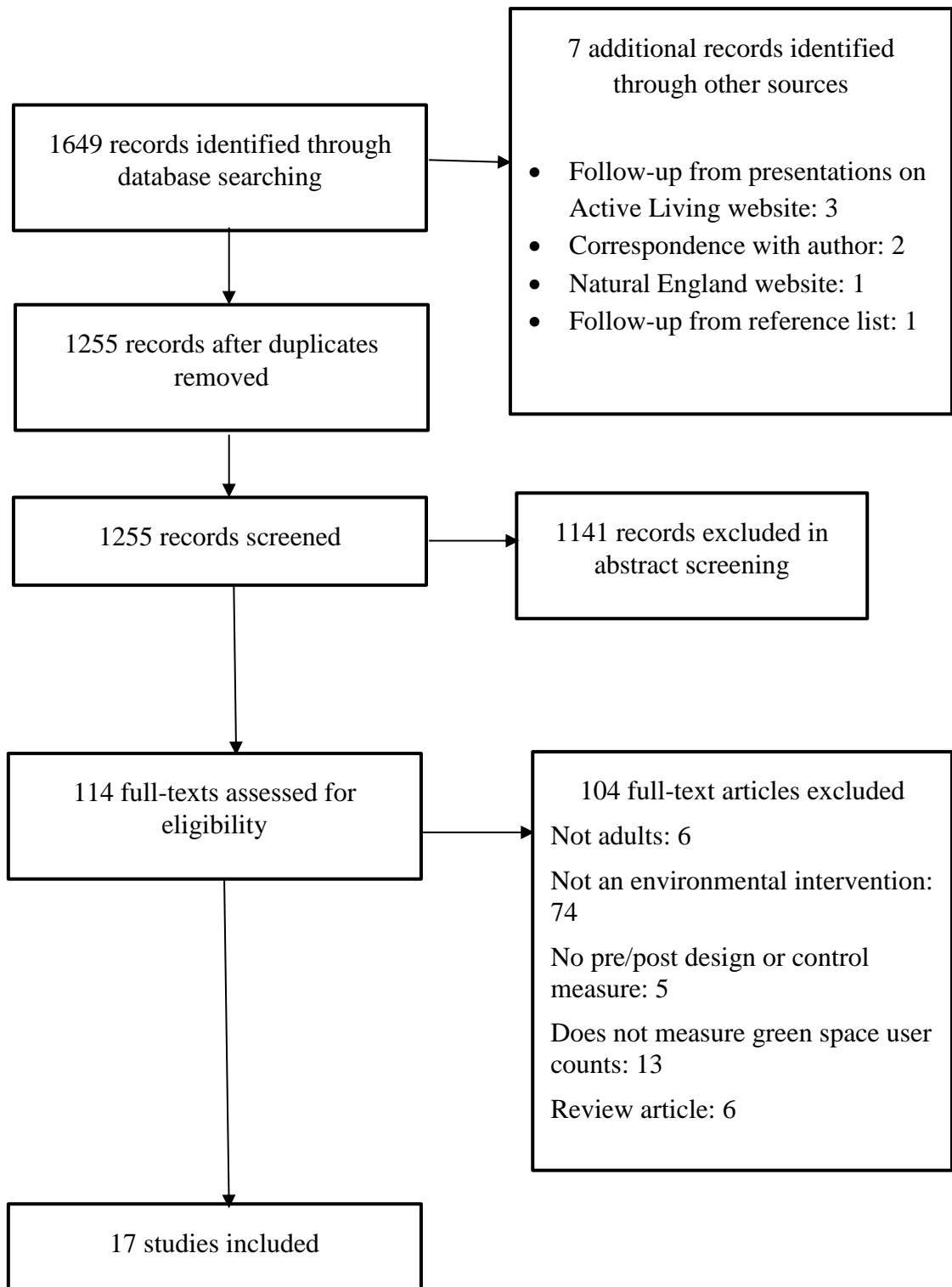


Figure 2.1 PRISMA flow diagram

2.3.1 Study characteristics

Key study characteristics are detailed in Table 2.1. Thirteen studies had a quasi-experimental pre-post design: eight were controlled (Cohen et al., 2009, 2015; Cohen, Marsh, Williamson, Golinelli, & McKenzie, 2012; Gidlow, Ellis, Smith, & Fairburn, 2010; Mowen et al., 2013; Slater, Pugach, Lin, & Bontu, 2016; Tester & Baker, 2009; Veitch et al., 2012) and five had no comparator (Bell & Austin, 2014; Cranney et al., 2016; King et al., 2015; Reed, 2013; Reed, Grost, & Mantinan, 2010). One study ran an RCT (Cohen et al., 2013) and one study measured a comparator at post-test only (Cohen et al., 2014). Eleven studies were conducted in the US, many of which were by the same group (Cohen et al., 2009; Cohen et al., 2012; Cohen et al., 2013; Cohen et al., 2014; Cohen et al., 2015). Three occurred in Australia (Bell & Austin, 2014; Cranney et al., 2016; Veitch et al., 2012) and one in the UK (Gidlow et al., 2010).

Table 2.1 Study characteristics

Reference	Study Design	Country	Population	Intervention	Comparison	Outcome	Follow-up period	Outcome Measures	Risk of Bias
Bell & Austin, 2014	Quasi-experiment, uncontrolled, pre-post design	Wide Bay, Queensland, Australia	77% of the Wide Bay population in lowest two quintiles related to the Index of Relative Socio-Economic Disadvantage (IRSD)	2 intervention parks; both held open days to gauge public opinion and suggestions. Changes organised into framework of: access, facilities, programs and enhancements	Baseline data from both parks collected via audits, systematic observations and household surveys	At Boreham Park, visitation increased from 170 at baseline to 562 at follow-up; at Schuhkraft Hub, visitation counts increased dramatically from 2 to a total of 231 across all data collection points.	Construction completed Feb and Mar 2014 at Boreham Park and Schuhkraft Hub respectively; park audits completed in immediate weeks following and systematic observations completed almost 3 months after re-opening	Park audits to assess physical environment; direct observation using SOPARC	High
Cohen et	Quasi-	California,	Predominantly	5 intervention	Comparison	On average,	Baseline	Direct observation	High

al., 2009	experiment controlled, pre-post design	USA	Latino and African-American; low-income; surveyed lived within 2 miles of park and recruited systematically	parks: 3 parks had new gyms, 1 had refurbished gym and field improvements, 1 had improvements to picnic area, walking path and playground area	parks had no upgrades. Matched by size, features and amenities and served similar population as counterpart	2000 people seen using an intervention and control park per week at baseline, 1500 at follow-up	collected Dec 2003- Nov 2004; follow-up Apr 2006-Mar 2008	of use using SOPARC; interviews with residents with a 2-mile radius	
Cohen et al., 2012	Quasi-experiment controlled, pre-post design	LA, USA	Observed users of both the Fitness Zone spaces and all other park activity areas; systematically interviewed park users from busiest and least busy activity areas	12 parks had Family Fitness zones installed (outdoor gyms) (average \$45,000 for 8 pieces of equipment)	10 matched control parks that did not install Family Fitness zones	Across the 12 parks, at first follow-up, difference represented 11% increase in users. At second follow-up, user counts similar to baseline	Baseline collected winter 2008-2009; follow-up in winter 2009/2010 and again in spring 2010	Direct observation of use using SOPARC; intercept survey on park use, perceptions of park	High
Cohen et al., 2013	RCT – parks were randomised into 3 study arms: park-director (PD) intervention	LA, USA	Parks selected on racial/ethnic diversity within 1-mile radius; households for interview randomly	Parks received \$4000 each to spend in ways they thought appropriate to increasing physical	Measurement-only control arm	Relative significant increase in park use in both PD-only and PAB/PD parks at	Baseline collected Apr 2008-Mar 2010; follow-up conducted Apr 2010-Apr 2012	Direct observation of use using SOPARC; survey of random residents within 1-mile of the park; interviews with users pre- and	Unclear

(n=16), PAB (park advisory board)/PD intervention (n=17) and a control arm (n=17). Randomised on park size, number of facilities and programs offered by the park and the socio-demographic characteristics of the population within a 1-mile radius

selected within 1 mile of each park (25 in each stratum, totalling 75)

activity. PDs/PAB members given training on outreach and marketing; purchases categorised into signage, promotional incentives and outreach and support for group activities

magnitude 7-12% over 28 observations (p=.035). Use in control parks declined 6-10% (p=.06). No significant difference between PD-only and PAB/PD parks

post-intervention (n=75)

Cohen et al., 2014

Quasi-experimental post-test only comparison

LA, USA

High rate of household poverty (30-41%); large minority population: Latino 70-80%, African-American 3-17%, Asian 0-

3 'pocket parks' converted vacant lots and urban parcels. Less than 1 acre, limited facilities, few/no programs, lack

Compared with playgrounds in larger (on average, 15-50%) neighbourhood parks that were matched to each of the pocket parks

Pocket parks had significantly more users than comparison park. After adjusting for

Baseline observations conducted mid-Jul and mid-August 2006; follow-up assessments in same season of 2008. Assessments of

Direct observation of use using SOPARC; survey on park use for residents and users

High

			16%; randomly sampled households within 0.25 mile of pocket park were surveyed – intercept surveys conducted within 0.5 mile where this was not possible	indoor facilities, not staffed. Typically fenced and locked when not open. All had playground equipment/ benches installed	by the percentage of households in poverty	all covariates, the comparison park playground areas had approximately 70% fewer users than the pocket parks on a daily basis.	comparison parks during 2008-2009		
Cohen et al., 2015	Quasi-experiment controlled, pre-post design	San Francisco, USA	Interviews conducted with residents from randomly selected households within ½ mile of the park. If household could not be accessed, on-street intercept interviews were conducted.	In the two renovated parks, new play equipment was installed, landscaping and ground surfaces. Hayes Valley also added fitness equipment and a recreation centre	2 parks (Margaret Hayward and Boeddeker Park) were not renovated. Two further parks were continuing renovation – no significant change in use was noted.	In Hayes Valley, person-hour visits increased from 156 to over 1000 person-hour visits per week. Use of West Sunset increased from 5500 person-hour visits to more than 9,300 person-hour visits per week. In the comparison	Baseline data collected May 2009; follow-up data collected May 2012.	Direct observation using SOPARC; interviews with 75 parks users and 75 residents from randomly selected households within ½ mile of the park	High

						parks, combined number of visits declined by 49%.			
Cranney et al., 2016	Quasi-experiment, uncontrolled, pre-post design	Maroubra, Sydney, Australia	Relatively high SES neighbourhoods, with some pockets of disadvantaged suburbs. Two-thirds of housing is medium to high density; one-third of residents speak a language other than English at home	Study park is 16.08ha. Outdoor gym installed at a cost of AUS\$60,000. Marketing and promotional strategies implemented to engage older adults in use of the gym. A guide to use was produced and exercise sessions were held with a professional.	Three data collection periods (Dec 2012, Jan 2013, Feb 2013) prior to installation of gym in March 2013.	23,905 park users observed during the study period: 8560 at baseline, 7091 at post-installation and 8248 at 12-month follow-up.	Immediate data collection post-installation in Mar 2013, Apr 2013, May 2013. 12-month follow-up from baseline in Dec 2013, Jan 2014, Feb 2014.	Direct observation using SOPARC; interviews; environmental audits	High
Gidlow et al., 2010	Quasi-experiment controlled, pre-post design	Stoke-on-Trent, UK	Survey distributed to all households within 300m of the park	4.6ha site identified through focus group; intervention involved program of	Similar neighbourhood green space site (2.4 ha, adjacent to primary school), only	Proportion who self-reported using the park rarely/never was lower at follow-up than	Baseline data collected spring 2009; follow-up data collected in spring/summer 2010. 12-month	Survey of green space use, perception and PA; focus groups for barriers/motivations; direct observation of use (4x1hr periods)	High

				child/parent and youth activities, new natural play area and improvements to coppice area	included in baseline observation	baseline; observation data found lower levels of use at follow-up compared with baseline.	intervention ran July 2009-June 2010	on 2 weekdays and Sat/Sun); audit of green space quality	
King et al., 2015	Quasi-experimental, uncontrolled pre-post design	Denver, USA	Two-acre undeveloped green space, situated between transitional housing for refugees	Community designed 'wish list' for the park and voted on best ideas. New park had a multi-purpose playing field for team sports, a play area with equipment, half courts for basketball, a shaded area, benches, a community garden and walking path	Baseline observations collected June-Oct 2010	Total count at baseline: 2888; total count at follow-up: 4525. Average monthly visitors observed using the improved park significantly increased from 180 to 651 (p=.002).	Park renovations completed spring 2012; follow-up data collected June-Oct 2012	Direct observation using SOPARC	High
Mowen & Hickerson, 2012; Mowen et al., 2013	Quasi-experimental controlled pre-post design	Allentown, Pennsylvania, USA	Centrally located park, often used for special events	109.6-acre regional park; investment in new playground, expansion and	Control park not slated for significant renovation	Few significant changes in short-term park visitation frequency (last	Baseline data collected June-Sept 2008 and 2011 at intervention and control.	On-site surveys conducted – used randomised sampling schedule to survey users at different times of	High

				enhancement of the trail system, expansion of picnic opportunities, renovated trellis and walkway, improvements to park sculptures, additional parking and support amenities		30 days) and length of stay between 2008 and 2011. Of post-intervention visitors, 54% stated they visited more frequently	Facilities upgraded in 2009-2010	day and week and throughout different park areas	
Reed, 2013	Quasi-experimental uncontrolled pre-post design	Spartanburg, South Carolina	Observed park users (SOPARC); 13 adults in focus groups (all White, 10 college-educated, 92% lived within 1-mile of the trail)	Two trails – installed way-finding signs, initiated community education; implemented tailored programs; facilitate policy changes and capital improvements; convened Advisory Committee; assisted in	4 observation periods on Wadsworth trail conducted pre-intervention (2010/2011); 15 quarterly observation periods conducted pre-intervention at the Mary Black Foundation Trail (2006/2009)	Wadsworth Trail saw 16% increase from 6615 in 2010/2011 to 7665 in 2012/2013 (adjusting for seasonality). Mary Black Foundation Trail experienced 163% increase from approximately 24,820 2006-	Initial evaluation from 2006-2009 (15 quarterly observations); secondary evaluation period post-intervention 2010-2013. Interventions administered 2010-2013	Systematic observation using SOPARC (4 times a day, 4 days a week); intercept surveys on trails and focus group of users and non-users of the trail	High

				soliciting funding to complete connection to elementary school; increased number of activities		2009 to approximately 65,449 post-intervention			
Reed et al., 2010	Quasi-experimental non-control pre-post design	Michigan, USA	Intercept survey (n=876) and systematic observation cohort	Trails- building new trails, extending the distance of current trails, enhancements with trailheads, benches, signage and lighting, trail promotion with signage and building connecting trails between cities. Parks- extend	Interviewer-administered survey conducted prior to interventions	Trails: 7125 users observed on 17 trails 2007-2009. Significant increase in use identified in five interventions. Two had significant decreases and 10 had no significant change. Parks: 4137 users observed	Unclear – evaluation period from 2007-2009.	Systematic observation using SOPARC – 4 times a day for 4 days; intercept surveys on park use	High

				length of trail, benches, signage, replaced play equipment, new bike racks, new or renovated walking path		in 14 parks. Five interventions had significant increases in park use. Two had significant decreases; the remaining parks had no significant change.			
Slater et al., 2016	Quasi-experimental, controlled, pre-post design	Chicago, Illinois, USA	Neighbourhood median household income ranged from \$12,333 to \$121,541. 55%, 23%, 16% and 6% of study parks were located in predominantly African American, White, mixed race and Latino neighbourhoods.	Community groups went through application process to nominate their local playground and provide input on design and maintenance. Average size 3.86ha.	39 intervention parks; 39 matched control parks. Control parks mapped to select those that were similar in size and park features and located near to intervention sites to ensure similar neighbourhood characteristics.	Park utilisation significantly increased between baseline and follow-up in intervention compared with control parks at .05 significance level. 35.71 average people/day to 42.46, compared with 29.38 to 27.33.	Baseline data collected July-Oct 2013. 12-month follow-up period July-Oct 2014. Intervention installed Aug-Nov 2013.	Direct observation using SOPARC	High

Tester & Baker, 2009	Quasi-experiment controlled, pre-post design	San Francisco, CA, USA	Systematic observation cohort; all parks located in low-income neighbourhoods, control park selected because of similar socio-demographics	Two parks had intervention at a cost of \$5.5m. In both: artificial turf replaced uneven dirt fields, new fencing, landscaping, lighting and picnic benches added. In first park, permanent soccer goals; in the second, a walkway around the field was restored.	Third park (Jose Coronado) did not receive any renovations or upgrade	Both intervention park playfields saw significant increases in male and female visitors, with over a 4-fold increase in the average number of visitors per observation among children and adults of both genders, but not in the control park	Data collected in two intervention parks and a control park from May 30 to June 5 in 2006 and post-intervention in 2007. Intervention implemented in the summer of 2006.	Direct observation using SOPARC - each park's target area was observed 8 times a day for 7 consecutive days at baseline and follow-up, giving 112 observations per park playfield	High
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Veitch et al., 2012a; Veitch et al., 2012b	Quasi-experiment controlled, pre-post design	Victoria, Australia	Systematic observation, all residents living within 1km of intervention park and control park received survey. Neighbourhood within most disadvantaged decile in state of Victoria	Residents established priorities for redevelopment: secure leash-free area for dogs; fenced, accessible all-abilities playground; a 365m walking track; access to a sheltered BBQ area; landscaping of gardens; additional fencing/ bollards	Control park selected based on having similar features as the intervention park at baseline and located in same neighbourhood	Total number of observed park users increased immediately after refurbishment was complete and continued at second follow-up (235 – 582 – 985). This was not reflected at the control park (83- 114- 51)	Observations completed at 3-time points: T1: 6 Aug – 30 Aug 2009 T2 (after refurbishment): 4 Mar – 18 Apr 2010 T3(12-months after): 15 Aug – 16 Sep 2010	Direct observation using SOPARC - conducted every 15 minutes during three different 1.5-hour periods on each day of data collection; data collected for nine days over 4 weeks.	High
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In 13 studies, green space use was measured using the System for Observing Play and Recreation in Communities (SOPARC), a validated direct observation tool that assesses park users' physical activity levels, gender, activity mode/type, estimated age and ethnicity (McKenzie, Cohen, Sehgal, Williamson, & Golinelli, 2006). Gidlow et al. (2010) adapted a version for the UK. Twelve studies utilized self-report techniques such as surveys; one study carried out surveys only (Mowen, Hickerson, & Kaczynski, 2013).

A risk of bias table and graph are shown in Figure 2.2. Cohen et al. (2013), the only study to run an RCT, was designated with a low risk of bias in terms of sequence generation but it is not known if those involved in allocation were aware of intervention assignment to the green spaces. The remaining non-randomised studies received a high risk of bias in terms of sequence generation and allocation concealment. All studies were highly biased in terms of failing to blind participants and outcome assessors; this was expected as blinding participants is impossible within this context. All studies received an unclear risk of bias in terms of attrition: it is not clear at follow-up who is a new user and who experienced the intervention. Some studies were noted for reporting bias when, e.g., outcomes reported in a public report were not reported in a peer-reviewed article (Mowen et al., 2013), or results that were not significant were not reported (Reed et al., 2010). Further bias was attributed to three articles when the intervention delivery deviated from protocol: control parks received the intervention between baseline and follow-up (Slater et al., 2016), some intervention parks and control parks received new equipment when this was not a part of the intervention (Cohen et al., 2013), and unforeseen budget cuts reduced activity programming (Cohen et al., 2009).

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Bell & Austin, 2014	+	-	-	-	?	+	?
Cohen et al., 2009	-	-	-	-	?	-	-
Cohen et al., 2012	-	-	-	-	?	-	?
Cohen et al., 2013	+	?	-	-	?	+	-
Cohen et al., 2014	-	-	-	-	?	+	?
Cohen et al., 2015	-	-	-	-	?	+	?
Cranney et al., 2016	-	-	-	-	?	+	?
Gidlow et al., 2010	-	-	-	-	?	+	?
King et al., 2015	-	-	-	-	?	+	?
Mowen et al., 2013	-	-	-	-	?	-	?
Reed, 2013	-	-	-	-	?	+	?
Reed et al., 2010	-	-	-	-	?	-	?
Slater et al., 2016	-	-	-	-	?	+	-
Tester & Baker, 2009	-	-	-	-	?	+	?
Veitch et al., 2012	-	-	-	-	?	-	?

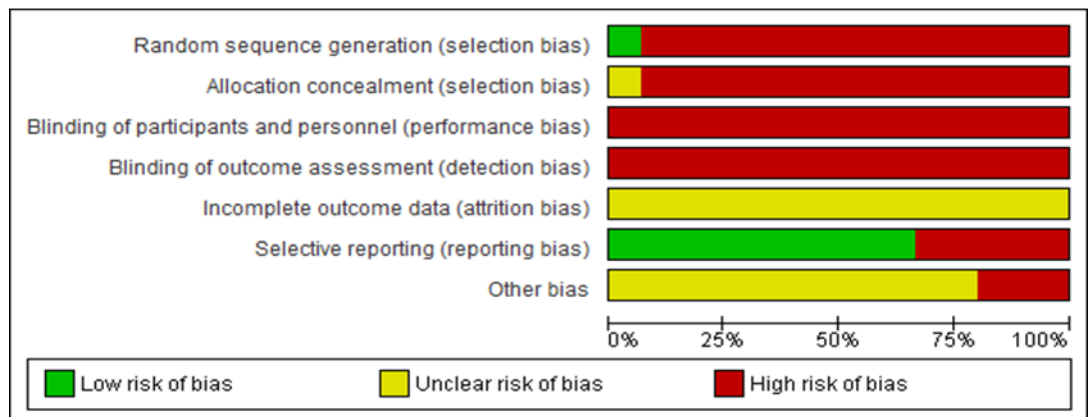


Figure 2.2 Risk of bias table and risk of bias graph

Figure 2.3 shows the quality of evidence as assessed using GRADE guidelines. The RCT (Cohen et al., 2013) received a 'moderate' rating as the study was seen to be suitable for the research question and a small effect was calculable, albeit risk of bias was serious. The observational studies that used SOPARC to measure use were given a 'very low' quality rating. They were seen to be highly biased, the results were inconsistent, and no effect sizes were reported leading to serious imprecision. Studies where use was self-reported in a survey also received a 'very low' quality rating for high risk of bias and inconsistent results. Imprecision was seen as not serious for these studies due to the typically large sample sizes, ranging from 209 (Gidlow et al., 2010) to 15,262 (Cohen et al., 2013).

The effectiveness of environmental interventions on the use of green space

Patient or population:

Setting: green space

Intervention: environmental interventions

Comparison: no intervention

Outcomes	Impact	Number of participants (studies)	Quality of the evidence (GRADE)
Number of users assessed with: SOPARC	A relative significant increase in users was found at a magnitude of 7-12% over 28 observations (p=.035). Use in control parks declined 6-10% (p=.06).	(1 RCT)	⊕⊕⊕○ MODERATE a
Number of users assessed with: SOPARC or equivalent	Studies showed inconsistent effects – 8 reported an increase in use, 4 had mixed results and 1 experienced a decrease.	(13 observational studies)	⊕○○○ VERY LOW b,c,d
Self-reported use	Studies found inconsistent results - 8 reported an increase, 1 was mixed and 2 found a decrease.	(11 observational studies)	⊕○○○ VERY LOW b,c,d

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval

GRADE Working Group grades of evidence

High quality: We are very confident that the true effect lies close to that of the estimate of the effect

Moderate quality: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different

Low quality: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect

Very low quality: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

Explanations

- a. Unclear allocation concealment, lack of blinding, other bias present
- b. No randomisation or allocation concealment, lack of blinding, unclear attrition bias
- c. Results were inconsistent across studies.
- d. No effect size or confidence intervals reported.

Figure 2.3 GRADEpro Summary of Findings

2.3.2 Intervention effects

Interventions were delivered in a total of 136 green spaces across the 15 studies. One hundred and one green spaces reported across 11 studies experienced an increase in use post-intervention (Bell & Austin, 2014; Cohen et al., 2009; Cohen et al., 2012; Cohen et al., 2013; Cohen et al., 2014; Cohen et al., 2015; King et al., 2015; Reed et al., 2010; Slater et al., 2016; Tester & Baker, 2009; Veitch et al., 2012). The remaining interventions resulted in either a decrease in use or the results were different between objective and self-report measures. The outcomes of 17 of a total 31 green spaces studied by Reed et al. (2010) were not reported as the results were not significantly different from baseline and are not referred to hereafter. Overall the majority of study parks experienced an increase in use following the intervention.

2.3.3 Intervention coding

Interventions typically were comprised of two behaviour change techniques (see Table 2.2). The maximum number of techniques delivered in one intervention green space was seven. ‘Adding objects to the environment’ was identified in 108 green spaces covering all studies, and ‘restructuring the physical environment’ was coded in 22 green spaces in 11 studies. These techniques are defined as adding to or changing the physical environment in some way so as to facilitate performance of the wanted behaviour. In this context, such techniques encourage use of the green space, and may take the form of the addition of new fitness equipment or the upgrade of an existing play area.

Table 2.2 Intervention coding

Author and Year	Study Area	2.2 Feedback on behaviour	4.1 Instruction on how to perform a behaviour	4.2 Information about antecedents	5.1 Information about health consequences	6.1 Demonstration of the behaviour	7.1 Prompts/cues	10.1 Material incentive	12.1 Restructuring the physical environment	12.2 Restructuring the social environment	12.3 Avoidance/reducing exposure to cues for the behaviour	12.5 Adding objects to the environment	Outcome
Bell & Austin, 2014	Boreham Park	X	X			X	X		X	X		X	INC
	Schuhkraft Hub			X	X	X	X			X	X	X	INC
Cohen et al., 2009	5 parks								X (2/5)	X (5/5)		X (3/5)	MIX
Cohen et al., 2012	12 fitness zones											X	MIX
Cohen et al., 2013	33 parks						X (32/33)	X (18/33)		X (33/33)		X (32/33)	INC
Cohen et al., 2014	3 pocket parks								X			X	INC
Cohen et al., 2015	Hayes Valley					X			X	X		X	INC
	West Sunset					X			X	X		X	INC
Cranney et al., 2016	1 park		X			X						X	DEC

	Gladstone Trail					X	X		X			INC
	Manistee Riverwalk Trail			X					X			INC
	Iron Ore Heritage Trail			X		X			X			INC
	(Negaunee Trail Head)											INC
	Iron Ore Heritage Trail			X		X			X			INC
	(Ishpeming Trail Head)											INC
	Big Rapids Riverwalk			X					X			INC
	Kalkashka											INC
	Northside Pathway Trail					X			X			DEC
Slater et al., 2016	39 parks			X					X			DEC
Tester & Baker, 2009	Garfield Square (Park A)			X		X						INC

	Silver Terrace (Park B)					X	INC
Veitch et al., 2012	Venn Wright Reserve	X	X			X	INC

Note. INC, MIX, DEC refer to an increase, mixed result, and decrease in green space use respectively.

‘Restructuring the social environment’ was identified in 87 green spaces in 10 studies. This restructuring is defined as making changes to the social environment that facilitate performance of the wanted behaviour, and was typically identified when use of the green space was marketed through outreach events or meetings were held with residents to raise awareness of the intervention and contribute to the design. ‘Prompts or cues’, usually represented by new information signs and posters within the green space, was coded in five studies, and ‘demonstration of the behaviour’, whereby an observable sample of the behaviour is provided, was coded in eight studies. This might refer to activity groups being put on in the park e.g. exercise sessions. A new or updated activity program was seen as providing an observable sample of the behaviour. ‘Instruction on how to perform a behaviour’ was coded twice and a further five were identified once (see Table 2.1).

2.3.4 Environmental changes

The technique ‘adding objects to the environment’ was employed in isolation in 15 parks across three studies (Cohen et al., 2012; Reed et al., 2010; Tester & Baker, 2009). Results were mixed: eight parks experienced an increase in use, and seven a decrease. Cohen et al. (2012) added fitness zones to 12 parks in Southern California. At follow-up 12 months after baseline, six of the parks experienced an increase in users, and six experienced a decrease. Overall there was an 11% increase in users from 7105 to 7906. They note the parks with the increase in use were primarily those with a larger surrounding population density. At second follow-up a few months later, the number of users was similar to baseline (7017).

This technique was combined with ‘restructuring the physical environment’ in 6 green spaces reported in 3 studies (Cohen et al., 2014; Reed et al., 2010; Veitch et al., 2012). Five had an increase in use and one a decrease. The changes were substantial, particularly in Cohen et al. (2014), where vacant lots were converted into pocket parks.

Use increased from three users in one lot and zero in the other two, to 32, 147 and 267 users in each renovated pocket park. Veitch et al. (2012) described an intervention whereby a leash-free area for dogs, a playground, walking track, BBQ area, and additional fencing were installed and gardens were landscaped. Use increased from 235 at baseline to 985 12 months later. On the other hand, Reed et al. (2010) report a park where a basketball court was repaired and a walking path was installed; use fell from 474 to 176.

Altogether these findings suggest that upgrading existing infrastructure as well as providing new equipment may be more effective than adding new equipment alone. However, the number of green spaces where only these changes were made is limited, and so no strong conclusion can be made.

2.3.5 Other behaviour change techniques

In seven intervention green spaces, either one or both behaviour change techniques whereby the physical environment is altered were combined with ‘restructuring the social environment’ only (Cohen et al., 2009; Mowen et al., 2013; Tester & Baker, 2009). Of these seven, three had an increase in use. One park studied in Tester and Baker (2009) experienced a nine-fold increase in the number of adult visitors, and two of the five parks investigated by Cohen et al. (2009) experienced an increase. The remaining three in Cohen et al. (2009) had a drop in use post-intervention; the authors’ state there was a decline in organised activities from baseline to follow-up, and the drop in those observed in organised activities accounted for 39% of the total decline in the average number of park users. Findings were conflicting for Mowen et al. (2013): there was no significant change in self-reported frequency of park use, however, 54% of respondents (who had visited the park prior to the renovations and were aware of the renovations) said they perceived they visited the park more often because of the changes.

A physical environment change was augmented with a 'prompt or cue' in two parks and two trails reported on in one study - Reed et al. (2010). A prompt or cue was also used in isolation on two trails in Reed et al. (2010). A prompt is understood to be an environmental or social stimulus that normally occurs at the time or place of performing the behaviour. The authors' report signage was added along the pathways within these green spaces, and all green spaces experienced a significant increase in use. This indicates a prompt or cue may be an effective intervention within this context, however the evidence is limited.

Interventions in 46 green spaces in eight studies were coded for 'demonstration of the behaviour' (Bell & Austin, 2014; Cohen et al., 2015; Cranney et al., 2016; Gidlow et al., 2010; King et al., 2015; Reed, 2013; Slater et al., 2016; Tester & Baker, 2009). This technique was coded where an observable sample of the behaviour was provided, such as the introduction of new activity programmes, e.g. dance classes (Tester & Baker, 2009) and walking groups (Reed, 2013). Ninety-five percent of these spaces (n=42) experienced an increase in use. Gidlow et al.'s (2010) results were mixed: while the proportion of respondents who self-reported using the park up to once a week increased from 15.4% (winter) and 17.3% (summer) to 24% and 30.6% respectively, direct observation indicated use had declined. In Reed (2013), direct observation indicated use had increased by 163% in the first trail and 16% in the second, although self-reported outcomes were unclear. In both trails, the proportion of residents who indicated regular use during the week dropped; it is unclear whether this is because more people reported very frequent use, or infrequent use. Cranney et al. (2016) reported a decrease in overall use (8560 at baseline and 7097 post-installation). On the other hand, the proportion of renovated outdoor gym users of all park users doubled from baseline to post-installation and this remained significantly higher compared to baseline for male children and

seniors at follow-up. An evaluation of this technique is precluded as in all studies it was delivered in conjunction with multiple other techniques.

Cohen et al. (2013) was the only study coded for ‘material incentives’, whereby 18 of 33 intervention parks provided incentives such as giveaways, alongside new signage and materials for activities. Intervention parks saw a relative significant increase at a magnitude of 7-12% ($p = .035$) and use of the control parks declined ($p = .06$) albeit it is not clear whether this technique is more or less effective than those it was delivered alongside.

2.3.6 Community co-design

Twelve studies reported on interventions that were co-designed with input from the local community (all except Cohen et al., 2012; Cohen et al., 2014; Cranney et al., 2016). This typically involved meetings with local residents and organizations to understand their needs and obtaining their feedback on designs. For example in King et al. (2015), residents were asked to produce a ‘wish list’ for their park and voted on their favourite suggestions. The results were shared with a subset of community members who designed three different park plans which were again put to a vote. King et al. (2015) report an increase in use from 2888 in 2010 to 4225 in 2012.

Overall 109 of 120 spaces that received community co-designed interventions experienced an increase in use. Moreover, of the studies that did not involve the community, almost half of the intervention spaces ($n=7$ of 16 in total) saw a decrease in use post-intervention. This suggests the community co-design of an intervention may produce more effective results.

2.4 Discussion

This study systematically reviewed literature on environmental interventions on the use of green space. One hundred and one of a total 136 green spaces covered by 15 included

studies demonstrated an increase in green space use post-intervention, suggesting environmental interventions may be effective. ‘Restructuring the physical environment’ as well as ‘adding objects to the environment’, as opposed to solely adding a new object appeared to be more effective in encouraging use, although this is based on a small number of studies. Delivering a ‘prompt or cue’ alongside one of the physical environment changes also appeared to be effective, but again the evidence base was limited.

Most interventions were comprised of multiple behaviour change techniques, meaning it is difficult to isolate their effectiveness - it may be one technique influencing use or a combination. This limits the ability to make specific recommendations for future interventions.

2.4.1 Study design

One study conducted an RCT (Cohen et al., 2013) while the remaining studies were quasi-experimental. Ten studies measured a control that was matched by size, facilities and surrounding population characteristics. In several studies the control also went through changes between baseline and follow-up. For example in Cohen et al. (2009) it is stated the park director of a control park scheduled additional baseball games during the intervention period, which drew in extra people. This directly contaminates the results, and it is not known to what extent this practice might have occurred in other studies. Additionally in some cases intervention and control parks were markedly different from each other. For example, in Veitch et al. (2012) the control park (10,000m²) was half the size of the intervention park (25,200m²). Ideally the control green space should be as closely matched as possible to the intervention green space.

All studies were assigned a high risk of bias except Cohen et al. (2013) which was given an unclear bias rating. This was primarily based on lack of allocation concealment, lack

of blinding and unclear bias in terms of attrition. Allocation concealment and blinding of participants would be difficult within this area of research; however, outcome assessors may be blinded to reduce detection bias. Reporting bias due to under-reporting of data and other biases introduced due to deviation from protocol also affected the bias rating assigned.

Several biases within this area of research will be difficult to control as studies are often opportunistic. It is advised that studies make use of relevant guidelines to make reporting as transparent as possible, ensuring the study can be assessed and interpreted accurately. Standardisation of reporting also improves the replicability of studies. The suggested guidelines for the most common study designs in this field are: CONSORT guidelines (Schulz, Altman, & Moher, 2010) for RCTs; STROBE guidelines (Von Elm et al., 2007) for observational studies and TIDieR for intervention studies (Hoffmann et al., 2014). These are informed by evidence and designed following expert collaborative effort.

2.4.2 Follow-up period

Most studies collected post-intervention data 12 months after baseline. This ensured follow-up measurements were taken in the same season to reduce any seasonal difference. Some studies were vague as to when the intervention was complete, meaning it was unclear how long it had been present when collecting post-intervention data. It is important to be exact about when the intervention was delivered as this can influence the interpretation of results.

Four studies collected post-intervention measurements at more than one time point.

Cohen et al. (2012) and Veitch et al. (2012) observed use twice post-intervention:

Cohen et al. (2012) at 12 and 15 months, and Veitch et al. (2012) at 3-4 months and 8-9 months. Cranney et al. (2016) had nine data collection periods: three at baseline, three

immediately post-installation and three at 12-months after baseline. Finally King et al. (2016) measured use monthly for four months from June when the intervention was completed in the spring.

Multiple post-intervention observations may be worthwhile for future studies to understand intervention sustainability; however, it is important to note that seasonal changes are likely to impact the level of use and so scheduling should be done with this in mind.

2.4.3 Outcome measures

Fourteen studies used SOPARC (or UK-equivalent) to measure park use (Bell & Austin, 2014; Cohen et al., 2009; Cohen et al., 2012; Cohen et al., 2013; Cohen et al., 2014; Cohen et al., 2015; Cranney et al., 2016; Gidlow et al., 2010; King et al., 2015; Reed, 2013; Reed et al., 2010; Slater et al., 2016; Tester & Baker, 2009; Veitch et al., 2012). SOPARC does not detail an observation schedule, leading to inconsistent use. In a recent systematic review of interventions to promote physical activity in green space (Hunter et al., 2015), the authors state a validated protocol is required to facilitate comparison of SOPARC across studies. It is also not known when using direct observation whether users had visited the park prior to the intervention; therefore restricting understanding of whether the intervention has encouraged new users.

Park use was also measured using household surveys (Bell & Austin, 2014; Cohen et al., 2009; Cohen et al., 2013; Cohen et al., 2014; Cohen et al., 2015; Gidlow et al., 2010; Veitch et al., 2012) or on-site surveys (Cohen et al., 2012; Cranney et al., 2016; Mowen et al., 2013; Reed, 2013; Reed et al., 2010). Household surveys allow identification of both users and non-users, but are limited by poor response rates, and exclude those who live outside the designated buffer zone.

It is recommended that studies make use of both direct observation and surveys to capture both users and non-users, and balance objective and subjective measures.

2.4.4 Population characteristics

Eleven studies were carried out in the US, three in Australia and one in the UK.

Widening the geographic area of research would further our understanding of cultural differences in green space use. Eight studies reported their study area was located in an area of high deprivation or high proportion of ethnic minorities (Bell & Austin, 2014; Cohen et al., 2009; Cohen et al., 2013; Cohen et al., 2014; King et al., 2015; Slater et al., 2016; Tester & Baker, 2009; Veitch et al., 2012). It is important to include a description of the demographic characteristics of the study population, such as age, gender, ethnic origin and socioeconomic status. Previous research has indicated park use varies across these characteristics (Cohen et al., 2007; Kaczynski et al., 2014; Natural England, 2015). It is advised in relevant reporting guidelines, e.g., CONSORT, STROBE, that this information is included as it allows readers to judge the generalisability of the findings.

2.4.5 Intervention content

Studies were coded for behaviour change techniques using BCTTv1. The taxonomy was adequate in its purpose to identify behaviour change techniques that appealed to individuals, e.g., ‘demonstration of the behaviour’ as it was primarily designed for individual level interventions. However, the relevant environmental techniques (‘restructuring the physical environment’, ‘adding objects to the environment’) at present cover a potentially diverse set of actions that may be delivered in an environmental intervention. It is recommended that the taxonomy is extended to allow for a more nuanced understanding of how the environment might be modified.

The quality of intervention descriptions was found to be poor. TIDieR guidelines (Hoffmann et al., 2014) recommend intervention descriptions include information on

materials used. Several studies did not do this, for example, where new signage was installed, it was not specified what information was displayed. TIDieR also states the mode of delivery of the intervention should be outlined. Again, where some studies introduced an activity program, little or no information was given on how they were received or how many people participated. It is crucial interventions are outlined in sufficient detail for replication purposes.

2.4.6 Recommendations for researchers

This review found the current literature on environmental interventions into the use of green space is biased and of poor quality. Given that multiple behaviour change techniques were often delivered at once in the included studies, future research should look to explicitly test the techniques on an individual basis in order to understand the effect of a single technique within this context of encouraging green space use.

The intervention descriptions within the included studies in this review provided inadequate detail regarding exactly what was delivered, how and when. It is imperative to provide this information so that future studies may replicate successful interventions. It is encouraged that researchers make use of relevant reporting guidelines to raise the standard of reporting.

This review had substantial input from grey literature, indicating a potentially large practitioner knowledge base. It is advised that researchers expand their network and cultivate a multidisciplinary environment, from which existing knowledge can be drawn.

2.4.7 Recommendations for policy makers

Providing rigorous evaluations of green space interventions currently is a challenge due to difficulties with randomisation, matching control parks and collecting longitudinal data. The cost of implementing environmental improvements is usually borne by local

authorities, meaning evaluators may have limited leverage to design, for example, randomised evaluations. Policy makers and funders are encouraged to prioritise more methodologically sound study designs.

This review also found the inclusion of the community in the intervention design process appeared to be beneficial in producing a more effective intervention. It is recommended that policy makers recognise the growing importance of community co-design and increase the opportunities for local communities to have a platform in intervention design discussions.

2.5 Concluding comments

There is a need to understand how environmental green space interventions might be designed to encourage use in order to promote health. One hundred and one of 136 green spaces covered by 15 studies experienced an increase in green space use following an environmental intervention, which is promising for future work; however the low quality of evidence means it is difficult to have confidence that this would be repeated in higher quality studies. Moreover the delivery of interventions that used multiple behaviour change techniques limits identification of specific effective techniques. This limitation is compounded by a poor standard of reporting, and it is recommended that future studies make use of standardised guidelines to improve this.

Chapter 3 The Influence of Park Features on Park Satisfaction and Park Use

3.1 Introduction

The systematic review of the previous chapter showed that previous studies which aimed to explore the impact of environmental intervention on use showed generally encouraging results. However, due to inadequate descriptions of intervention content there remains little guidance about how best to change green spaces to encourage use. As mentioned previously, there is evidence to suggest that the beneficial impacts of green space on health are realised through use of that space. Therefore, further research is needed to explore factors which predict use of green spaces.

As discussed in Chapter 1, park use has been associated with structural factors, such as park proximity and size, but findings are inconsistent across studies (Coombes, Jones, & Hillsdon, 2010; Giles-Corti et al., 2005; Kaczynski, Potwarka, & Saelens, 2008; Kaczynski, Potwarka, Smale, & Havitz, 2009; Mowen, Orsega-Smith, Payne, Ainsworth, & Godbey, 2007). This inconsistency may be explained by variation in park quality.

There is particular interest in park quality as it represents a readily modifiable determinant of use. In terms of particular features in a park which may impact on perceptions of quality, the presence of playgrounds, paved trails, basketball courts, water features, shelter and picnic areas have been related to increased park use and park-based physical activity (Baran et al., 2014; Kaczynski et al., 2009; Rung, Mowen, Broyles, & Gustat, 2011; Shores & West, 2008). However, this has not been examined outside the US, where the desire for certain facilities may be somewhat different.

Conversely, other aspects of a park have been shown to discourage use. For example, incivilities such as litter, vandalism and unclean washrooms have been shown to deter use and park-based physical activity (Gobster, 2002). This aligns with a review of qualitative studies that identifies lack of maintenance as a key issue in influencing use of parks, particularly the quality of playing surfaces and the cleanliness of the park (McCormack, Rock, Toohey, & Hignell, 2010).

It is not clear to what extent the presence of certain park features and incivilities might impact on park satisfaction. Nieuwenhuijsen et al. (2017) has suggested that research is carried out into a persons' satisfaction with green space as this has not been widely researched but is likely important. It is suggested that park satisfaction represents a potential mechanism in the relationship between park quality and park use, in that greater satisfaction with features leads to increased use.

There is further evidence to suggest the relationship between park features and park use may be moderated by ethnicity and socioeconomic status (Kaczynski et al., 2014).

Kaczynski et al. (2014) found fitness stations and skate parks were related to park use only for those on a low income, while playgrounds, baseball fields and basketball courts were associated with park use only for Black users. It is not known whether the relationship between park features and park satisfaction and park use differs between ethnicities and across the socioeconomic spectrum. As previous research has indicated that the relationship between surrounding green space and certain health outcomes can be moderated by ethnicity (Dadvand et al., 2014) and socioeconomic status (Dadvand et al., 2012a; 2012b; McEachan et al., 2015), an exploration into ethnic and socioeconomic differences in the relationship between park features, park satisfaction and park use is warranted.

In this chapter I build on current understanding of the influence of size, proximity and park features on park use, and investigate their influence on park satisfaction for the first time. Park satisfaction is suggested as a potential mediator of the relationship between park features and park use. Present research indicates there may be differences by ethnicity and socioeconomic groups, furthermore there is also interest in these as moderators.

The aim of this study was to explore the influence of park size, proximity and quality on park satisfaction and park use. The second aim was to explore whether park satisfaction mediated the relationship between park features and park use. The final aim was to examine whether ethnicity and socioeconomic status moderated the relationship between park features and park satisfaction and park use.

3.2 Methods

3.2.1 Study Design

This study utilised a multi-method design. Bespoke data was collected from the Born in Bradford (BiB) cohort, a longitudinal cohort of 12,453 mothers and 13,776 children, who were recruited at 28 weeks gestation from 2007 to 2011. A full description of the cohort and setting has been reported elsewhere (Wright et al., 2013). The current study used data collected between June 2013 and June 2015, when the child was 4 years old. In addition, an observational audit of 41 parks within Bradford to record present park characteristics (features and incivilities) was conducted by a team of researchers from 15th June to 3rd July 2015 using a standardised direct observation tool.

3.2.2 Participants

Potential participants were those participating in a sub-study of the BiB cohort who completed a survey which included questions on park use (n=842). Participants named

up to two parks that their child most frequently visited in the summer, and again for the winter months, then their satisfaction with each park. Participants also noted the duration of use of these parks by their child during weekdays and the weekend.

Forty-one parks in Bradford were audited, from a total of 224 unique parks identified from the bespoke questions. All parks that had participants report use in both the summer and winter and were reported more than once in at least one season were audited.

The sample was limited to women with singleton pregnancies who had complete data for all variables in the analysis, for whom a park that was audited could be linked, resulting in a total of $n=620$ included in the analysis (see Figure 3.1 for a flow diagram).

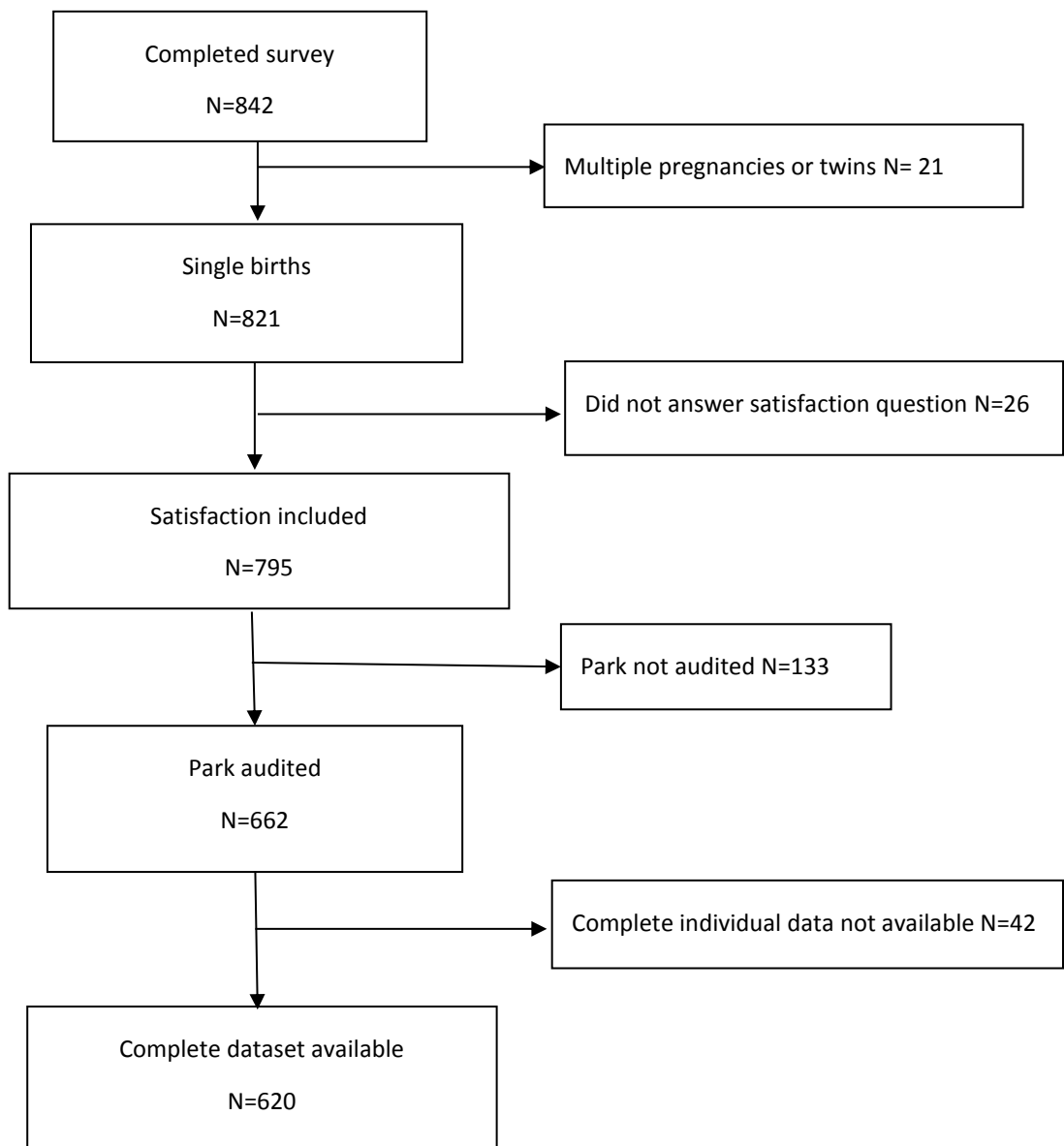


Figure 3.1 Flow diagram of participants

3.2.3 Variables

3.2.3.1 Park-level variables

Park quality

Park quality was assessed using the Natural Environment Scoring Tool (NEST) (Gidlow et al., 2017), adapted from the Neighbourhood Green Space Tool (NGST) (Gidlow, Ellis, & Bostock, 2012), which was developed for the PHENOTYPE study (Nieuwenhuijsen et al., 2014). The tool lists 47 items categorised into eight domains of quality: access, recreational facilities, amenities, natural features, significant natural features, non-natural features, incivilities and usability. The tool typically grades each item for quality whereby a higher score indicates better quality. For the incivilities domain, a higher score indicates an incivility was more noticeable and therefore lowered the quality. If the item is not present in the park, it is marked as zero. For some items quality was not asked e.g. presence of good view point, and so presence (=1) or absence (=0) was indicated. The usability domain scores the space on how suitable the park appears to be for various activities e.g. walking, socialising, children's games ("not useful", "somewhat useful", "useful", "very useful").

The tool was completed by two independent observers for each park. The level of agreement between observers was calculated, ICC = 0.90. Item scores were recoded during data processing to only indicate presence (=1) or absence (=0) of each feature, with no indication of quality. Usability was dichotomised (does not support the activity= 0 and supports activity = 1). Any disagreements between observers in terms of presence or absence were resolved during analysis by selecting the higher of the two scores provided i.e. presence was the default. Three items were removed that asked only for level of quality when presence of the feature had been indicated previously, resulting

in 44 items. Item scores within each domain were summed to produce a domain score.

The items contained within each domain are shown in Table 3.1.

Table 3.1 Park features by domain

Domain	Features recorded for presence
Access	Entrance points, walking/ cycling paths
Recreational Facilities	Playground equipment, grass pitches, courts (e.g. tennis, basketball), skateboard ramps, other sports or fitness facilities, presence of open space
Amenities	Seating/benches, litter bins, dog mess bins, public toilets, café/kiosk, man-made shelter, picnic tables, drinking fountains
Aesthetics – Natural features	Flower beds, planters or wild flowers; other planted trees, shrubs or plants
Aesthetics – Non-natural features	Water fountain, other public art, historic or attractive buildings or other man-made structures
Incivilities	General litter, evidence of alcohol use, evidence of drug taking, graffiti, broken glass, vandalism, dog mess, excessive noise, unpleasant smells
Significant natural features	Presence of water, good view points, vistas, scenic views; presence of trees
Usability (Suitable for)	Sport, informal games, walking/running, children’s play, conservation/biodiversity, enjoying the landscape/ visual qualities, meeting, socialising with friends, neighbours; relaxing/ unwinding, cycling, water sports, fishing

Park size

All audited parks were mapped in ArcGIS mapping software and park size was calculated in hectares.

3.2.3.2 Individual-level variables

Park use

Participants were asked how many days and minutes on average over weekdays and the weekend their child used the named park(s) for summer and winter. An average annual index of use was calculated for each participant by multiplying the number of days by the number of minutes for the week and the weekend and summing for each season, then averaging between the seasons. Park use was measured in average minutes per week over the course of the year.

Park satisfaction

Park satisfaction was assessed by asking participants to rate their satisfaction with the parks their child used on a Likert type scale (1=very dissatisfied to 5=very satisfied). This was found to be not normally distributed, and so was collapsed to a 3-point scale (whereby 1-3 were aggregated) with higher scores indicating greater satisfaction.

Park proximity

Proximity to a green space was measured using Euclidean (straight line) distance between participant postcodes to the boundary of the nearest green space, identified from Urban Atlas (<http://www.eea.europa.eu/data-and-maps/data/urban-atlas>).

Socio-demographics

Ethnicity

Ethnicity was self-reported using standard ONS classification in the BiB baseline questionnaire and categorised into three groups: White British, Pakistani and a diverse mixed 'Other'.

Socioeconomic status indicators

Socioeconomic status was measured at individual and area level, in line with McEachan et al. (2015). Individual indicators were maternal education measured by highest educational qualification (0 = maximum of 5 GCSEs, 1 = A level equivalent or above) and a subjective measure of poverty ('How well would you say you or you and your husband/partner are managing financially these days?') (0= struggling financially, 1 = not struggling financially). At an area level, Index of Multiple Deprivation (2010) scores were attributed to all individuals in the sample based on postcode and aggregated to quintiles.

Other measures

Marital and cohabitation status (married and living with partner, not married and living with partner, not living with partner) was also a control variable. Other measures were assessed but are not reported here.

3.2.3.3 Data Analysis

Unadjusted linear regression analysis was performed to identify the predictors of park satisfaction and of park use from the park feature domains, size and proximity. Domains identified as significant for each were entered as park level variables into multilevel model (individual: level 1; park: level 2). Null models were run initially to determine the variation in satisfaction and use at the park level. Control variables were entered sequentially to adjust for proximity (model 2), ethnicity (model 3), socioeconomic status and demographics (model 4: maternal education, financial status, marital and cohabitation status), and the Index of Multiple Deprivation (IMD) (model 5).

To explore whether ethnicity or socioeconomic status had a moderating role, separate interaction terms were entered into an unadjusted model one at a time. For

socioeconomic status, maternal education, financial status and IMD quintile were entered. Interactions were statistically tested using the likelihood ratio test.

Multilevel mediation was used to explore the mediating role of park satisfaction in the relationship between park features and park use. Park feature domains that significantly predicted park use in the linear regression analysis were tested. Bootstrapping was used to create SEs and 95% CIs. All analyses were carried out in Stata 13.1.

3.3 Results

3.3.1 Participants

The socio-demographics of participants are reported in Table 3.2.

Table 3.2 Characteristics of study participants

	Total N (%)	Satisfaction score= 1 (lowest) N (%)	Satisfaction score= 2 N (%)	Satisfaction score= 3 (highest) N (%)	Park use (mins) M(SD)
All	620 (100)	187 (30.16)	161 (25.97)	272 (43.87)	231.57 (230.57)
Ethnicity					
White British	226 (36.45)	60 (26.55)	53 (23.45)	113 (50.00)	268.16 (255.20)
Pakistani	301 (48.55)	101 (33.55)	83 (27.57)	117 (38.87)	205.66 (210.57)
Other	93 (15.00)	26 (27.96)	25 (26.88)	42 (45.16)	226.55 (219.83)
Education					
Maximum of 5 GCSEs	304 (49.03)	96 (31.58)	68 (22.37)	140 (46.05)	221.46 (216.47)
A level equivalent	316 (50.97)	91 (28.80)	93 (29.43)	132 (41.77)	241.30 (243.32)
Financial status					
Struggling financially	189 (30.48)	57 (30.16)	53 (28.04)	79 (41.80)	231.44 (209.73)
Not struggling financially	431 (69.52)	130 (30.16)	108 (25.06)	193 (44.78)	231.64 (239.37)
Marital status					
Married and living with partner	444 (71.61)	134 (30.18)	119 (26.80)	191 (43.02)	209.88 (219.73)
Not married and living with partner	96 (15.48)	24 (25.00)	24 (25.00)	48 (50.00)	302 (269.43)
Not living with partner	80 (12.90)	29 (36.25)	18 (22.50)	33 (41.25)	266.91 (220.25)
IMD quintile					

1 (most deprived)	221 (35.65)	79 (35.75)	51 (23.08)	91 (41.18)	203.13 (197.17)
2	165 (26.61)	49 (29.70)	42 (25.45)	74 (44.85)	232.73 (216.95)
3	118 (19.03)	27 (22.88)	37 (31.36)	54 (45.76)	283.61 (304.75)
4	92 (14.84)	29 (31.52)	26 (28.26)	37 (40.22)	234.95 (221.90)
5 (least deprived)	24 (3.87)	3 (12.50)	5 (20.83)	16 (66.67)	216.77 (184.78)

Almost half (49%) of the sample was Pakistani, with 36% White British and other ethnicities making up 15%. The sample was evenly split in terms of educational background. The majority reported they were not struggling financially (70%) and 72% reported they were married and living with a partner. Most of the sample were in the most or second-most deprived IMD quintile.

43.87% (n=272) of respondents reported high park satisfaction ($M = 2.14$, $SD = 0.85$). A one-way analysis of variance (ANOVA) was calculated on park satisfaction for all individual variables. Significant differences were observed between ethnicities, $F(2, 617) = 3.05$, $p = .048$; no other differences were observed. Tukey tests were conducted on all possible pairwise contrasts. White British ($M = 2.23$, $SD = 0.84$) and Pakistani ($M = 2.05$, $SD = 0.85$) were found to be significantly different at the .05 significance level such that Pakistani mothers reported lower satisfaction with their local park.

ANOVAs were also carried out to explore differences in park use by socioeconomic and demographic groups. Significant differences were observed by ethnicity $F(2, 617) = 4.83$, $p = .008$; marital status $F(2, 617) = 7.60$, $p = 0.0005$; and IMD quintiles $F(4, 615) = 2.40$, $p = 0.0493$. Post-estimation tests revealed significant differences between White British ($M = 268.16$, $SD = 255.20$) and Pakistani groups ($M = 205.66$, $SD = 210.57$);

not married and living with partner (M = 302.46, SD = 269.43) and married and living with partner (M = 209.88, SD = 219.73); and IMD quintile 3 (M = 283.61, SD = 304.75) and IMD quintile 1 (most deprived) (M = 203.12, SD = 197.17).

3.3.2 Linear regression analysis

Unadjusted linear regression analyses were carried out to identify park features that predicted park satisfaction and park use (see Tables 3.3 and 3.4).

Table 3.3 Linear regression of park characteristics on park satisfaction (k=41)

	B (95% CI)	β
Access	-0.07 (-0.53, 0.40)	-0.01
Recreational facilities	-0.04 (-0.12, 0.03)	-0.05
Amenities	0.07 (0.01, 0.13)*	0.14*
Natural features	-0.05 (-0.22, 0.11)	-0.04
Non-natural features	-0.01 (-0.11, 0.09)	-0.02
Significant natural features	0.001 (-0.19, 0.19)	0.001
Incivilities	-0.12 (-0.17, -0.07)***	-0.25***
Usability	0.14 (0.04, 0.24)**	0.20**
Size	-0.00008 (-0.0007, 0.0006)	-0.01

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

F (9, 610) = 18.83 with an R^2 of 0.2174 (adjusted R^2 0.2059)

Table 3.3 shows the amenities, incivilities and usability domains that significantly predict park satisfaction. A higher amenities and usability domain score was associated with a higher park satisfaction score, whereas the presence of more incivilities negatively impacted on park satisfaction.

Table 3.4 Linear regression of park quality and size on average weekly park use (mins) (n=620)

	B(95% CI)	β
Access	-135.03 (-272.19, 2.21)	-0.09
Recreational facilities	-5.00 (-27.05, 17.11)	-0.02
Amenities	-6.93 (-25.43, 11.57)	-0.05
Natural features	46.57 (-2.45, 95.59)	0.12
Non-natural features	-6.47 (-37.66, 24.71)	-0.04
Significant natural features	-47.23 (-102.39, 7.93)	-0.15
Incivilities	-18.68 (-33.49, -3.87)*	-0.14*
Usability	-11.64 (-41.06, 17.79)	-0.06
Size	0.24 (0.04, 0.43)*	0.11*

*p < 0.05

F(9, 610) = 5.63 with an R² of 0.0767 (adjusted R² 0.0631)

Table 3.4 indicates incivilities are also negatively associated with park use, with weekly duration of use reduced by 19 minutes on average. The effect of the size of the park was significant but negligible.

3.3.3 Multilevel modelling

Park satisfaction

A null model was fitted initially to assess whether the parks differ from each other, on average, on satisfaction scores (data not reported). A substantial proportion of the total variance in the park satisfaction score is accounted for by differences between parks (ICC = 24.92%). Unadjusted and adjusted multilevel models of park satisfaction are reported in Table 3.5. Variation drops considerably in the unadjusted model when adding the park feature domains (model 1 ICC= 2.02%) and remains low in the final adjusted model (model 5 ICC = 2.07%), suggesting that park quality explain this variability in satisfaction.

Table 3.5 Multilevel models for effects of NEST domains (model 1) and socioeconomic and demographic information (model 2-5) on park satisfaction

	Model 1 Unadjusted	Model 2 Adjusted for proximity	Model 3 Model 2 + Adjusted for ethnicity	Model 4 Model 3 + Adjusted for SES and demographics	Model 5 Model 4 + Adjusted for IMD quintile
Amenities	0.07 (0.01, 0.12)*	0.07 (0.01, 0.13)*	0.07 (0.01, 0.13)*	0.07 (0.01, 0.13)*	0.07 (0.01, 0.13)*
Incivilities	-0.12 (-0.17, -0.08)***	-0.12(-0.17, -0.08)***	-0.12 (-0.17, -0.07)***	-0.12 (-0.17, -0.07)***	-0.12 (-0.17, -0.07)***
Usability	0.11 (0.03, 0.20)**	0.11 (0.03, 0.19)**	0.11 (0.03, 0.20)**	0.12 (0.03, 0.20)**	0.11 (0.03, 0.20)**
Distance		-0.0003 (-0.0008, 0.0003)	-0.0003 (-0.0008, 0.0003)	-0.0003 (-0.0008, 0.0003)	-0.0002 (-0.0008, 0.0003)
Ethnicity					
Pakistani			-0.04 (-0.19, 0.12)	-0.05 (-0.22, 0.13)	-0.05 (-0.23, 0.13)
Other			-0.02 (-0.20, 0.17)	-0.01 (-0.20, 0.19)	-0.008 (-0.21, 0.20)
Education					
A level equivalent or higher				-0.08 (-0.21, 0.04)	-0.09 (-0.21, 0.04)
Financial status					
Not struggling financially				-0.02 (-0.15, 0.11)	-0.02 (-0.15, 0.11)
Marital status					
Not married and living with partner				0.019 (-0.15, 0.11)	0.02 (-0.18, 0.21)

Not living with partner				-0.17 (-0.36, 0.02)	-0.17 (-0.37, 0.03)
IMD quintile					
2					0.05 (-0.10, 0.20)
3					0.05 (-0.13, 0.23)
4					-0.06 (-0.26, 0.14)
5					0.12 (-0.22, 0.47)
Constant	1.24 (0.61, 1.86)	1.27 (0.64, 1.90)	1.27 (0.64, 1.90)	1.32 (0.67, 1.96)	1.32 (0.66, 1.98)
ICC (%)	2.02	2.15	2.16	2.19	2.07

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

N.B. Unstandardised beta coefficient and 95% CIs displayed

Model 1 reports all included park feature domains that are significantly related to park satisfaction. An increase in amenities and the number of activities the park is suitable for is associated with an increase in park satisfaction while an increase in the number of incivilities is associated with a decrease in park satisfaction. These results persist in all models following adjustment. No significant association was identified between park satisfaction and socioeconomic status and demographics including ethnicity.

Park use

A null model was also fitted to assess whether the parks differ from each other, on average, on duration of park use (data not reported). A small proportion of the total variance in parks use is accounted for by differences between parks (ICC = 8.47%).

Unadjusted and adjusted multilevel models of park use are reported in Table 3.6.

Variation drops slightly when the significant park-level variables are added (ICC = 4.97%). There is little change following the addition of further variables in models 2-5.

Table 3.6 Multilevel models for effects of NEST domains (model 1) and socioeconomic and demographic information (model 2-5) on park use

	Model 1 Unadjusted	Model 2 Adjusted for proximity	Model 3 Adjusted for ethnicity	Model 4 Adjusted for SES and demographics	Model 5 Adjusted for IMD quintile
Incivilities	-20.44 (-36.06, - 4.81)**	-20.54 (-36.20, -4.88)**	-17.25 (-33.44, -1.07)*	-16.32 (-32.19, 0.45)*	-16.02 (-31.78, -0.25)*
Size	0.037 (-0.20, 0.28)	0.035 (-0.20, 0.28)	0.03 (-0.21, 0.27)	0.05 (-0.18, 0.29)	0.07 (-0.16, 0.30)
Distance		-0.03 (-0.19, 0.13)	-0.04 (-0.20, 0.12)	-0.04 (-0.20, 0.11)	-0.04 (-0.20, 0.12)
Ethnicity					
Pakistani			-31.82 (-80.87, 17.23)	0.73 (-53.54, 55.01)	0.63 (-55.66, 56.92)
Other			-16.51 (-74.71, 41.69)	0.14 (-60.01, 60.29)	-4.65 (-66.42, 57.11)
Education					
A level equivalent or higher				26.5 (-9.99, 63.03)	25.08 (-11.68, 61.83)
Financial status					
Not struggling financially				2.06 (-37.6, 41.75)	4.28 (-35.35, 43.92)
Marital status					
Not married and living with partner				77.82 (19.98, 135.68)	76.35 (18.73, 133.98)

Not living with partner				57.62 (0.31, 114.92)	59.38 (1.47, 117.30)
IMD quintile					
2					19.21 (-26.45, 64.87)
3					56.26 (2.6, 109.91)
4					-4.27 (-64.94, 56.41)
5					-44.83 (-148.62, 58.95)
Constant	305.26 (247.40, 363.13)	309.65(248.11, 371.19)	315.35 (253.12, 377.57)	258.92(183.99, 333.84)	243.06(160.98, 325.14)
ICC (%)	4.97	5.02	4.71	4.70	4.03

* $p < 0.05$, ** $p < 0.01$

N.B. Unstandardised beta coefficient and 95% CIs displayed

Does ethnicity or socioeconomic status have a moderating role?

The associations between park quality and park satisfaction and park use were then explored. Interactions were entered separately in unadjusted models predicting park use and park satisfaction using the significant park-level variables only (i.e. amenities, incivilities, usability), and ethnicity and socioeconomic status (education, financial status, IMD quintile). No statistically significant interactions were observed.

Does park satisfaction mediate the relationship between park features and park use?

Park satisfaction was then explored as a potential mediator in the relationship between park features and park use using multilevel mediation. This was tested separately using amenities, incivilities and usability as the independent variables. Amenities and usability were not significantly related to park use ($B = -9.69$, $SE = 10.04$, $p = 0.33$; $B =$

-10.82, SE = 11.81, $p = 0.36$). Incivilities was significantly related to park use ($B = -21.38$, SE = 7.93, $p < 0.01$) and park satisfaction was significantly related to park use ($B = -0.18$, SE = 0.03, $p < 0.01$). However, park satisfaction did not predict park use when controlling for incivilities ($B = 21.89$, SE = 11.89, $p = 0.07$). Therefore, no evidence of mediation by park satisfaction in the relationship between park features and park use was found.

3.4 Discussion

This study is the first to explore the influence of park quality, size and proximity on park satisfaction, and contributes to current knowledge on the influence of these on park use. Several key points can be made from the findings. First, a greater number of amenities and level of usability is associated with increased park satisfaction, and the number of incivilities appears to negatively influence park satisfaction. Incivilities also appear to be negatively associated with park use. The results suggest the quality of the park is more predictive of satisfaction and use than structural factors such as size or distance.

Second, individual-level characteristics had no influence on park satisfaction nor park use after park quality was controlled. This again suggests that the contents of the park is important, and individual factors have little bearing on park satisfaction or level of use.

These results represent similar findings in current research into predictors of park use and park-based physical activity. For example, Kaczynski et al. (2008) audited 33 parks and had local residents complete physical activity logs over the course of a week. It was found that parks with more features were more likely to be used for physical activity.

Giles-Corti et al. (2005) designed a measure of park attractiveness based on a composite score of certain features present in a park, including play equipment, paths, and sports facilities. They found the likelihood of using a public open space was much greater

when the model was adjusted for distance, attractiveness and size. Moreover, the impact of attractiveness on park use was equivocal without including park size in the model, and it is noted that larger open spaces tend to have more attributes present in them. The evidence so far demonstrates the number of features is important in park satisfaction and park use.

The effect of the presence of incivilities in a park has been reported previously in terms of park use and perceptions of a park (Gobster, 2002; McCormack, 2010). The findings presented here are in line with current understanding and highlight their relationship with park satisfaction. The presence of incivilities may also be linked to perceptions of park safety (Bedimo-Rung, Mowen, & Cohen, 2005), which likely exacerbates park dissatisfaction.

Other domains that comprised the NEST found not to have a significant influence on park use or park satisfaction in the linear regression models were: access, recreational facilities, natural and non-natural features. This is an interesting result as it challenges what might typically be expected of a park space. Moreover, previous research has indicated that the presence of natural features, ease of access, and opportunity for recreational activity is associated with greater park use (Costigan et al., 2017; McCormack et al., 2010). This was not supported here, and this might be explained by the fact a range of spaces were visited to complete the audit. The primary purpose of the spaces visited varied, from play areas with little presence of nature, to large areas of open, natural space with few amenities and facilities. Further research might look to examine how the importance of features varies across green spaces designed for different purposes.

No evidence was found of moderation by ethnicity or socioeconomic status on the relationship between park features and park satisfaction. This was unexpected, given

previous evidence into ethnic differences in the use of and preferences for green spaces. For instance, Payne, Mowen, & Orsega-Smith (2002) found that Black people preferred that park land had a recreational function rather than a conservation one, and preferred organised recreation activities over nature based activities. Further research might examine the preferences of the South Asian population such as in this study.

There was no evidence that park satisfaction was a potential mediator in the relationship between park features and park use. No study has previously quantitatively examined the role of park satisfaction in park use, and further work may still be worthwhile.

Amongst the main strengths of the study was the considerable number of parks that were audited as well as use of a diverse sample of women from a deprived area. The parks varied in terms of quality, and the NEST (Gidlow et al., 2017) was found to be reliable between observers.

Several limitations are acknowledged. First, the study was limited by a fairly small sample size ($n=620$). The high levels of deprivation and high levels of ethnic minorities from which the sample came may also reduce the generalisability of the results.

However, the results indicate that ethnicity and socioeconomic status do not influence park satisfaction or park use, rather it is certain features present in the park. Second, the survey from which park use and park satisfaction was derived asked the participant which park their *child* used and how satisfied they were with it. The parks provided may differ to the parks they frequent without their child. It is suggested parents are unlikely to take their child or let their child visit a park they are unsatisfied with. Lastly, the survey was conducted between June 2013 and June 2015, while the parks were audited in the summer of 2015. The audited parks may have experienced changes in recent years that may be reflected in the survey but not in the audit, however, no significant changes to the parks are known to the author.

There are a number of policy implications from these results. Development of environmental interventions to encourage park satisfaction and park use may be more effective than individual or community-based interventions. The incivilities domain was predictive of both park satisfaction and park use and, therefore, should be prioritised for intervention over other features. Amenities and usability were also related to park satisfaction, and therefore items within these domains should be referred to when increasing satisfaction is the objective.

3.5 Conclusion

This study found an increase in the number of amenities and activities available in a park is associated with greater satisfaction, whilst an increase in incivilities was associated with lower satisfaction and also lower use. Individual level variables were not predictive of use or satisfaction, and so it is recommended that policy makers and planners focus on environmental interventions rather than targeted individual interventions.

Chapter 4 Exploring Preferences for Park Features in Low and High-quality Parks by Ethnicity and Level of Use: A Qualitative Study

4.1 Introduction

In the previous chapter, the associations between park features, park satisfaction, and park use were demonstrated. The findings indicated the presence of amenities and number of activities available was positively associated with satisfaction with parks, whilst the presence of incivilities was negatively associated with both satisfaction and park use. This finding has important implications for the management of green spaces, and suggests that removal of incivilities be targeted as a priority.

While the analysis of Chapter 3 reveals the statistical associations between park features and satisfaction with, and use of, parks that can be useful and productive for policy and planning, it is not clear *why* these associations are present. There remains limited information regarding the contextual factors that may explain the link between park quality, satisfaction and use. Qualitative methods such as individual interviews, focus groups and in-situ observations can be used to provide rich and detailed information that can complement quantitative work and contribute to the understanding of these contextual factors (Miles & Huberman, 1994). Qualitative methods can clarify the results of other methods such as those used in Chapter 3, allow for a more nuanced understanding of the identified associations, and potentially introduce a new perspective or rival explanation.

In terms of the existing qualitative evidence for relationships between park features and park use, McCormack, Rock, Toohey, and Hignell (2010) carried out a literature review into how urban parks might influence park use and physical activity. Twenty-one studies were identified, 14 of which conducted focus group interviews, 10 conducted

individual interviews and 5 used in-situ observation. The review identified five overall themes thought to be important for encouraging park use and park-based physical activity: features, condition, access, aesthetics and safety. These findings support our current understanding as reported in Chapter 3 in terms of the importance of offering amenities such as toilets, water fountains and picnic tables, and in the reduction of incivilities such as cleaning up litter, reducing vandalism, and maintenance of overall cleanliness. McCormack et al (2010) also highlight the importance of the social environment in influencing park use. The review includes several studies that indicate the presence of ‘undesirable’ users (e.g. homeless people, young people) and fear of violence in a park and how this can negatively impact on its perceptions and use (see Gearin & Kahle, 2006; Wilbur, Chandler, Dancy, Choi, & Plonczynski, 2002). In other words, it is suggested the determinants of park satisfaction and use extend beyond the structural nature of the park to include the influence of other users, their behaviour, and the wider social environment. McCormack et al (2010) conclude that the perceptions of the social environment and the perceptions of the physical environment are inextricably entwined, and that perceptions of park attributes are formed in relation to broader social contexts. The previous study was limited in the extent to which it could tap into these broader social contexts, and thus qualitative methods are a useful adjunct to further explore the impact of these social contexts on park use, and their interplay with environmental features.

The review included only one study from the UK (Scotland) (Day, 2008) and one from Spain (Ferré, Guitart, & Ferret, 2006), indicating a paucity of knowledge on this topic in Europe. The studies focussed on older people and children respectively, and no study could be identified that qualitatively examines the influence of park features on park use among adults.

Furthermore, the review identified studies that focussed on particular ethnic groups (e.g. Ries et al. (2008) had an all African-American sample), however it did not specify any study examining a South Asian sample. As previous quantitative research has shown differences in the association between park features and park use by ethnicity (Kaczynski et al., 2014), it is important to understand a variety of perspectives from different ethnicities. This study is situated in Bradford, UK, where the resident population is 67.4% White British and 24.8% South Asian (ONS, 2017). The setting therefore represents an opportunity to examine these two ethnic groups and contribute to the current literature.

In order to develop an effective intervention to promote green space use, it is also important to understand the perspective both of those who use the park and those who do not. Those who do not are of particular importance as those with the least exposure to green space stand the most to gain from interventions that promote it. Research shows that increasing exposure is associated with lower health inequality related to income deprivation (Mitchell & Popham, 2008). Therefore the inclusion of users and non-users in the study is important. Lastly, there is also interest in studying both low and high-quality parks. This allows the range of features that can be discussed to be expanded, and provides additional clarity on how varying quality in features might also affect how they are perceived.

Overall, the aim of this study is to identify the range of park features that are liked and disliked in a park.

4.2 Methods

4.2.1 Methodology

Semi-structured interviews were conducted using a walk-along interview methodology (Kusenbach, 2003). A walk-along methodology involves interviewing the participant

while walking in the designated environment, in this case, a park. Using this method, the researcher can observe and ask questions while the participant is experiencing the environment. As a result, walk-along interviews are considered valuable for studying perceptions of and spatial practices in the physical and social environment (Kusenbach, 2003). The information collected has a greater ecological validity than traditional interviews (Cauwenberg et al., 2012).

4.2.2 Participants

Residents who lived in the vicinity of a chosen park, were over the age of 18 and either White British or South Asian were eligible to participate. These ethnicities were chosen as they are the dominant ethnicities across the study area; other present ethnicities include Polish and Roma, however these are in small numbers. Participants confirmed how often they used the park prior to the interview and were designated as a ‘non-user’ (infrequent or no use) or a ‘user’ (frequent use).

The aim was to recruit 16 participants in total. A sampling frame was chosen to ensure an even split by ethnicity (White British/ South Asian), park quality (low/ high) and level of use (frequent / infrequent or no use). Table 4.1 presents the sampling frame used.

Table 4.1 Interview sampling frame

	Low Quality	High Quality
User	South Asian	South Asian
	White	White
Non-User	South Asian	South Asia
	White	White

4.2.3 Setting

Recruitment was based around one high quality park and one lower quality park in Bradford. Selection of parks was based on Natural Environment Scoring Tool (NEST) average total scores, calculated in Chapter 3. The low-quality park scored 22 out of 43, the high-quality park scored 32 (see Table 4.2).

Table 4.2 NEST Scores

Park (Max Score)	Domain								Total Score (43)
	Access (2)	Recreational Facilities (6)	Amenities (8)	Natural Features (3)	Non- natural features (3)	Incivilities (9)	Significant natural features (3)	Usage (11)	
Low quality park	2	5	2	1	0	2	2	8	22
High quality park	2	5	6	3	1	5	1	9	32

The parks are located in similar and highly deprived wards. The percentage of unemployed is 8.4% and 9.3% in the low-quality and high-quality ward respectively, compared to 4.4% in England. The percentage of those in bad health or very bad health was 7.3% in both wards (compared to 5.5% in England), and the percentage with no qualifications was 37.7% (high-quality park) and 39% (low-quality park), compared to 22.5% in England (ONS, 2017). As a whole, Bradford is ranked the 5th most income deprived local authority in England, and 27% of the district's population live in areas classed in the top 10% most deprived areas in England (City of Bradford Metropolitan District Council, 2017).

4.2.4 Procedure

Participants were approached using existing community networks (for example, a 'Friends Of' park group, community centres). Using snowballing methodology, these

participants then suggested friends and others who might be interested in participating, and in turn these contacts suggested potential participants also. Potential participants were first contacted by the researcher via email or phone. Those interested in taking part received an information sheet via email or in person. The information sheet outlined the purpose of the study, what participants were asked to do, how the data might be use and how to withdraw. Participants were given the opportunity to ask any questions regarding the information sheet or the interview more generally. If they were interested in participating having read the information sheet, a convenient date and time for the interview was arranged. Participants provided written informed consent immediately prior to the interview. A semi-structured interview schedule was developed, primarily using open-ended questions, to understand the preferences towards park features. Initial questions asked about their participant's typical pattern of use, and then focussed on features that participants liked or disliked (see Appendix C for the topic guide). A pilot interview was conducted with a draft interview schedule with a resident local to the low-quality park. The pilot provided opportunity to practice the schedule, identify any unexpected issues and finalise questions based on feedback from the participant. All interviews were conducted in English and lasted 30 – 60 minutes. Each interview was audio-recorded and transcribed verbatim either by the researcher or a third-party, in which case the transcriptions were checked by the researcher. The transcriptions were imported into QSR NVivo 10 software for analysis.

4.2.5 Data analysis

Thematic analysis was employed in this study using the framework approach. Where thematic analysis uses a theme based approach, the framework approach is both case and theme based. Developed by Ritchie and Spencer (1994), it has been shown to be a systematic and flexible approach to analysing qualitative data within multi-disciplinary health research (Gale, Heath, Cameron, Rashid, & Redwood, 2013). It involves

developing a hierarchical thematic framework that is used to classify data into key themes, and then developing a 'matrix' to structure this by cases also. The ability to examine findings by both theme and case was well suited to the study given the research questions.

The researcher was familiarised with the data through transcription and checking transcripts completed by others. Units of text that addressed the research question were identified. Where these were similar, they were grouped together and given a provisional code. This was an iterative process whereby codes were adjusted as more transcripts were coded. Upon completion, the entire data set was reviewed to ensure the coding was comprehensive and had supporting text. A second researcher double-coded 10% of the total number of transcripts ($n=2$) to ensure inter-rater reliability and reduce subjectivity in the analysis. There was a substantial level of inter-coder reliability ($k = 0.64$).

Once a definitive set of codes had been established, these were organised into key themes. Themes were identified using both an inductive and deductive approach. At first, a deductive approach was taken, whereby theme identification is directed by a pre-existing coding frame (Braun & Clarke, 2006). In this instance, the NEST was used to structure the initial framework. However, emerging interview data went beyond the tangible park features specified in the tool, at which point an inductive approach was taken. Furthermore, little or no interview data was relevant for some domains and so these were adjusted or dropped as potential themes. Provisional themes were shared and discussed with the supervision team and another researcher within the wider research team and refined where suggested.

A matrix was then created in MS Excel. Themes were charted within the matrix whereby each case or participant has his/her own row and columns represent codes.

Separate charts are completed for each theme. Summaries of each code by case were inputted into the relevant cell. Textual data was then contrasted by themes across cases.

4.3 Results

4.3.1 Participants

There were 16 participants in total. The sampling frame was met and an even split was achieved between ethnicity, park quality and level of use. Table 4.3 shows the age and gender split of the sample. Three-quarters were female and half were in their 30s.

Participants were given anonymous identifiers based on the quality of the park (high quality (HQ) or low quality (LQ)), ethnicity (White British (WB) or South Asian (SA)), and level of use (user (U) or non-user (NU)). Two participants were interviewed for each of the potential categories, so 1 or 2 is the final identifier e.g. LQ SA U 1.

Table 4.3 Demographics of participants

	White British (n)		South Asian (n)		Total
	User	Non-user	User	Non-user	
<i>Gender split</i>					
Male	1	1	0	2	4
Female	3	3	4	2	12
				Total	16
<i>Age split</i>					
18-30	0	1	1	1	3
31-40	2	2	2	1	7
41-50	1	1	1	1	4
51-60	0	0	0	1	1
61+	1	0	0	0	1
				Total	16

4.3.2 Thematic analysis

Themes identified in analysis were grouped into three overarching themes: (1) individual environment, (2) park environment and (3) social environment. While the topic guide focused on preferences for park features, due to the semi-structured nature of the interview participants were able to deviate from this. This resulted in participants explaining their individual pattern of use of the park and other local green spaces (discussed in theme 1) and the impact of the wider societal context (discussed in theme 3). The individual and societal context evidently cannot be ignored and contribute to participants' preferences within the park; therefore, this is discussed as part of the results. A conceptual model of the identified themes is outlined in Table 4.

Table 4.4 Conceptual model of interview themes

Socioecological model					
	Individual	Interpersonal	Organisational	Community	Public policy
Individual level	Current pattern of use				
	Previous pattern of use				
	Use of other parks				
Park environment	Suggestions for change	Graffiti	Change in facilities over time		
	Appreciation of nature and wildlife	Visibility	Maintenance of facilities		
	Health benefits of natural features	Sports facilities	Loss of natural features or change in quality		
		Playground equipment	Main road		
			Litter		
Social environment		Anti-social behaviour			
		Smoking / drugs / alcohol			
		Presence / absence of other users			
		Community use			
		Activity groups			
		Events			

4.3.2.1 Individual level

Participants talked about their previous and current pattern of use of the study park and use of other parks. A range of frequencies were reported, from every day to a few times over many years. Use of other parks in the area was common, and comparisons were made between other parks and the park in which the interview took place.

Sub-theme 1a: Current pattern of use. Wide variation in the frequency of use was observed, with no obvious difference by ethnicity or quality of park. No participants had never used the park, but non-users considered themselves to either infrequently use the park or currently avoided it having used it in the past. One participant described how they had rarely used the park in the 15 plus years they had lived in the area:

“Yes, I’d just say about 4 times, 5 times. In the whole of 15, 16 years that I’ve been here... Yeah, yeah, that’s it and then I’m walking with you now.” (HQ SA NU 2)

The opposite extreme was also observed, with several participants from both ethnicities and across both parks stating they used their park “every day”. All participants described usually visiting the park with others - either family or friends. A mix of users and non-users (n = 5) said they would not visit the park alone. This was associated with personal safety.

“Oh I never come by myself no, I feel braver if I’ve got one of the kids with me... Yeah I feel unsafe on me own, I’d never walk through here on my own, never.” (LQ W U 2)

Those that did say they sometimes visited alone maintained their primary pattern of use was visiting with others. Typical activities were going for a walk (or dog-walking) and watching their children play. One participant mentioned they might come for a jog

around, and one was involved in a ‘Friends Of’ group that meant she often ran or attended activities or events for people in the park.

Sub-theme 1b: Previous pattern of use. Participants that had grown up in Bradford (n=5) said they had used the study park when they were younger.

“This park has always been here and I’m 40 now and as far as I can remember this is the only main park my parents have ever brought us to, ever since we were about 4, 5 of what I can recall but it was probably up and running before that.” (LQ SA U 2)

Yeah I mean I haven’t been in this park for a while, I mean I come through on a morning to go to work but that’s about it. Er, but like I say back when, back when I were 15, 16 maybe even younger er like I say we used to, my mate lived just over side of park there so we were in here nearly every day, you know what I mean. (LQ W NU 1)

Participants who were from the area explained that when they were younger they used the park for a range of activities, including playing football and cricket, meeting friends, school sports days and visiting the café. Now, three remain frequent users but two are infrequent users (one from each park). Moreover, some participants commented fewer children and young people use the park nowadays due to the rise in ‘distractions’ such as television and computer games.

Sub-theme 1c: Use of other parks. Participants had a good level of awareness of what other parks were present in the area and the quality of them. For example, participants could compare the study park and other local parks in terms of available facilities and natural features.

“Erm, so yeah it’s just like in [NEARBY PARK], comparing it to [STUDY PARK], they’ve got lots of different levels on it so it’s got a nice flower area, like a proper park area by the pond and that and then it’s got erm all the play stuff for [NAME], my little boy. And, yeah, exercise machines and, it’s just more, much more interesting than this.” (LQ W NU 2)

All non-users stated other parks or green spaces in the area that they visited. This finding demonstrates these individuals do not avoid all parks altogether and instead make use of alternatives. Furthermore, several users of the study park pointed out alternative parks that they would not visit:

“The other one’s are smaller. There’s one on [ROAD NAME] that’s not far from here and it’s terrible it’s just a mess, there’s glass everywhere...Yeah it’s just not nice place especially for kids, children and stuff. There’s just like glass everywhere and people just sat there chilling and smoking, it’s not good.” (HQ SA U 2)

Overall, it was clear participants had neighbourhood parks that they did or did not visit, both users and non-users alike. Participants were able to say which parks had more flowers, a better play area, which held local events, and also which parks suffered from graffiti and vandalism.

Some participants mentioned also visiting parks that were further afield (beyond walking distance). The researcher noted that participants were describing very high-quality parks in the district, therefore participants seemed willing to travel further for a better quality space.

To summarise, a wide range of frequencies of visits to the study parks was observed, from every day to a handful of times in over a decade. However, those that were from the area stated they used to use their park a lot when they were children, and non-users explained they made use of other parks in the area.

4.3.2.2 Physical environment

Participants talked about the physical features present in the park and the level of maintenance. Specifically, participants referred to the recreational facilities and amenities, natural and non-natural features, incivilities (litter, glass, vandalism, graffiti), and safety (visibility, main road).

Sub-theme 2a: Recreational Facilities and Amenities

Playground equipment. Early in data collection, the high-quality park had new playground equipment with a perimeter fence installed. Participants in this park were positive about the new equipment, and praised it for being well-maintained, enclosed and well-spaced out.

“Yeah yeah they’re good I mean you know um, they’re like well-maintained and stuff and people do get sort of good use from them...I think that’s, with the swings and that you know it’s used by the littleuns and that’s really good that it’s like an enclosed area as well so that’s quite nice.” (HQ SA U 1)

This is contrasted with the low-quality park, where participants described it as often very busy with limited equipment for the number of children wanting to use it. This leads to children either having to wait their turn to play on the equipment, or sometimes children would not let others play on it. It was described as the “most well used” area in the park, but participants did not like the small size of it.

“There isn’t enough playing equipment and there isn’t enough room so at times when you do come here you don’t get nowhere to sit or something to play on kids don’t get nothing to play on so I have to sit here for hours on end to have a go at something or another.” (LQ SA U 2)

“It is always busy in there, there is always a few kids in there morning til night there’s always a few kids in there. But I just think for the size of the space, it’s a small park. It’s small especially with how many kids around here, there’s hundreds.” (LQ W U 2)

Sports facilities. A range of sports activities were available in both parks.

Participants in the high-quality park were positive about the football pitches, some stated they either used to use them regularly or enjoyed watching others play. One participant said they use the badminton courts because they can now play for free as opposed to going to the sports centre and another mentioned the ‘pitch and putt’ (golfing game) was “good for families.”

This is contrasted with the low-quality park, where there were some concerns for the quality of the sports ground and subsequent issues when people moved to play elsewhere. A couple of participants explained that in poor weather the grassy area where people would usually play football becomes muddy, and instead the players move to the basketball courts, where it is a tarmacked surface.

“Yeah, yeah this area, because normally the rain is coming here they’ve no proper places and there’s mud on there. That’s why we were going to play here [*basketball courts*].” (LQ SA NU 1)

“The football courts are very, because they’ve got like the football, basketball, cricket pitch, it’s free, they’re always full and people, lads, they might argue...and that’s what causes a lot of arguments and rubbish, you can see all the rubbish behind these...they don’t use the posts over there because where the grass is worn away when it rains it’s left just like all muddied so they don’t really.” (LQ W U 2)

The second participant went on to explain this displacement to the courts had led to arguments in the past because too many people were inside the basketball courts.

Some of the South Asian participants from the low-quality park commented on the bowls court. One participant said it was a “new thing” for his family and he had not seen it before and he liked to see them play. Another said it was good to watch and cheer on the elders; she used to watch it previously where she used to live. However, a White user said that while it was nice to sit and watch, the court is kept locked and bowls people do not interact with other park users, despite them displaying an interest.

Maintenance of facilities. In the high-quality park there was a clear difference between users and non-users: non-users felt that the park had continued to deteriorate over time - referring to the tennis courts that had been left to ‘rack and ruin’, with weeds coming through the gravel, and broken seats on a roundabout and broken zip wire in the playground area.

Users instead perceived improvements to the park over time:

“Before that [*‘Friends’ group established*] I don’t think anybody were really in charge of it, which made it run down a little bit, erm, but it’s a lot nicer, also like the courts, up there you know, they’re really nice, because they’ve got like, old bits that they’ve updated quite recently haven’t they...erm, so we like that as well...And I like the fact they’re re-doing this as well [*playground equipment*], the park part of it, because it did need work I just hope it doesn’t go back to how it were.” (HQ W U 2)

Participants from the low-quality park had similar comments in terms of noticing a deterioration in the maintenance of the park’s amenities and facilities over time. The presence of rust and flaking paint on the basketball courts was noted, and several participants commented on the slippery rubber surface in the play area when it got wet.

Change in facilities over time. Participants recalled facilities and amenities that were previously present in the park and had been removed. This was consistent across parks. A lack of toilets, cafes and greenhouses were mentioned for both parks, the removal of a pond was noted in the high-quality park, and the closing of the park lodge, removal of allotments and arcade machines was noted at the low-quality park. Some non-users reflected that this meant they felt there was nothing for them to come for now, and they felt disengaged as a result.

“There used to be, you used to treat it as a kind of, you know like 2-3 hours, you’ll engage in your walks and your leisure time, play a bit of football or whatnot and then think I’ll go to the café...and you know, relax and have a drink and stuff. Well that element’s disappeared as well. So, you’re really stuck. So therefore, it just disengages you from it more and more, because there’s less on offer. That’s how I see it really you know, there’s less on offer really.” (HQ SA NU 1)

Some participants related these losses to cuts in council park budgets. Participants agreed the ‘non-essential’ status of the park meant that features had been removed or

not maintained to reduce costs and it had suffered as a result. Participants were agreed across both the low and high-quality parks.

Suggestions for change. Many suggestions were made for changes in both parks. Participants commented on empty concrete spaces in both parks that they felt were currently wasted and could have something new added.

Participants in the low-quality park expressed a desire to have more varied play equipment that appealed to children of all ages. In addition, several participants in both parks felt the addition of something for teenagers e.g. a skate ramp, bike track or graffiti wall, would be beneficial, as they felt the parks did not have much for them.

Some participants in the high-quality park wanted toilets, and some participants in the low-quality park felt a rail around the pond would be a good addition as children can go close to the edge of it. Suggestions made by other participants included: an ice cream van, water fountain for dogs, more bins, more benches, a path around the bottom edge, CCTV and lighting, and a vegetable garden.

Sub-theme 2b: Natural and non-natural features

Appreciation of nature and wildlife. Participants consistently spoke positively about the nature and wildlife present in the parks regardless of their level of use. The variety and appearance of the trees in the parks was appreciated. Some participants commented on a feeling of ‘escaping’ the city, and moving ‘into the countryside’.

“It’s a really sort of well-maintained because you’ve got a huge selection of different trees, so many different types so not just having one sort of boring tree which is good.” (HQ SA U 1)

Wildlife was also appreciated – squirrels, rabbits and bats were mentioned, and in the low-quality park where there is a pond, the ducks and swans were commented on. Some of the participants that had children commented that they brought their child to see them because they liked to see the wildlife.

“I think it’s a good nature, I see a lot of squirrels. Sometimes you see a rabbit here and there, but you won’t see that that often but you will see it in the mornings and there’s a lot of squirrels which I like. I like the trees how they’re decorated around the park as well. It’s nice, the shades. I think there’s everything that I like, its good.” (LQ SA U 1)

Health benefits of natural features. The mental health benefits of greenery in the park were recognised by users and non-users alike. Participants frequently mentioned feeling relaxed when in the park; the calmness and peacefulness of the trees provided a pleasant experience. One participant described the trees as “good for our brains”, while others pointed to specific benefits that nature had for them: one non-user highlighted that it is a nice place to come and “do mindfulness”, while one user in the low-quality park explained:

“I think because there’s a pond and the ducks and that are there. I think, I suffer with depression but if you come to a place like this, especially like, I wouldn’t sit here because when it gets busy, it’s noisier, I prefer to sit that end where it’s quieter and just sit and watch the ducks or whatever and it helps calm me so, I get relaxed.” (LQ W U 1)

Loss of natural features or change in quality. Participants also spoke of the change in quality of the natural features in the park over time. Participants from the high-quality park particularly noted the lack of flowers in the park compared to the past. A previous greenhouse, rose garden and paddling pool were also noted, as well as a decline in maintenance:

“I mean, you know in days gone by I mean this grass wouldn’t be left like this, this was immaculate. You know all these verges would be cut, it would all be like swept you know, it would all be cleaned. It wouldn’t be you know all this, foliage, under benches like that you know. It would be nice and neat, it would be really, really pleasant. So, increasingly it’s not the pleasant experience it once was.” (HQ SA NU 1)

The lack of flowers was also brought to attention in the low-quality park, with one participant stating:

“Like no flowers! Why aren’t there any flowers? When I think of a park that’s what I think of.”

(LQ W NU 2)

The level of maintenance of the natural features was similarly noticed in the low-quality park:

“The um pond, that has really gone down cause I remember when, in our days when we used to come, it was always clean, the grass was always cut, the trees were big but they weren’t as big as what they are. They weren’t just left to grow all out of proportion.” (LQ SA U 2)

Overall, all participants regarded the natural features – the trees, shrubs and flowers – as a positive presence in the park. Some defined a park by their presence, some saw it as an ‘escape’ from the urban form and some recognised clear health benefits they gained from being in it. The natural features were appreciated and liked by all participants. There was also a recognition that the number and/or quality of natural features in the parks had deteriorated in recent years, and this was disappointing for many participants.

Sub-theme 2c: Incivilities. Participants referred to tangible incivilities present in their parks: this was split into litter (including glass) and graffiti and vandalism.

Litter (including glass). Participants negatively perceived the presence of litter in the park. In the low-quality park litter was seen as a particular issue, and two related occurrences were identified: first, that bottles and cans were often dropped on the ground, and second, food is frequently dumped in the park. One user explained the presence of bottles and cans in the park brought up issues of safety for children and elders and as a result she will not let her children run around where the glass is. The park also suffered from people dumping food: one user commented that tubs of rice were left out and pigeons and rats come for it, another described how he had seen chapattis dumped in the pond. This had resulted in rats coming into the park, and the council had cut back the hedges in order to try to combat this. Participants from the low-quality park stated the pond was often a place where litter was thrown. Participants

commented that the pond had had various items thrown in it including a microwave, trolleys, and a gas canister. Another issue regarding the pond was the thick algae during the summer appears solid to children and they have fallen in before. Both ethnicities and users and non-users in the low-quality park mentioned litter as an issue that they disliked about the park.

In the high-quality park, the perception of the degree of littering in the park was more mixed. Two users of the park commented that there is less litter now than there used to be, with one explaining:

“It seems a lot better. You don’t see as much litter as you used to as well, so you can tell people are making an effort to come pick up their rubbish.” (HQ W U 2)

Non-users in the park had mixed views: two commented that there is lots of litter and bottles on the ground, whereas one stated that the play area is usually tidy, it’s usually litter free and the grass is always cut.

It appears the users in the high-quality park maybe be more forgiving of litter in the park, having recognised that the issue had been worse in the past. On the other hand, non-users largely remained unaffected by any recent improvement and still viewed it as a problem.

Graffiti and vandalism. Participants in both parks commented on incidents of vandalism and graffiti. Participants in the high-quality park described past incidents, such as the old play area railings being set fire to and people climbing into the bowls court and vandalising it. One South Asian non-user explained how for him this had led to a perception of inevitability related to vandalism. When discussing the installation of the new play equipment in the high-quality park, the participant commented:

“And even all this equipment, this is lovely equipment, all this in a year or twos time will be vandalised.” (HQ SA NU 1)

Vandalism and the presence of graffiti was also an issue in the low-quality park. Some participants mentioned that the bowling hut had been set on fire and destroyed in the past, bins were set on fire, and one participant had called the fire brigade when a pile of leaves had been set on fire.

Sub-theme 2d: Safety. An additional two concerns were raised that were unique to each park. Visibility in the high-quality park was an issue and in the low-quality park participants were concerned about the adjacent main road.

Visibility. The high-quality park has a high density of trees in some areas. The layout of the trees was noted by participants of both ethnicities and level of use. For non-users, the density of trees and restricted visibility of the rest of the park made them feel wary. It created a sense of danger for them where they were afraid someone may be hiding in the bushes, and they do not know who might jump out at them. For example, one South Asian non-user explained,

“I mean here you can go somewhere and you don’t know where you are and who’s behind you and anything can happen. It just feels very uncomfortable, so that’s what I don’t like about this park.” (HQ SA NU 2)

This feeling was reiterated by a White non-user who said,

“It’s just the layout of park where as you going through certain parts you don’t know who is going to be hiding behind the bush or behind the tree.” (HQ W NU 1)

This sentiment was echoed by one White user, who explained when he was younger people had jumped out at him and now he avoids particularly dense areas.

Main road. In the low-quality park, the proximity of the main road to the park came out as an issue for both users and non-users. A low wall separates the road and the park, and this worried participants with regard to children running off and into the road. The low wall was not seen as a sufficient barrier and potentially dangerous for children.

If there was a higher wall, one South Asian user pointed out, this may stop children seeing oncoming car or foot traffic and they would be less likely to run out.

In summary, participants referred to the physical features that are present in the park, including recreational facilities, natural features, incivilities and structural safety issues. The contrast between the low- and high-quality park were made clear when participants spoke about recreational facilities and amenities. Natural features and incivilities were universally liked and disliked by participants respectively, and both parks had safety issues for participants that were unique to the park.

4.3.2.3 Social environment

Participants spoke about aspects of the social environment within the park, such as other users and their behaviour, activity groups and events, and also the wider community.

Sub-theme 3a: Community use. There was a clear difference between users and non-users in terms of their view of how the park was used by others in their community. On the whole, users in both parks were able to describe different groups of people that they saw in the park and how they used it. For example, one participant said:

“I think most people that have dogs and stuff like that in the area use it a lot, people with families use it a lot, it is pretty much full all the time, every time you come. It’s never quiet or dead with nobody around. So I think people do use it in the community a lot and people do tend to travel and come and use it a lot so it’s pretty good like that.” (HQ SA U 2)

The participant viewed the park as well used and could recall what activities different people were using in the park. However a non-user interpreted this differently:

“I think it’s all segregated, so to like the cricketers just for cricket, and the footballers just for football. There isn’t any mingling if you know what I mean. They all pretty much just come in and do their bit, so either go playground. There isn’t any mixing.” (HQ W NU 2)

Non-users in both parks did not agree with the level of use that was described by users, and in addition, their peer group were not park users either. In the high-quality park, non-users said:

“It’s all my peer group and all my colleagues and these people I know you know, they’re all of the same mindset, they’ve all like slowly distanced themselves and removed and don’t frequent the park anywhere near the levels. Not even one a month a lot of them. They’ll go for months and months and months without even coming anywhere near it you know.” (HQ SA NU 1)

“I’ve never really talked about the park, talked to anyone about it really, because they don’t use it. The people I know they don’t use it at all.” (HQ SA NU 2)

This pattern was also observed in the low-quality park – users were aware of other users in the park whereas non-users regarded the park as rarely used and/or did not understand it to be used by their peer group.

“It all depends on the atmosphere because the park is more like in this weather now, if you came here about 5ish it would be packed out.” (LQ SA U 2)

“I know my sister like obviously I started coming to this park first with my sister she’s got three kids and I know she doesn’t come as regular as well she’s actually stopped as well.” (LQ SA NU 2)

This was a clear difference between users and non-users – users still regarded the park as well used by a number of different groups of people, whereas non-users felt they were in an environment where going to the park was not a typical activity.

Sub-theme 3b. Anti-social behaviour

Antisocial behaviour. Two participants spoke openly about direct encounters with groups of young people that had affected their view of the park – both non-users of the high-quality park.

“And I’ll say to somebody oh I was in the park the other day or whatever you know and somebody came up to me and said do you want to buy some stuff. You know, you think look I

just want a pleasant walk in the park, I don't want someone offering me drugs, and you know it's kind of, it's open, it's quite brazen." (HQ SA NU 1)

"One of them punched him [her son], and then they all jumped on him, and obviously my son just shouted at his mates, cause all the girls were screaming, obviously they were upset, he told them to get them away, he managed to get away from them. He were on the floor, because they were kicking him and stuff, he managed to get away from them, and then he rang and his dad went...Anyway, he had to go hospital and things, had to go to the station for photographs, and his body was full of footprints. They wouldn't let me see a video. He went to court, just awful really" (HQ W NU 2)

No other participants mentioned a specific incident, although both that had experienced this behaviour in the park were non-users. Other participants talked about the presence of groups of young people only. Some non-users said seeing groups of young people at the park made them feel uncomfortable and they had moved on or left the park as a result.

"Well obviously they [*two teenage girls*] were blocking the tunnel [*in the playground*], and I'm not controversial you know I don't like getting into arguments and you don't know youth now, they're so sharp and you know I just better be quiet and move elsewhere you know." (HQ W NU 1)

"And plus it's like not just one or two of them they always come in big groups it's like one or two will start coming, this is what happened the very last time I was here, one or two started coming and then they were like making phone calls and then slowly a group of two turned to like a big group of 13 and me and my sister just turned to each other and said it's time to go kids come on let's go home." (LQ SA NU 2)

Some users in the low-quality park appeared to plan their visit based on the time of day to avoid encountering this issue. It was acknowledged that users would not typically visit in the evenings.

"I think that lots of people that use it in the morning trying to avoid things, try to avoid a lot of issues in the afternoon. And I see more elders walking in the morning than in the afternoon as

well. I think they're more safe in the mornings than the afternoon...all the little three-year olds and two-year olds I think they use it until like 3 o'clock and then they avoid the time after three o'clock once the kids are out of school so." (LQ SA U 1)

There was one participant that described a positive experience with a group of young people.

"There were these like teenage boys and they were all playing on the swings and I asked them if I said when you've finished can my little girl just sit in the sand, she just wants to sit in the sand but she doesn't like you spinning round and they said oh no it's fine she can just sit there as long as she wants we won't play as long as she's there and I said oh that's really nice, thank you, so they do consider other people." (HQ SA U 2)

Lastly, one behaviour in the park was noted by one participant as potentially being perceived 'shamefully' by others.

"There were youths again with like boys and girls and girls sitting on their laps and things like that and it's with it being an Asian community and some people are still backdated...It's like it's not an issue it's more of a, it's like a shameful thing to, like things you shouldn't do in front of elders, that's the religion as well coming into this." (LQ SA NU 2)

This behaviour may be regarded as 'anti-social' or 'shameful' by the Asian community.

No White participant commented on this behaviour in the park; this may be a key difference between ethnicities in what is regarded as acceptable behaviour in a park.

Lastly, one participant who had experienced an incident in the park with a man watching the children described how parents would let each other know when something seemed suspicious or you go home and tell others to take their child home.

Smoking/drugs/alcohol. Seeing other individuals in the park engage in behaviours such as smoking, drug-taking and drinking alcohol influenced how participants used the park. This made participants feel uncomfortable and most referred to the impact this behaviour also had on their children – it made them feel uncomfortable and parents did not want their child around this type of behaviour.

“That’s when I stopped coming because when we came there were just youth people here playing loud music and it was just the environment what was created. I mean they came and sat on the kiddy swings all these big youth people and they were smoking and then just, not just your normal cigarettes, you know the other stuff. And when you’ve got kids you don’t want them to be sniffing that, breathing it in basically. So I just thought no you know what, I don’t want to really come to this park anymore.” (LQ SA NU 2)

This sentiment was expressed by participants in both parks, of both ethnicities and level of use. Participants were concerned for the welfare of their children (all participants had children, but primarily those with younger children - 11 had children under aged 16 and 1 other had two young grandchildren). Participants did not want them seeing others smoke, drink alcohol or take drugs.

Motorbikes and quadbikes. Participants from both parks described the presence of motorbikes or quadbikes in the parks. Users were intimidated and sometimes scared by bikes, especially for young children and older people, because of how quick they can travel. Participants felt they did not care about other users, and they can ride past you very closely.

Dogs. The presence of dogs not kept on a lead was an issue for participants from both parks. Loose dogs were considered potentially dangerous, particularly for young children.

“We get a problem with loose dogs running round the park. And erm children and dogs don’t mix do they, if the children are running about the, it’s er it’s frightening you know to see a loose dog, amongst children, small children.” (HQ W U 1)

“So I mean until now I have objections so for example if you see the dogs...They’re not on the lead, so I’m just a bit more wary when I’m with children you know just how they moving they’re not coming too close if they haven’t got muzzles or leads.” (HQ W NU 1)

There were objections to dogs not on leads also in the low-quality park, again with regard to young children.

“Because these dogs are going to come everywhere, some of the people are very careful they are going to hold it properly, some leave them and throwing the ball and they’re going to be running around the park so and the children and the pigeons and the dogs, it’s a natural thing, they can come everywhere, anywhere, you can’t say anything.” (LQ SA NU 1)

Sub-theme 3c: Other users.

Presence of other users. Participants spoke positively about seeing other people in the park. Seeing others was associated with a feeling of safety for many participants.

“So, it’s nice when you see lots of people in, and sometimes you feel a bit safer when there’s more people.” (HQ W NU 2)

Several explanations for this feeling of safety were provided: people could not do anything destructive in the park if others are around to see it, there are more eyes watching the children in the playground and parents could watch the children collectively, and if you do see anything suspicious, you can divert yourself towards families and dog walkers. Furthermore, one participant explained:

“I think it’s well used so that attracts it to you as well if you’re feeling... so if I go to a park and it’s dead I think why is no-one using it and then I’m a bit like well I shouldn’t use it because no one else is there so I think the more people that are there the more people that are attracted to it which I certainly do, everybody is using it so it must be a good park.” (HQ SA U 2)

Some participants also commented that it was pleasing to see a diverse range of users, and that this was important to them. Participants said they liked seeing different ethnicities enjoying the park, and felt this was important for children to be exposed to also.

“I think some people might not like it but I see a lot of people from you know different races coming here and it’s nice because everyone’s like from somewhere else and likes the park, so it’s nice.” (LQ W U 2)

Participants were clear that seeing other users in the park behaving in an ‘appropriate manner’ was a positive social aspect that attracted them to the park. It was seen as safer

and a sign of the quality of the park. However there was a clear difference for participants between ‘other users’ like themselves, versus ‘other users’ that were groups of young people.

“It’s just the play area you see a lot of people there, you don’t see it in other places. You’ll see lads, but you know you want to see women, women like to see women, children.” (HQ SA NU 2)

Participants talked about how the number of other users they saw in the park affected them. Seeing other people in the park, barring groups of young people, was a positive sight for participants – participants felt safer when they saw other users like them. On the other hand, seeing no one was unsettling for some participants.

Absence of users. Non-users commented on the lack of other users that they saw in the park. Compared to the past, the number of people seen in the park was understood to be a lot less.

“You’ve got a lot of space for kids to play, I mean even like the summer time, I’ve been walking past up here in summertime and there’s been nobody in here. Back in my days sometimes you couldn’t come down and play football because there was nowhere for you to play.” (LQ W NU 1)

Alongside this, participants said they would expect the park to be more well-used.

“And emptiness, emptiness, yeah, there’s nobody. I mean because the people that live round here, I do know them, so if I was to come to the park, I’d expect to see them. If you don’t see them you don’t feel like they’re there. You know sometimes they can’t meet up with you but they could be already at the park, because it’s a place that’s used a lot, so you see your friends. I see more friends on [ADJACENT ROAD] walking up and down than I see in the park.” (HQ SA NU 2)

Again, non-users understood the park as not a typical activity in their community – in fact they were more likely to see people they knew on the street or elsewhere.

Interestingly, one participant (a frequent user), saw this differently:

“I think it’s because there are so many entrances as well so you don’t actually see a lot of people because most parks just have one entrance and you have to go out of that entrance but you can come in here, you can come in there, you can go over the barriers, through cemetery, through woods you can come in at all angles which people just walk through it everywhere.” (HQ SA U 2)

Sub-theme 3d. Events

On the whole participants spoke favourably of events in the park. However, few participants said they had attended many events, or attendance appeared sporadic. In the high-quality park, the fun fair was the main event the park hosted. Some participants commented that people who would not normally use the park any other time do tend to come for the fair, and they liked this.

“A lot of people were like why don’t it come more than once a year and stuff like that. Cause I think like people are busy with their lives like working and bringing up children and stuff like that, they don’t tend to get together with everybody like with the whole community and I think the fair did that it’s really good.” (HQ SA U 2)

Meanwhile in the low-quality park, popular events were also a fun fair, the Islamic Eid festival and previously Bradford Mela (a musical event). Participants spoke of attending the fun fair, however there were some complaints regarding the noise, the amount of people and the litter that occurred as a result.

“I could actually hear, they did them, you know the machines, they did them, and I could hear them from my house because my house is like over there a bit. So when it’s the funfair it’s like really annoying because you can hear it. But it’s not too bad. It’s just that big horn they blow it’s really annoying.” (LQ W U 1)

With regards the other events in the low-quality park, the Bradford Mela was spoken of by several participants positively, although this has moved to another local park.

Differing views were observed for the Eid festival celebrations: while South Asian

participants did not speak about attending the festival, one White non-user had purposely avoided, saying,

“There was a kind of Asian event a few months ago but again it’s based on, I mean I’ve nowt against Asians but it’s all for them, know what I mean. A lot of White people, I don’t wanna go to that it’s for Asians.” (LW W NU 1)

Overall, participants were agreed that events were effective in encouraging the community to use the park and they liked to see the park well-used, but there were some issues in terms of noise and litter. One difference by ethnicity was observed: one White participant felt excluded in an event that was focused on the Muslim community.

Sub-theme 3e. Activity groups

Participants that were not already members of an activity group in the park all expressed a desire or willingness to be part of a group. A clear split was identified between users and non-users: users were typically part of or had started an activity group in their park, whereas non-users were usually not aware of any activity groups.

“Cos [WIFE’S NAME] not the type of person that meets people, she’s a little bit shy, so it’s really nice to, for her to get out the house and meet people. I think it’s a great little session that they run here. It’s good...A lot of people she’s met, we did a course, like a 6-week, 8-week course [in the park] it were, erm, I think that were really good, and she got some good friends, so I think she’ll carry on doing it now.” (HQ W U 2)

“Yeah cause now we’ve started a walk group, we’ve started a walking group with um [PROFESSIONAL AT COMMUNITY CENTRE] and first couple of weeks we’ve been coming down here and walking all the way around and having a look at different ways how we could change situation.” (LQ SA U 2)

Non-users on the other hand said they would like to be a part of a group but were not aware of anything in their park. Non-users said they would be encouraged to come if there was a group available, such as a “cycling club for ladies or jogging club for ladies” (HQ W NU 1). One Asian non-user explained he already uses another park for a

weekly running event, and so there is potential for him to use this park, if there were organised events for groups available.

“Maybe that’s why with parkrun [*WEEKLY RUNNING EVENT AT NEARBY PARK*] the reasons there. So therefore, I only started parkrun about, when I was 50 so 3 ½ years ago. So there is a potential to get you back in but it has to be some sort of organised activity utilising that public space and then that can get you back in.” (HQ SA NU 1)

There was a clear divide between those that accessed groups in the park, either self-organised or organised by others, and those that did not. Users were members of Friends Of groups, walking groups, family support groups and litter pick groups. Non-users felt they did not have access to a group that they could visit with, or were not aware of current groups, and expressed their desire for one to be formed. Suggestions ranged from walking to cycling to tennis groups.

In summary, participants described the social environment of the park, which included: how the community used it, the potential for encountering anti-social behaviour, the number of other users, events, activity groups, and wider societal issues. Users tended to view the park was well-used by their personal network and the wider community, and tended to be a member of a social group that used the park, whereas non-users were not and saw the park as underutilised.

4.3.2.4 Summary

To summarise, three overarching themes were identified that shaped preferences for park features: individual environment, physical environment and social environment. In terms of the individual environment, a wide range in the frequency of use of their local park was found in the participants. Participants classed as a ‘non-user’ in the current study did make use of other parks in the area, whilst ‘users’ did not make use of others. This indicates the potential variability between individuals in their regard for a park, regardless of the contents.

Within the 'physical environment' theme, participants universally liked natural features such as trees, flowers and water features in their park, and disliked incivilities such as litter and vandalism. The difference between the low and high-quality parks were made apparent when participants referred to the level of maintenance and range of playground equipment and sports facilities available. The loss of facilities and natural features over time was attributed to the decline in the park budget by several participants, although the high-quality park had benefitted from the presence of a 'Friends Of' park group that had been able to raise funds for new equipment, arrange activity groups and conduct regular litter picks.

The final theme was the social environment. In this theme there was a clear difference between users and non-users. For users, visiting a park was part of their social routine, whether this was with friends, family or an interest group. On the other hand, non-users did not know other people that used the park, and consequently believed their community did not often use the park either. Furthermore, on the whole seeing other people in the park was encouraging, and events and activity groups that drew people in were typically welcomed by participants. Some behaviours were not viewed favourably, such as smoking and drinking, and groups of young people sometimes made participants feel uncomfortable. Users would counter this by visiting at times in the day when this was not likely to occur.

4.4 Discussion

The current study aimed to identify preferences for park features among Bradford residents. Walk-along interviews were used to obtain context-specific and detailed data. While the topic guide focussed on physical features within the park environment, this expanded during interviews to include multiple hierarchical environments that work together to shape likes and dislikes for park features. This is in line with the socio-

ecological approach, whereby an individual's behaviour is shaped by the interaction with the social environment, including interpersonal, organisational, community and policy levels. A number of reviews into the built environment, including parks, and its relation to physical activity have also been based on the socioecological model (Humpel, Owen, & Leslie, 2002; Owen, Humpel, Leslie, Bauman, & Sallis, 2004).

4.4.1 Park features

Participants referred to recreational facilities and amenities, natural and non-natural features, incivilities and (structural) safety within the park.

Playground equipment was regarded positively, but participants from the low-quality park explained the current equipment was insufficient in size and was poorly maintained. The findings support results from a range of previous qualitative studies that show a variety of playground equipment that is age-appropriate and well-maintained is important for encouraging park use (Ferré et al., 2006; Ries et al., 2008; Tucker, Gilliland, & Irwin, 2006; Veitch, Bagley, Ball, & Salmon, 2006). Sports facilities were similarly considered positively, but again the low-quality park suffered from poor maintenance of facilities, which participants did not like. Furthermore, the presence of sports facilities has been associated with park-based physical activity in both qualitative (McCormack et al., 2010) and quantitative (Cohen et al., 2006; Floyd et al., 2011; Rung, Mowen, Broyles, & Gustat, 2011) research. When designing interventions in a park, planners should consider the presence and quality of such facilities, in order to promote this behaviour.

Natural features and wildlife were viewed positively by participants. Participants appreciated their presence and some went further to recognise the mental health benefits they gained from being in nature. Moreover, the *variety* of natural features and wildlife was also well liked, pointing to growing evidence on the positive impact of biodiversity

on mental health and well-being (Fuller, Irvine, Devine-Wright, Warren, & Gaston, 2007; Dallimer et al., 2012). However, there was also an understanding that the natural features were increasingly not well-maintained. The presence of geese faeces and the lack of flowers in the low-quality park was disliked by participants. In this way, natural features (or lack of) and wildlife can equally have a negative impact on participants. These findings and the supporting literature indicate urban planners should promote the presence of a variety of natural features in green spaces, which will encourage species richness and benefit the well-being of visitors.

Lastly, incivilities in the park, including litter, glass, graffiti and vandalism were disliked by participants. In the low-quality park, there were concerns for the concentration of litter in the pond; in the high-quality park litter appeared to be less of a problem, although non-users continued to see it as an issue. Previous studies have also concluded there was a universal preference for natural features and a concern for cleanliness and maintenance (Gobster, 2002; Özgüner, 2011).

These findings contribute to research that examines preferences for park features by ethnicity. For example, Ho (2005) found African Americans and Hispanics gave 'recreational facilities' the highest importance ratings, compared to Chinese, White and Japanese participants who gave the lowest importance score. White and Hispanic participants also gave greater importance to 'wildlife' than other ethnicities. In this instance, future work should be carried out to explore potential differences by ethnicity with a larger sample. The findings at present suggest there are few ethnic differences in preference, which challenges epidemiological work that has found ethnicity moderates the relationship between green space and health outcomes (Dadvand et al., 2014; McEachan et al., 2015).

4.4.2 Interaction of park features with the individual and social environment

Our study revealed that the primary pattern of use for both parks was visiting with others, such as family or friends, and typical activities for users and infrequent ‘non-users’ were walking (or dog-walking) and letting their children enjoy the playground equipment. This is in line with current understanding of how parks are most often used in the UK (Natural England, 2017a). Other activities mentioned were picnicking, exercise, and taking part in an organised group (e.g. ‘Friends’ group, parenting group). All participants indicated that it was rare for them to use the parks alone, if at all. This goes against the findings of Tinsley, Tinsley, and Croskeys (2002), who showed White participants were more likely to visit their park alone than Asian participants. Tinsley et al. (2002) explain this may be due to more collectivist traditions in Asian culture. The small number of participants in this study may not allow for these patterns to emerge.

A number of aspects in the social environment impacted personal pattern of use and the view of park features. The potential to experience anti-social behaviour in the park, the lack of perceived park users in their social network, and the perceived lack of use of the park by the community as a whole were all associated with non-use or infrequent use in participants, and may contribute to a fear or unease of visiting alone. These reasons were all connected to a feeling of personal safety when in the park. This concern has been identified as a deterrent for use in a number of studies, particularly in relation to single women in a park (Bedimo-Rung et al., 2005; Wilbur, Chandler, Dancy, Choi, & Plonczynski, 2002).

On the other hand, seeing other people in the park making use of the facilities and amenities present was encouraging for participants. Krenichyn (2004) concluded that for women in the US, parks were ‘socially intimate’ places, and activities were enriched by the presence of others. Non-users lamented the lack of activity groups available to them in the park, citing this as a possible solution to get them using it. In this way, it

was not always the physical state of park features that led to them being liked or disliked, but how they were engaged with.

4.4.3 Strengths and limitations

The study had a number of strengths including (1) the recruitment of a multicultural sample from a highly deprived area and (2) the use of the walk-along methodology.

The inclusion of White and South Asian adults is novel and addresses the limitations of current research. A further strength is the use of walkalong interviews in data collection.

The opportunity for the participant to walk in their own local park provides greater ecological validity than a traditional interview. Cauwenberg et al. (2012) describe the “three-way interaction between place, researcher and participant” when using this methodology, which reveals themes that may not otherwise emerge in a traditional interview.

In terms of limitations, the findings reported here are based on interviews with adults only: children were not included. All participants were parents and had visited the park with their children, and this is a common activity for the wider population. It is possible that children have a different perspective on the features in a park and this has been missed, however research with adolescents has shown similar preferences to those presented here (Ries et al., 2008). A child’s use of a park is likely determined by their parent or guardian, but future research might consider inclusion of a range of age groups in order to capture a representative sample of the community as a whole.

A final limitation of the study is that the interviews were only conducted in good weather. Preferences toward park features may be different in poor weather. However, participants did speak about park features in different weather conditions and across seasons without prompting, e.g. when it rains the football pitch in the low-quality park

becomes muddy, and the playground surface becomes slippery when wet. Therefore, it is not believed this impacted too much on the findings.

4.4.4 Implications

There are a number of implications from this study in terms of urban planning and policy. Within the park environment, reasonable maintenance of age-appropriate and well-sized park features such as playground equipment and sport facilities are important, as well as removal of incivilities such as litter and graffiti. The study demonstrated the physical and social environment also interacted to shape preferences for park features. In designing an intervention to promote use, it is key that the community is involved, as they will have local knowledge of the unique social context. In addition, community or group-based initiatives as well as an environmental intervention may be more effective in promoting use than an environmental intervention alone. For example, events in the park might increase perceptions that it is widely used by the community, a perception that is not currently held by non-users in this sample. Alternatively, non-users expressed a desire to visit the park as a group, and so frequent activity groups might also encourage use.

4.5 Concluding Comments

The findings of this study demonstrate the inextricable nature of the physical and social environments that work to shape preferences for park features. There were also some differences observed between frequent and infrequent users. It is therefore concluded that interventions to promote park use should be designed with input from the community, including users and non-users, and aim to modify the social environment as well as the physical features.

Chapter 5 Evaluating the Early Stages of a Co-design Process to Develop an Environmental Intervention in a Green Space

5.1 Introduction

5.1.1 Background

It was concluded in the previous chapter that the physical and social environment of a park work together to shape preferences for its features. It was recommended that communities are involved in designing interventions to improve local parks, in order to capture local knowledge and maximise the acceptability of developed solutions. In Chapter 2, 12 of the 16 studies included in the systematic review involved the community in designing the environmental interventions that were delivered. Of the 120 green spaces that these studies covered, 109 experienced an increase in use following the intervention. Half of the developed interventions in the studies that did not involve the community experienced a decrease in use. Together these chapters demonstrate the importance of co-designing environmental interventions.

The importance of community input in intervention development has been recognised at both the national and international level. Guidance from NICE recommends that “local communities, community and voluntary sector organisations and statutory services work together to plan, design, develop, deliver and evaluate health and well-being initiatives” (p6, NICE, 2016), which includes all programmes, activities and research that aim to improve health and well-being. In addition, a review into evaluations of interventions designed to change behaviour specifically in the health, transport and environment sectors concluded interventions that adopted a participatory approach, whereby participants were involved in the process of intervention design, were more effective than those that did not (Morris, Marzano, Dandy, & O’Brien, 2012).

At an international level, the WHO has reflected the recognition of the importance of community participation in one of their key recommendations in a review specifically of urban green space interventions:

“Urban green space interventions need to be planned and designed with the local community and the intended green space users. This will ensure the derivation of benefits for the local residents and will aid the delivery of interventions that serve the needs of the community - especially in deprived areas” (p5, WHO, 2017).

Altogether, the evidence demonstrates that community participation is important in designing and delivering effective interventions to promote health, and this is being recognised in guidance provided for researchers and organisations. It generates community ownership and support, and ensures potential conflicts can be identified and mitigating measures can be implemented early on.

However, at present there are few evaluations of community participation in designing interventions in open space. Pawlowski et al. (2017) outline three reasons to explain this limited knowledge: developing change in public open space is time-consuming, expensive and complex; it involves many participants from different sectors working together; and evaluation often requires study designs and methodologies that are innovative in order to meet this complexity (see Veitch et al., 2017). For these reasons, guidance on how best to engage the community in environmental intervention design and delivery is currently limited.

The need for evaluations of participatory approaches in this field in the UK is growing. Due to park budget and staffing level cuts, communities are now increasingly asked to help both in the design and the ongoing maintenance of their local green spaces.

According to the State of UK Public Parks most recent report, 78% of park friends and

user groups contribute to maintenance activities. Furthermore, 30% of councils stated they were considering transferring management of parks to community groups (Heritage Lottery Fund, 2016). In this way, there is a growing trend towards community involvement in a range of park activities, and evidence is needed to ensure this is performed effectively.

In summary, there is currently a lack of research that evaluates the co-design of environmental interventions with the community. There is growing demand for this research from national and international bodies and this gap must be addressed.

5.1.2 Research context

5.1.2.1 Better Start Bradford

As discussed in Chapter 1, this thesis is aligned with the Better Start Bradford (BSB) programme. BSB is a Big Lottery funded programme that aims to improve the health and well-being of 0-3 year olds in three of the most deprived wards of Bradford (Bradford Moor, Little Horton and Bowling and Barkerend).

Better Place, one of the workstreams for BSB, aims to deliver environmental changes within the three chosen wards. The theme was prompted by community desire to improve their local environment and furthermore, central to this theme is the co-design of these interventions with the community. Through collaboration with Better Place there was therefore an opportunity to evaluate a pilot co-design process. An independent organisation was appointed to deliver the interventions for Better Place from September 2017 onwards, therefore due to time and resource constraints, it was not possible to complete the full co-design process. The scope of this study then covers identifying and refining the priorities for improvement only. An outline of the approach taken is described fully in section 5.2.

The evaluation provides important, direct evidence for Better Place when co-designing environmental interventions with the community in the future. The findings and experience from this research will also be valuable to other programmes that are looking to co-design environmental changes within deprived and ethnically diverse communities.

5.1.2.2 Experience-based co-design

One approach to participatory design that Better Place was interested in developing was ‘experience-based co-design’ (EBCD) (Bate & Robert, 2006). This approach was designed in healthcare settings to allow patients and staff to work together to identify and implement quality improvements. It first involves a local diagnostic phase, in which participants are interviewed on their experience in the care pathway, and then key points, or ‘touch points’, within the interview are highlighted. Films comprised of these touch points are created, and are used to stimulate discussion with patients and staff, separately and then jointly. The key priorities for improvement are identified within the groups and then solutions to these issues are sought with input from all participants.

Further to this, the approach has been adapted to produce ‘accelerated experience-based co-design’ (AEBCD) (Locock et al., 2014). AEBCD uses video and audio archive footage of patient narratives in place of the interviews with patients to develop service improvements. This results in a reduced time frame (from 12 months to 6 for the development process), and so allows for more pathways to be studied in the available time. These two related approaches served as inspiration for the bespoke approach that was developed for this study. The AEBCD has never been used within this setting, but was deemed relevant for a number of reasons: (1) it uses a structured approach that can be repeated, (2) it captures the views of service users and service providers, and

represents these equally and (3) the approach is evidence-based. Therefore this method was chosen for adaptation.

The key difference in this application of AEBCD was that rather than using video or audio footage from an archive, or producing a film, still photographs of the study park were used and quotes from residents to stimulate discussion. This was done for two main reasons: the archival footage is not applicable to this study, and time and resources were too limited to produce films of touchpoints. The use of these materials is warranted as previous research has indicated that photographs can be a powerful tool in research (Harper, 2002), and furthermore, the use of national or local narratives are the foundation of EBCD and AEBCD. In the AEBCD report, Locock et al. (2014) state “narrative and stories, oral or written, are far and away the most powerful and natural way of accessing human experience” (p3). They go on to say that despite accounts of an experience being subjective, they can reveal issues and priorities that would not otherwise occur to those offering the service.

5.1.2.3 Setting

The green space chosen to be the subject of the co-design discussions was a park located in the ward of Bradford Moor, and therefore within the BSB area. Approval for this setting for the study was given by the Better Place theme group. The park was previously identified as the ‘low-quality park’ in Chapter 4, having also been audited for quality in Chapter 3. A full description of the park and the ward is given in section 4.2.3 of this thesis.

5.1.3 Aim and Research Questions

The aim of the study is to describe and evaluate the early stages of the co-design of an environmental intervention in a green space in a deprived ward in Bradford. In doing so, the following research questions were formulated:

- 1) Can the AEBCD approach to co-design be adapted for use in the development of an environmental intervention?
- 2) What are the implications of using photographs and quotes in this context?
- 3) Do participants find the adapted approach acceptable?

5.2 Method

5.2.1 Design

This pilot study involved both the co-design process and an evaluation. The proposed design of the approach was presented by the researcher at a Better Place theme group meeting, and approval was given by the group. Table 5.1 presents the stages of the adapted approach compared with the AEBCD approach, and the stages are discussed in more detail below.

Table 5.1 Stages of AEBCD and the adapted approach

AEBCD Stage	Description	Adapted Stage	Description
Secondary analysis of narrative interviews from the online archive	Secondary analysis of the relevant archive film is undertaken to identify key ‘touch points’ along the relevant care pathway.	Identify setting and conduct observations	Aim: To build a comprehensive overview of the state of the park and its place in the community
			Description: This stage has been achieved previously within the context of this thesis. A quality audit of the park was done as part of data collection for Chapter 3, and semi-structured interviews were conducted in the park that contributed data for Chapter 4.
Creation of trigger films	Trigger films are created that feature the identified touch points. There is a balance between both positive and negative experiences.	Collate stimuli material	Aim: To gather material that can be used to stimulate discussion in meetings in stages 3-5
			Description: Photographs of the park features, plus quotes from the previous interviews were collated to use as stimuli material.
Discovery and engagement work with staff, including staff feedback	Participant observation and one-to-one interviews are carried out with staff to learn about their experience in the relevant care pathway. Findings from this are presented at a staff feedback meeting. Staff priorities for improvement are agreed.	Stakeholder meeting	Aim: To discuss and prioritise issues for change in the selected park according to local stakeholders
			Description: The stimuli material was presented at a meeting of local stakeholders and they were asked to discuss the issues in the park. These were prioritised using a voting system.

Focus group workshop with local patients and carers	Patients and carers take part in a focus group workshop. Participants watch the trigger film and an emotional mapping exercise is completed to reflect their experiences, or may offer their own issues. They are then asked to vote for their priorities for improvement.	4. Resident meeting	Aim: To discuss and prioritise issues for change in the park according to local residents
			Residents were invited to a meeting to discuss the issues in the selected park. The stimuli material was presented at this meeting, and residents were asked to complete a similar exercise whereby they wrote down how they felt about the stimuli. Issues were then discussed and prioritised through a vote.
Co-design workshop of staff, patients and carers	Staff, patients and carers are invited to a joint meeting where their experiences can be shared. The trigger film is shown again. Respective priorities for improvement are shared and it is agreed which of these could be worked on in a co-design sub-group.	5. Joint meeting	Aim: To reach an agreement between stakeholders and residents on priorities for change in the selected park
			Stakeholders and residents were invited to a joint meeting. Priorities for improvement from previous meetings were presented and stimuli material provided again. The priorities for improvement were discussed and agreed jointly as a group.
Co-design subgroups of staff, patients and carers & final event	Subgroups of patients, staff and carers work together to respond to the agreed priorities for improvement by planning and implementing changes. Interventions are designed collaboratively by patients and staff with support from facilitators.	<i>Not within scope of the pilot</i>	N/A
Final event	Participants meet again to review and celebrate their achievements, and plan future joint work.	<i>Not within scope of the pilot</i>	N/A

5.2.1.1 Co-design approach

The adapted approach is described in more detail below.

Identify setting and conduct observations

The setting chosen for the pilot was a park in Bradford Moor ward. Extensive previous research has been carried out in the selected park insofar as it was audited for quality in Chapter 3, and it was the ‘low-quality’ site in which 8 interviews were carried out for Chapter 4. Further detail on the park is provided in Chapter 4.

Arrange stimuli material

Photographs of the park and quotes from interviews conducted for Chapter 4 were used to stimulate discussion.

Photographs were taken a few days prior to the stakeholder meeting (discussed in next section) to ensure they were up-to-date. Photographs were taken on a clear, sunny day, and park features identified in the audit and in the interviews were photographed. Similarly, interview quotes were selected on the basis that they represented common themes identified in Chapter 4 (see Appendix D for example photographs and quotes used).

Stakeholder meeting

Local stakeholders were invited to a meeting by the researcher. Stakeholders were defined as those involved in the maintenance or planning for the park, either at the local or district level. The aim of the meeting was to discuss and then prioritise the issues for change in the park. The researcher led the meeting and facilitated discussion, while another member of the research team acted as an observer and wrote the issues being discussed on a whiteboard visible to everyone present. All

stakeholders were given stickers to place next to their top five most important issues on the whiteboard. Issues that received no stickers were removed. A further vote was intended for the issues with most votes to narrow these down to five, however, as is described further in the results, discussion started organically in the meeting between participants to group similar issues. A consensus was reached via discussion on four overarching issues that covered all the issues that had remained after the initial vote (i.e. did not include issues with no votes).

Residents' meeting

Next, residents who lived close to the park were invited to a meeting with the aim of establishing the issues in the park from the residents' perspective. In this meeting, the participants were presented with the stimuli material and completed a similar exercise to the equivalent in EBCD, whereby patients first reflect on the emotional impact of touch points. Here, residents were similarly asked to write how they felt about the stimuli on a whiteboard. This was followed by a discussion of the issues. The researcher led the meeting and acted as facilitator. A member of the research team was present in the meeting to write the issues on a whiteboard. The issues were voted on using five stickers as above, which made the five top issues apparent.

Joint meeting

Lastly, the stakeholders and residents met together in a joint meeting. The aim of the meeting was to present the priorities of the stakeholder and resident meetings to the group and then jointly identify priorities for change in the park. The stimuli material was provided again to stimulate discussion, and the issues were noted by the notetaker while the researcher led the discussion. Five overarching issues had been produced in the discussion, and it was agreed by all that these would remain the top

priorities. Otherwise, a voting system to reduce the number of issues would have been carried out.

5.2.2 Participants

14 people were contacted in total to participate in the stakeholder meeting. Members of the local council, school representatives, ward officers, councillors, police and fire services, as well as Better Place, were contacted.

Participants who completed an interview as part of Chapter 4 were approached to join the residents meeting; they were also asked to approach any potentially interested family or friends. Participants who completed a consultation survey for a separate piece of research for BSB and had consented to being contacted for future research were also invited. In total, 10 people were contacted.

For the joint meeting, attendees of both previous meetings were contacted again, minus one resident who did not provide contact details (n=16).

5.2.3 Setting

The venue chosen for each of the meetings was a community centre located in the Bradford Moor ward. It is a commonly-used meeting place in the community, it is easy to access for all parties, and it is nearby to the park.

5.2.4 Evaluation

The evaluation made use of two sources of data: questionnaires and observation.

5.2.4.1 Questionnaire

A feedback questionnaire was distributed at the end of each meeting (see Appendix E for all questionnaires). Questions were informed by the questionnaires used in the AEBCD evaluation (Locock et al., 2014). The questionnaires included questions on

the effectiveness of the photographs and quotes, the experience of engaging with other participants, and participation in the meeting. Questionnaires were given to all participants at the end of each meeting. Five of the seven stakeholders completed a questionnaire. Two participants left the meeting early and were emailed a questionnaire and sent a reminder, but were not returned. All residents at the second meeting were given a questionnaire, but two completed as a pair, leaving 8 responses in total. All participants at the joint meeting (n= 6) completed the questionnaire.

5.2.4.2 Observation

A record was made of all priorities that were discussed, and the results of the voting, for each meeting. Observational notes were kept by the observer and researcher during each meeting, and additional observations were noted by the researcher retrospectively.

5.2.5 Ethics

Completion of the Health Research Authority checklist from the NHS confirmed that this pilot did not require ethical approval (see Appendix F). An outline of the process was seen by the Programme Manager of the BSB Innovation Hub, which aims to evaluate the interventions that are being delivered by BSB. The pilot was understood to represent service design and improvement, as the evaluation will be made available to Better Place to inform future co-design processes.

5.3 Results

In this section, the priorities from each meeting are described and then an evaluation of the process based on the questionnaire responses and observations is presented.

5.3.1 Stakeholder meeting

Seven stakeholders attended the meeting (14 invited, 5 gave no response and 2 were unable to make the allotted time). There were 3 men and 4 women present.

Attendees were from: Better Place, Bradford Fire Station, Bradford East Area Neighbourhood Team (represented by a local Police Community Support Officer), the Bradford Metropolitan District Council (BMDC) Parks and Countryside Service, and The Anchor Project (an organisation that runs activities in the park).

5.3.1.1 Priorities

The stakeholder meeting was held in May 2017. The aim was to discuss and prioritise issues for change in the selected park according to local stakeholders. The meeting began with a welcome and introduction, and the stimuli material was presented. There was then a broad discussion of all issues stakeholders felt were present in the park. These were recorded on a whiteboard by the notetaker.

Table 5.2 Stakeholder meeting: all issues

Gangs	Horses in park
Park use – how busy	Lack of facilities for very small children
Safety at night	Small play area
Safety in day	Worn play equipment
Security of park – low wall for young children	Large tarmacked area – used for fairs – could have other uses
No flowers	Empty lodge
Busy road	Feels old fashioned
Lack of railings	No wildlife area
Access for quadbikes	Natural – could be more landscape
Pond area not in good condition	Sustainability of changes – who will maintain
Litter	Anti-social behaviour in parks
Damage to park furniture	Feels intimidated by large groups
Damage to play equipment	Children falling into pond
Canadian geese	Scared of dogs
Vandalism	Looks neglected – limited money and manpower for upkeep

The issues from the stakeholders covered a range of problems, from the lack of and quality of the various recreational facilities, a number of safety issues (both structural and issue relating to a feeling of personal safety), animals (dogs, horses, geese) in the park, and the lack of or poor maintenance of natural features in the park. There was a particular focus on children in terms of facilities for them and their safety. Stakeholders also highlighted the lack of resources for upkeep of the park, and how the park will be maintained in the future.

Following this discussion all participants were given 5 stickers and were asked to place them next to the five issues they regarded as most important. 16 issues had stickers placed next to them, from the original list of 30.

A second round of voting with fewer stickers was intended in order to reduce the number of issues further, but before this it was pointed out by a number of participants that several issues were similar to each other and they wanted to group these together before voting. This was put to the group and agreed, and so further discussions were had. The results of this are shown in Table 5.3. The process to reach the overarching issues was relatively short – ‘anti-social behaviour’, ‘naturalness/aesthetics’ and ‘vandalism and damage to equipment’ were easily designated as overarching issues, and all participants agreed to the contributory issues. ‘Community sustainability’ was more difficult to resolve as one participant felt that the ‘empty lodge’ was a separate issue. This required more discussion between the group, however the case was made that the lodge represented a potential opportunity to host community groups or events and so was related to ‘community sustainability’. Consensus was reached so that eight issues in total remained to be voted on.

Table 5.3 Grouping of stakeholder issues

List of issues	Issues absorbed
Anti-social behaviour	Gangs, anti-social behaviour, feel intimidated by large groups
Naturalness/aesthetics	Natural – could be more landscape, no flowers, park use – how busy?
Vandalism and damage to equipment	Damage to park furniture, damage to play equipment, vandalism, worn play equipment)
Community sustainability	Sustainability of changes, ‘Friends’ group, lodge empty
Children falling in pond	
Security of park	
Quad bikes	
Litter	

A second round of voting was then carried out; ‘children falling in pond’ and ‘security of park’ received the fewest votes (one each), leaving six priorities for change. Again it was pointed out following the vote that two issues – ‘community sustainability’ and ‘anti-social behaviour’ were connected, and that ‘quad bikes’ were a form of anti-social behaviour, and so there was a desire to merge these. There was no specific number of issues to be prioritised, but guidance from AEBCD suggests four or five. The researcher ensured everyone agreed to this, and then the four issues were confirmed. Therefore the issues prioritised in the stakeholder meeting were:

- (1) Community ownership to maintain and tackle antisocial behaviour (including quad bikes)
- (2) Vandalism and damage to equipment
- (3) Naturalness/ aesthetics
- (4) Litter

5.3.1.2 Evaluation of meeting

Overall the response to the first meeting with stakeholders was positive. When asked, *‘What are your overall impressions and feelings about the meeting today?’*, all five answered ‘Good’. The meeting was praised for *‘good discussions on various issues in the area and park’*, however one participant commented that the meeting was *‘very quiet, need more people, more voices’*.

On the other hand, when asked *‘Is there anything else that you would like to add about any aspects of this project so far’*, the two participants responded:

“Good to see fire and PCSO [Police Community Support Officer] at meeting to get a range of views and real evidence of what does and does not happen in the park which can help to settle people’s fears or (mis)perceptions.”

“An interesting and useful experience – helpful to have the input from PCSO and fire service.”

Participants appeared positive about the presence of different voices at the meeting, particularly those that could provide reports of incidents in the park and the local area. This was evidently considered important and useful for stakeholders in making decisions on areas to address.

In terms of the stimuli material, when asked how they felt about the use of photographs and quotes, one participant rated the materials as ‘Excellent’ and four ‘Good’. One participant also commented that *‘real issues which affect our community can be seen on these photos and statements’*. The materials provided context that they may not be exposed to day-to-day in their professional roles. In this way the stimuli material were viewed positively by stakeholders.

When asked if they thought the priorities agreed on reflected their own experience with the park, all five respondents marked ‘Yes’, and when asked how they would like to see the park change, the responses reflected the priorities, for example:

“Fundamentally helpful if a Friends group could get interested parties to help to look after the place.”

“I think it just needs rejuvenating. Damaged furniture needs replacing. Preventative measures put in place to stop quads accessing the park.”

“Investment that enables communities to be engaged with the development of the park to reflect their preferences/ ideas.”

The stakeholders’ suggestions of further community engagement and replacement of damaged equipment is in line with the priorities that were decided on.

The final question on the feedback form asked participants what could be improved if the meeting were run again. One participant praised the meeting for being ‘*well-organised*’. One participant commented on the structure of the meeting and another on clarity with voting:

“What about solutions? I’d structure differently – 1. Problem analysis 2. Ideas (without constraints) 3. Possible solutions (with constraints e.g. time, cost etc)”

“Clarity on voting – but as it was a first meeting understandable this is in development/ ideas stage”

These two comments indicate the need to clearly explain the co-design process to everyone present; the structure of the process was explained prior to the meetings and at the start of each one, but may need reiterating to ensure everyone understands. The voting system was adapted during the meeting to meet the desires

of the participants - it will be important for Better Place in future to be flexible to the situation at each meeting that is held.

5.3.1.3 Additional observations

There were three key observations from this meeting: its formal procedure, communication during the meeting and the handling of stimuli materials.

First, it was recognised by the researcher that the stakeholder meeting was fairly professional in its organisation and procedure. Attendees at the stakeholder meeting were all initially contacted by email as the standard method of contact for professionals. All stakeholders who confirmed attendance also attended the meeting. This may be because it is seen as unprofessional to forget or miss a booked appointment. Moreover, there were several comments when organising the meeting that the time and date needed to be arranged well in advance, as attendees had busy work schedules. Three stakeholders also could only attend half of the meeting as they had other work commitments overlapping. The observed expected professionalism was further exemplified by the fact that two stakeholders at the first meeting came with prepared materials on their involvement with the park, and one enquired in an email exchange about an agenda for the meeting.

In terms of communication during the meeting, stakeholders took it in turns to speak, typical of a 'professional' meeting. Conversation was slightly more weighted to people who may be more confident naturally, but also a number of the attendees knew each other in a professional capacity already. This was useful for facilitating discussion between them and made them feel more comfortable in speaking, but this might have additionally portrayed a 'closed' environment to other stakeholders that were present.

Lastly, referring to the stimuli materials, it was observed that one stakeholder commented on the lack of people in the photographs that were provided. The photographs were taken early on a Saturday morning, in good weather, although there were a few people present at the time. This also might be something to consider in future co-design processes, as the lack of people in pictures may portray the park as not well used and this may bias some discussions, whether this is accurate or not.

5.3.2 Residents' meeting

Nine participants attended the meeting. Ten were invited; five were not able to come or did not respond to the invitation. Of the five who confirmed attendance, four came to the meeting, and an additional five arrived at the meeting on the day having not been contacted by the researcher but instead knew others who had been invited. All but one participant were South Asian, however, it should be noted the White participant is Muslim and heavily involved in the South Asian community. Participants were all women aged 25-40 with children of primary school age (one acted as carer to a grandchild of this age).

5.3.2.1 Priorities

The residents' meeting was held in June 2017. The aim of the meeting was to discuss and prioritise issues for change in the selected park according to local residents. Following an examination of the stimuli material and a short 'emotional mapping' exercise to share experiences, residents discussed all the issues present in the park for them. The notetaker at the meeting listed these on a whiteboard (see Table 5.4).

Table 5.4 Residents' meeting: all issues

Not valued if it looks unkempt	Looks unloved
Picnic bench gone – litter there now	Miss greenhouse
Quadbikes and motorbikes – ruin grass	Tarmac – wasted area
Second rate	Tennis court
Playground surface – coming up, slippery, phoned council – algae	Creativeness good – e.g. crates for cricket but left after
People and how they treat it	Wardens not there now
Lots of people – rubbish	Dog poo – maybe not as bad as others
Lost the tuck shop	Dog off lead – up a slide
Fair nice but then concrete area not used	Litter after events
Pond – green, don't like to walk round it, go outside and avoid, no shortcuts	Teenagers don't like problems there – unsafe – swear and bullied by older and younger kids
Caravans via entrance to lodge – same entrance to burn car, open it sometimes	Silverhill Drive – dealing drugs
Cleaners don't come enough – asked them and they said only 1x week should be everyday – would make a difference	

Residents often described the general level of maintenance in the park – ‘unloved’, ‘second rate’, ‘not valued’ – and also spoke about various things that had been lost from the park over time, for example, picnic benches, the greenhouse, the tuck shop, wardens and frequency of cleaners. Similar issues to the stakeholders were listed also: natural features were mentioned with reference to the pond, and issues with anti-social behaviour e.g. drugs, swearing and bullying, and how people ‘treat’ the park.

Similar to the stakeholder meeting, it was again suggested by participants that some issues were very similar and so it was requested that the issues were grouped. There was further discussion within the group about which issues were connected and

could be merged. This was an easy procedure to carry out and was led by the researcher. The researcher ensured everyone in the group agreed with the final result of the discussion before voting took place. There were then 13 issues for participants to vote on. Participants were given five stickers as per the previous meeting that they were asked to place next to their top five most important issues to be addressed. One person only voted four times – it is assumed this was a miscounting mistake on their part. The result of the vote is shown in Table 5.5.

Table 5.5 Result of residents' vote

Issues	Votes
Litter	9
Playground equipment	8
Maintenance	8
More places to play/ things to do	7
Pond	6
Dog poo	3
Teenagers	1
Burning things	1
Playground surface	1
Dogs off leads	0
Safety/ crime	0
More events	0
Quadbikes	0

Following the vote, residents who had voted for ‘dog poo’, and ‘playground surface’ commented that these were actually related to ‘maintenance’ (8 votes). The

participants who voted for ‘teenagers’ and ‘burning things’ also stated they felt other issues were more important. Therefore, the residents decided not to vote again after this and agreed to maintain the top five from this vote.

5.3.2.2 Evaluation of meeting

Five respondents rated their overall impression and feelings about the meeting as ‘Excellent’ and three rated it as ‘Good’. When asked if the stimuli material represented how the park is viewed in the community, six participants responded ‘Excellent’, one ‘Good’ and one ‘Average’. No additional comments were provided from residents in terms of overall impressions or the materials. When asked about the ‘emotional mapping’ exercise to initially reflect on and share experiences, four rated it as ‘Excellent’, three as ‘Good’, and there was one with no response.

In relation to the priorities, all participants commented that they agreed they reflected their own experience of the park, for example:

“Yes definitely. If everybody sees the things in the line of positive it would make a lot better and safe place, with friendly environment”

However, one participant commented it was *“good to discuss issues but feels like it would be good to follow up with something constructive.”* Furthermore, residents were asked, *“Reflecting on the issues today, how would you like to see the park change?”* All suggested changes were structural, for example, new equipment or improved quality, improvements to the landscaping and pond, and litter and rubbish. This is in line with the priorities that were set at the meeting. There was a focus particularly on the playground equipment for children – five of the six that left a response for this question referred to it. For example, *“Park, children’s area,*

surface of playground, dog poo, litter and rubbish”, “Less litter. Clean pond. Maintenance of playground equipment”.

One encouraging aspect of this meeting was the feedback in terms of meeting other residents and having a discussion about the park with others. When asked, *‘How did it feel to meet other residents and talk about your experiences?’*, six respondents rated it as ‘Excellent’ and two as ‘Good’. Two further comments related to this were left on the feedback form when asked if there was anything else they wanted to add:

“I really enjoyed talking to people and meeting people who think like me”

“Was great to get together with other ladies and make new friends :)”

This was an unexpected but encouraging outcome of the meeting: attendees were able to connect with others and discuss a topic that was common to everyone, with one specifically saying she enjoyed meeting others that *‘think like me’*. The social interaction between community members may be valuable in future meetings to build a sense of ownership as a group over the co-design, thus contributing to the sustainability of the process.

Lastly, when participants were asked if the meeting could be improved at all, one answered, *“It depends what improvement has taken place”*, and another answered, *“More people representing different backgrounds.”* All but one participant was from a South Asian background, and most were observing Ramadan at the time of the meeting. The one White resident was also a practising Muslim. Most also had young children, with several recognising each other from primary schools in the area. They were all women roughly mid-twenties to forties. In this way, the meeting attendees were not greatly diverse in their demographics. However, much of the area is South Asian and Muslim, and the target group for BSB is children aged 0-3 years, and so these participants, as parents or grandparents of young children, would fit in

the demographic Better Place would be interested in when repeating this process. Nevertheless, inviting more men and different age groups to the meeting might diversify the group while maintaining the interests of BSB.

5.3.2.3 Additional observations

The meeting with residents was quite a contrast to the first stakeholder meeting. Of those that were contacted by the researcher, most did not have an email address, and so they were phoned, or texted when they were not available. Furthermore, several participants were 'called in' by another participant at the start of the meeting. This represents a much more informal approach, where some participants were notified at the start of the meeting and arrived 10-15 minutes later, and most communication from the researcher was done via phone or text. This is evidently very different to how the stakeholders approached the meeting.

Another difference was the dynamics of communication between participants during the meeting. In the residents' meeting, several conversations were often happening simultaneously, and the atmosphere was more 'chatty'. This was likely contributed to by the fact that it appeared everyone present either knew each other directly or through a friend, or recognised each other from where their children go to primary school. It was clear this helped a lot with making people feel comfortable speaking. The emotional mapping exercise was also effective in this way as it encouraged people to discuss their feelings about and experiences in the park first before moving on to discuss the issues. This was helpful in getting participants to share and connect with one another. In addition, one resident in particular appeared to know the majority of the other residents personally, and was enthusiastic for the co-design process. This eased the facilitation of the meeting somewhat, as she was eager to hear from everyone present, and often brought others into the conversation where

possible. Overall, her position in the social network of the group and her enthusiasm contributed to the success of the meeting, and highlights the importance of having key contacts within the community that can encourage others to take part and to engage fully with the process.

In the same way that several stakeholders could only attend part of the meeting because of work commitments, several residents left early because of childcare commitments (the meeting finished at 3pm, when many children would be coming out of school). Moreover, two babies were also brought to the meeting.

In this way both parties had commitments outside of the meeting to manage, and the commitments were related to the ways in which participants approached the meeting. Where stakeholders had appointments booked weeks in advance and arrived at the stated time to meet their work schedule, residents had much more unpredictable schedules as they were looking after children and came if they were available at the time. Creche facilities or a playworker might be considered by Better Place in the future to accommodate participants bringing children to the meeting. If offered initially this also may encourage more people to come to the meeting and make them feel more comfortable.

5.3.3 Joint meeting

Six participants attended the joint meeting. All residents who attended were South Asian women, aged 25-40, with young children (n=3). Stakeholders present were from Better Place and BDMC Parks and Countryside Service (n=3).

5.3.3.1 Priorities

The joint meeting between stakeholders and residents was held in July 2017. The aim of the meeting was to reach an agreement between stakeholders and residents on the priorities for change in the park.

The meeting began with a welcome and introductions, and the researcher presented the priorities established at the previous meetings to the group. The issues spoken about in the joint meeting largely overlapped with those brought up in previous meetings, but there was a greater recognition of the wider context of the park in terms of council funding for parks and cuts to the budget. Issues were spoken about in more detail – the status of the lodge and who owned it, the maintenance schedule of natural features, and how the community could be more involved in the park. The issues were recorded by the notetaker, and then arranged into categories.

Participants agreed that the categories that had been organised were reflective of the key issues that were discussed, and so it was put to them to maintain these categories as the top five issues. All participants agreed. The issues (within the park) and the five priorities are shown in Table 5.6.

Table 5.6 Joint meeting: issues and priorities for change

‘Friends’ group and working together with council	Could resurrect it
	Funding & constitution
	Talk to lodge owners
	Bowlers present for couple hours on Saturdays
	Police do not go inside parks
	Get people’s confidence up
	Groups based in parks, not for surveillance – build ownership, for young people
	Volunteers – recognisable, to go to, different to wardens, presence

Lake	Litter trap Getting rid? Water play, natural lake, beach, 'bog' garden, ice skating Boat club kept it clean Funding
Lodge	Sold to next door restaurant Partner?
Play opportunities	Play for all ages and cricket nets Water play Slopes
Appearance	Dirty, can't walk round park Litter – overflowing after weekend or unused Victorian features gone Mowing regime, ecology, layers Natural stuff less easy to vandalise

The joint meeting collectively decided that greater community engagement from the council and possibly forming a 'Friends' group was the top priority for them.

Community engagement and ownership was also a key issue for stakeholders in their meeting and so this has carried forward. The lake, the lodge and the play opportunities were also jointly identified as areas to address. The pond was identified as a key issue in the residents' meeting and improving naturalness was also an issue for stakeholders. The lake became an independent issue from 'naturalness' in the park, as it was a particular eyesore for residents. The lodge was not identified as a standalone issue in the residents' or stakeholders' meetings however during discussions in the joint meeting it was seen as a key opportunity for community events, and there was a lot of discussion on who owned the property and what it was currently used for. The fourth issue identified was play opportunities –

both groups recognised in their separate meetings the importance of providing good quality play equipment that is of a good size and this was recognised again. The equipment is currently seen as lacking maintenance and too small for the local population, however, it was also understood that the parks and play budget for the council was very limited.

5.3.3.2 Evaluation of meeting

All attendees (n=6) completed an evaluation form. Participants were asked to give their overall impressions and feelings about talking about and sharing experiences with stakeholders and residents. Responses were positive from both groups – three residents rated their feelings as ‘Good’, one stakeholder marked ‘Good’ and the other two rated ‘Excellent’. A stakeholder commented that,

“The conversations were very useful and great to have local residents at the meeting. I think more would have been better and different age groups but still excellent discussion.”

Altogether the group appeared to view the meeting positively. Participants were more specifically asked for their impressions and feelings on *‘Discussing and deciding with both stakeholders and residents the priorities for change’*. All participants responded with ‘Good’. An additional comment was left by a stakeholder:

“Again, very useful discussion but would have benefitted from more interaction e.g. using maps/ plans to prioritise – getting residents more involved in ‘physically’ prioritising.”

This suggests everyone was satisfied with the results of the discussion and outcome in terms of the top priorities. The comment from the stakeholder is interesting as

they are encouraging more input from residents in “*physically prioritising*”. This essentially reflects the top priority from both the stakeholder meeting and joint meeting – encouraging community involvement, possibly through resurrecting a previous Friends group and working together with the council. The comment also suggests other things that might be used as stimuli material. A similar comment was given when respondents were asked ‘*Did you feel comfortable taking part in the meeting and able to contribute your own thoughts and feelings?*’. A stakeholder commented that they ‘*would have preferred a bit more interactive material not just the quotes/same images as before*’. Moreover, in the feedback form, three stakeholders rated the stimuli material as ‘Good’, one resident rated it as ‘Excellent’ and two as ‘Good’. One further comment was added that the stimuli material provided ‘*interesting comments both positive and negative*’. Altogether, the stimuli material seems to have been well-received, and these comments provide useful feedback on how the stimuli material can be improved for the future.

When asked, ‘*What are your impressions of the outcome of the discussion of the next steps for the group?*’, responses were positive on the whole. One stakeholder rated it ‘Excellent’, two rated it as ‘Good’, and then two residents rated it ‘Good’ and one rated it as ‘Average’. A stakeholder commented that it was a ‘*good effort to try and progress some positive action*’, and another commented saying ‘*it would be good to get more community engagement*’. This reiterates again how it was felt that community engagement was key in improving the park, and this was particularly felt by stakeholders, possibly because they were more aware of the budget cuts that were affecting the public sector in which several worked.

A resident also expressed, ‘*as there are no next steps it’s hard to know the value of the discussions*’. It was not possible within the study to act on the issues that had

been spoken about. This was made clear throughout the process and was managed as best as possible through information sheets and informed consent, but nevertheless may have affected the enthusiasm that residents might otherwise feel for taking part in a co-design process. This was highlighted again when participants were asked, *'What could be improved if the meeting was run again?'*, when one respondent also commented, *'like to see changes in the park'*. Two residents left additional comments regarding the number of other residents that were present at the meeting:

"More residents – better representation of the people living in the area."

"Tell more people to come and discuss about the issues."

Three residents who had confirmed attendance to the joint meeting did not come, and so only a relatively small group of residents (compared to nine at their meeting) were present. This is likely to have impacted on how those who did attend felt about the joint meeting.

5.3.3.3 Additional observations

One action in organising the joint meeting showed how the stakeholders understood meetings as a 'formal' process. A stakeholder who had previously attended the first meeting was not able to come, but instead sent a colleague in their place. On the other hand, three residents who had confirmed they would attend did not arrive, with no explanation given. This contrasting action shows how expectations and perception of the meeting were different between the groups.

In terms of communication, conversation returned to a more formal style, where people took it in turns to speak. Communication in the joint meeting was weighted towards the stakeholders. This may be explained by the fact stakeholders are more used to speaking within a group meeting and are more confident in their actions. The

stakeholder who had come in the place of a colleague spoke a lot, perhaps because he was a 'new' voice, but also, he offered information on how the park was currently managed, and was able to answer a lot of questions from other participants. Similarly to the information provided from the police and fire services, the objective information on issues was seen as valuable by stakeholders and residents alike.

It was observed that residents were relatively quiet compared to stakeholders. The residents did speak more during a discussion on next steps for the process. They may have felt this was more relevant to them going forward and were interested in future developments. This is reminiscent of a comment left in the feedback questionnaire from the residents' meeting, where one respondent expressed an interest in 'something constructive' being produced from this process.

Nevertheless, it was observed during the meeting that the group progressed from talking about the issues to discussing potential solutions. It was encouraging to see collaboration between the groups. For example, during a discussion on the level of litter, a participant from the council explained the limited number of staff means it is hard complete even essential tasks such as collecting litter. A resident suggested the community could be involved with this and then park staff could dedicate their time to more skilled tasks that they are trained for. Residents were more empathetic to the situation when they listened to a council worker explaining the situation, and this stimulated conversation. To see this understanding and partnership between the groups demonstrates the utility and value of including both in the co-design process.

5.3.4 Summary of findings

5.3.4.1 Priorities

In terms of the application of AEBCD to this setting, the process was able to successfully produce a set of priorities for improvement in the selected park, based on meetings with local stakeholders and residents. The priorities determined separately by stakeholders and residents had some similarities, but also had some interesting differences. Stakeholders considered building community ownership a key priority. It was felt that if ownership of the park was increased within the community, then incidents of anti-social behaviour would reduce. In contrast, this was not considered a priority by residents (nor was it particularly discussed at their meeting). For residents, their concerns lay more in cleaning up the park, such as litter, the pond, and a general improvement in ‘maintenance’; improving the playground equipment and in increasing the number of activities in the park. Playground equipment was specifically mentioned by the residents group, possibly because this is a well-used feature in the park, but also because participants in the residents’ meeting all had young children or grandchildren. For residents, anti-social behaviour and vandalism were not big issues in the park, whereas these were highlighted by stakeholders in their list of priorities.

In the joint meeting, priorities were combined. Building community ownership, possibly through a ‘Friends’ group, was maintained as a priority from the stakeholder meeting. The lake, which residents had focussed on as a particular eyesore, was also kept as a top priority, as well as play opportunities as this was considered important for residents. Interestingly the lodge became a key priority at the joint meeting. The lodge was discussed at length in relation to who owned it, what the status of it was and how it could be incorporated into the park again

(previously the park warden's office). The final priority from the joint meeting was related to the general 'appearance' of the park, which was a broad priority covering naturalness, litter, maintenance and vandalism. A summary of the priorities is shown in Figure 5.1 below.

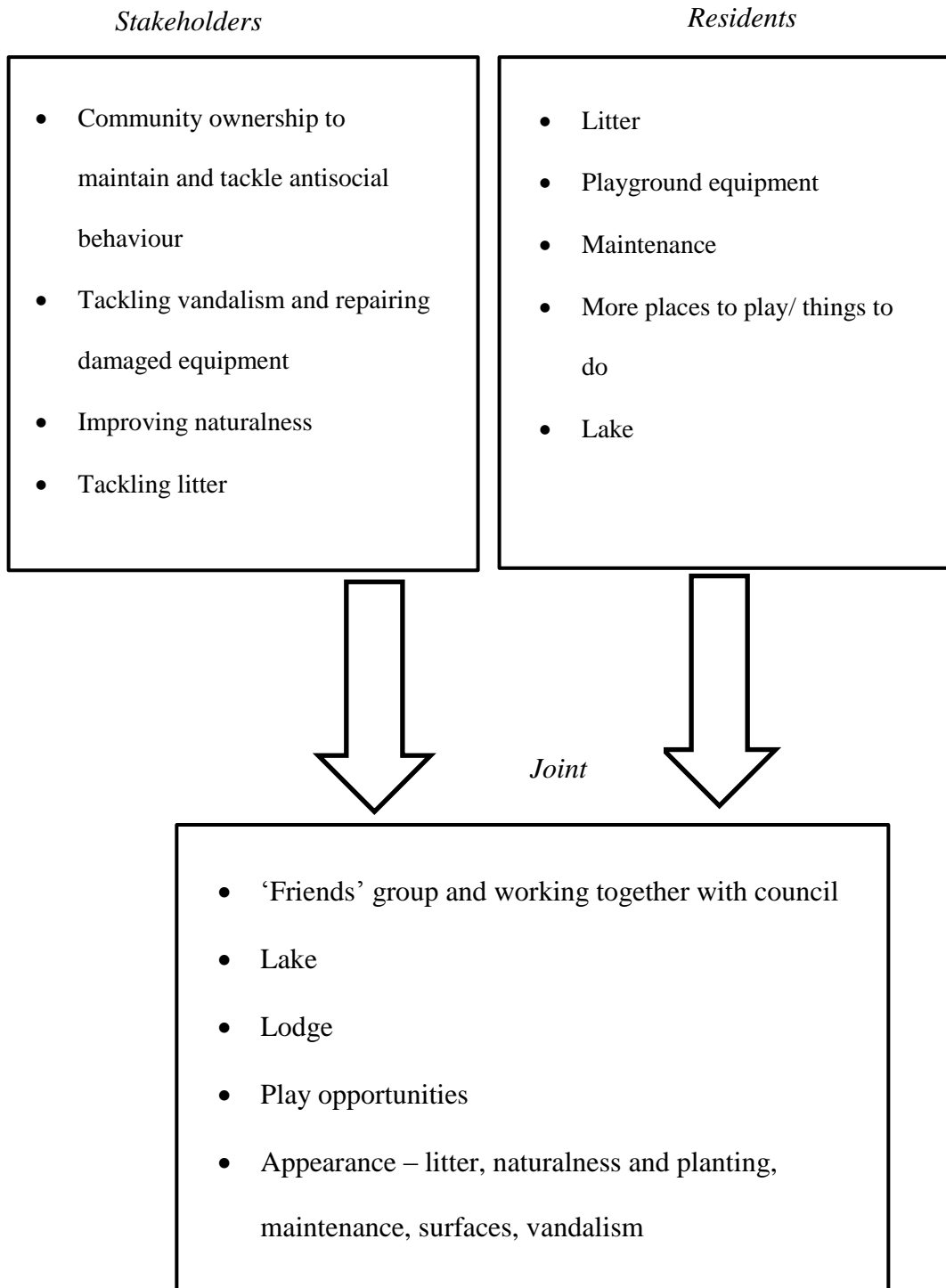


Figure 5.1 Summary of priorities

5.3.4.2 Questionnaire results and observations

In this pilot study, priorities for improvement were successfully identified, however, based on the feedback questionnaires and observations it is recommended that the need for flexibility is recognised, in order to ensure the success of applying this approach in this setting in future. There were clear differences between the groups that need to be managed. One such difference was the contrast between meetings in terms of a formal and informal approach. Where stakeholders preferred email, residents preferred phone or text. Where stakeholders needed advance notice of the meeting and were balancing work commitments, residents were happy to come to the meeting spontaneously on the day and had to balance childcare commitments (although this may be due to who was invited to the meeting). In terms of future co-design processes, it may be too much to ask of stakeholders to attend multiple meetings if they are stretched for time, and for residents, their schedule is not necessarily in their control. The meeting is not likely to be a high priority. For future co-design meetings, Better Place need to be aware of the incongruous expectations of the different groups in terms of correspondence, attendance and the expected standards of the meeting.

Another related difference was the variation in communication style during the meetings, and the differences in contribution in the joint meeting. This lends itself to the presence of an experienced facilitator in future co-design processes, who can ensure everyone is comfortable and balances the conversation between people wherever possible.

Stakeholders appeared to value having others present that could provide objective evidence of anti-social incidents in the park (although the number of incidents was actually very few). The presence of those who can provide data on safety and crime

in a park may be worthwhile in future meetings to ensure priorities are set with guidance from objective evidence, and may be particularly appreciated by stakeholders who might be more used to making decisions based on the data presented to them.

Residents on the other hand seemed to most enjoy meeting others in the community and bonding over their shared experiences at the park. Promoting the social aspects of the process may be key in encouraging attendance at meetings and building enthusiasm and ownership over it. In addition, it was noticed in the residents' meeting that having someone present from the community that knows the neighbourhood well and is enthusiastic about the process can be very beneficial. A key contact in the community who champions the project can be valuable in recruiting participants, encouraging interest and building ownership for the process.

In terms of the implications of using photographs and quotes, the materials were well-rated in the feedback questionnaires, and the researcher observed in each meeting that the photographs and quotes were referred to numerous times during discussions. When speaking about a particular feature, on a number of occasions the relevant picture was found and used as a tool to aid understanding. For example, when there was a discussion about the state of the lodge in the park, the photograph of it was pointed to and shown around to demonstrate where it was located in the park and the current condition of it. Furthermore, the quotes were also referred to when participants were speaking about certain issues, reflecting that the person who had given the quote had also spoken about the issue. For example, during a discussion on anti-social behaviour in the park, one participant referred back to a quote and explained that this demonstrated her point well (about feeling uncomfortable with groups of people in the park). Useful feedback was also

provided on the feedback form on how the materials might be improved in future, for example, making the materials more interactive, such as the inclusion of maps, and using a variety of photos throughout the process. One stakeholder felt that making the stimuli more interactive would allow residents to prioritise issues 'physically'. Altogether, the stimuli material appeared to serve as useful props that facilitated communication between participants and added weight to their points when contributing to discussions, but greater variety may be appropriate in future co-design processes.

Lastly, in terms of the acceptability of the process for participants, responses to the meetings were generally positive in the feedback questionnaires. Overall impressions in the separate meetings were highly rated and respondents were positive about sharing experiences between stakeholders and residents in the joint meeting. When asked about how they felt about the priorities that had been agreed, respondents to the feedback form for each meeting were positive, indicating they did agree with the priorities that were set. When asked to detail what changes they would like to see, comments were mostly in line with the priorities that had been set in the relevant meeting, for example stakeholders commented on community engagement and replacing damaged equipment, whereas residents commented on improvements to the children's playground equipment and clearing up litter.

The final question in each feedback questionnaire asked how the preceding meeting could be improved. Following the stakeholder meeting, suggestions were related to the structure of the meeting and clarity on voting, both of which are readily addressable for future co-designs. One resident suggested inviting people from different backgrounds; despite efforts to invite people from different backgrounds to the meeting, residents who attended were mainly South Asian and Muslim, with

young children. In future co-design processes, Better Place will be primarily concerned with recruiting people with young children as this is their target group, but more effort could be made to diversify the invitees in terms of age group and gender. Residents at the joint meeting felt more residents at this meeting would be good. Efforts should be made to recruit more residents to the meetings, this would not only provide social support for residents who may be quieter, but also more people can strengthen common issues within the group and potentially highlight new ones too. This could be achieved by inviting groups of residents, as opposed to individuals.

5.4 Discussion

The overall aim of this study was to describe and evaluate the early stages of the co-design of an environmental intervention, informed by the AEBCD approach, with a deprived and ethnically diverse community in Bradford. The adapted co-design approach was successfully implemented over a series of three meetings with stakeholders, residents and a joint meeting, culminating in an actionable set of priorities, and therefore successfully addressing the first research question. One way in which the approach was adapted was the use of photographs and quotes to act as stimuli material, in place of video footage. The results from the feedback questionnaires and observations indicated participants found these to be useful and valuable during discussions, and so these materials may offer a sufficient alternative where resource is very limited. In terms of acceptability, overall impressions of the process from participants in questionnaires and additional observations were positive; this is encouraging for future co-design processes. Differences were noticeable between groups in terms of meeting procedure and communication, but participants appeared to be comfortable working with each other and satisfied with

the priorities agreed. For this reason the approach is deemed acceptable, and a number of points for improvement can be suggested.

There are few examples of evaluations of co-design of interventions in open space for comparison, but the studies that do exist also demonstrate success with community involvement.

One of the largest available examples of community involvement in intervention design and delivery in a green space is Cohen et al. (2013), which was an included study in the systematic review of Chapter 2. An evaluation of community engagement performed for this study is published separately (Derose, Marsh, Mariscal, Pina-Cortez, & Cohen, 2014). The team aimed to describe the implementation of an RCT using community-based participatory research approaches to increase park use and physical activity in 50 parks (of which 33 received the interventions) in Los Angeles. Park directors and/or park advisory boards received \$4000 to spend on attracting park users and encouraging physical activity, plus marketing training and baseline measurement of these activities. Each park developed their own plans, with input from the project team, and subsequently the intervention parks experienced significant increases in use and in park-based physical activity.

However, the authors describe the scaling up of their methods across 33 parks as challenging. They explain that it was difficult to carry out an in-depth approach for each park, and that a certain amount of standardisation had to occur in terms of survey instruments for park users and residents. They claim this standardisation reduced the 'tailoring' of the research to each community, conflicting with one of the central tenets of community-based participatory research. There is then a balance to be struck, particularly in multi-site interventions, between standardisation in

evaluation and intervention tailoring. This is something for Better Place to consider going forward, as they aim to deliver multiple interventions across the BSB area.

Furthermore, the need for flexibility in the study design is crucial. This is echoed in Pawlowski et al. (2017) who in their study protocol, describe testing their co-design tools and collecting background information on the research context and target groups. The goal of the study is to co-design urban installations tailored to promote active living among children and seniors in a deprived area of Copenhagen. They found that children required very well-prepared workshops in order to maintain their attention, and seniors struggled to see themselves as being part of the later implementation phase. The process is now adapted insofar as the workshops are more differentiated and tailored to the specific target groups. Similarly, in this pilot the different needs of the stakeholders and residents have been demonstrated, and so using the findings of this chapter, it is possible to make a number of recommendations for future adaptation.

5.4.1 Recommendations

Presence of a facilitator to balance conversation

First, it is recommended that an experienced facilitator is present at each meeting to lead discussions, ensure conversation is balanced between contributors, and encourage those who are quieter to speak. This is a core component of traditional EBCD and AEBCD (Bate & Robert, 2006; Locock et al., 2014), and was taken on by the researcher in this instance. Particularly as it was noticed that stakeholders tended to speak more, and within stakeholders there were those who were more confident, it is important to maintain a balance in the partnership between stakeholders and residents. The presence of an experienced facilitator might address this issue.

Presence of a community champion to support residents

Residents may need more social support than stakeholders in encouraging them to attend meetings and during meetings. At the joint meeting, resident numbers were low and this in turn seemed to impact how much they contributed. This is contrasted with the residents meeting, where the presence of someone who knew most people and was passionate about the project made a huge difference in terms of enthusiasm from the group. Building relationships with key contacts in the community, making use of community networks during recruitment, and encouraging attendance as a group may help in ensuring residents feel supported in the process.

In addition, the promotion of community champions was recommended by Roussos and Fawcett (2000) in their review of collaborative partnerships to improve community health. They report that, among the reviewed studies, leadership was the most often reported internal factor for a partnership's effectiveness in creating community change. Community champions diversify this leadership, making partnerships less vulnerable to manipulation from those with more 'power' over the proceedings.

Ensure the process is accessible for all

There are some aspects of the process that can be kept consistent, and this can ensure participants find the process easy to take part in and are not dissuaded from coming to further meetings. This involves, for example, using a location for meetings that is both close to the chosen green space, but also convenient for residents and stakeholders to get to. A clear introduction and overview of the process at each meeting is useful so the expected outcome of the meeting is known, and is particularly helpful for participants who may be attending a meeting for the first time. In the pilot it was found that participants were juggling work or personal

commitments around the meetings, and so efforts to make the process as convenient as possible may help to reduce attrition.

5.4.2 Strengths and limitations

A key strength of this study is the partnership created between the research team, the public sector, the voluntary sector and the community. Veitch et al. (2017), in their discussion on the challenges of natural experiments in open space, have highlighted that it is important to establish these partners before the commencement of a project as they can provide insight into the feasibility of an intervention and can facilitate research translation. Furthermore, it is understood that promoting health and well-being in cities requires the involvement of many participants from local to regional level (Giles-Corti et al., 2016). This study was able to achieve this and bring together the people needed to make changes in a park in order to promote health.

On the other hand, while a list of priorities for change have been identified and it is hoped they are feasible given the input of various participants, it was beyond the scope of the current research to further develop these and see the changes occur. A number of recommendations have also been made to improve the adapted process. This approach and the recommendations were intended for the Better Place workstream; however, it may be useful in other situations.

Future research should aim to test this approach with other groups in other settings. Given the increased calls for community involvement in the design of interventions to improve health, it is imperative that more research is carried out into effective ways of doing this, particularly in deprived communities where interventions are likely to be needed most.

5.5 Concluding Comments

This study piloted the initial stages of a co-design process to design an environmental intervention in a park in a deprived area of Bradford. A set of priorities were established for change, and the approach was deemed to be acceptable to participants. A number of recommendations for future iterations of the process were also made. This research will have direct impact on the co-design process that the Better Place workstream will implement in future.

Chapter 6 Discussion

6.1 Introduction

There is mounting evidence that green space can deliver benefits for physical and mental health and well-being. It is important to encourage use of green space, so that the potential for accessing these benefits is maximised. Modifying the determinants of use is one way of achieving this. While much research has been carried out into the role of proximity, accessibility, and size, there remains a lack of research examining the influence of the quality of the park. Understanding the role of quality and the perception of a park is important so that effective environmental interventions to encourage use can be designed.

This is in line with calls from the WHO (2017), who state that understanding how to design and deliver effective urban green space interventions is ‘critical’ to ensure positive health, social and environmental outcomes are present. Furthermore, the importance of community input in the design of an intervention has been recognised at both the national and international level (NICE, 2016; WHO, 2017), but there are few evaluations of community involvement in the co-design of environmental interventions. Guidance is needed on how best the community might be engaged in an environmental intervention co-design process. Overall, this thesis aimed to provide evidence to inform the design of an environmental intervention into green space use in order to promote health.

In Chapter 2, our current understanding of environmental interventions into green space use was systematically reviewed. This provides an overview of the literature and provides a clear context within which this thesis is situated. Following this, the chapters within the thesis look to address the current gaps in research. First, a statistical analysis is carried out to identify park features that predict park

satisfaction and park use, plus an analysis of whether ethnicity or socioeconomic status are moderating factors, and whether park satisfaction mediates the relationship between park features and park use (Chapter 3). Chapter 4 reports a qualitative study into preferences for park features, and an exploration into whether this differs between ethnicities, level of park use, and quality of the park. The final study of this thesis (Chapter 5) piloted an approach to prioritising and refining issues within a park with a view to co-designing an environmental intervention with input from local stakeholders and residents. The results from these studies are summarised below.

6.2 Summary of findings

In Chapter 2 a systematic review was conducted that aimed to identify previous environmental interventions to encourage use of green space. Additional aims were to describe the behaviour change techniques that comprised the interventions using the BCTTv1 (Michie et al., 2013), and to examine the effectiveness of community input in the intervention design. The final aim was to evaluate the quality of the evidence available.

Of the 1649 papers identified in the database searches, 15 papers met the inclusion criteria. These papers reported on environmental interventions in 136 green spaces, with 101 green spaces experiencing an increase in use post-intervention. In terms of the behaviour change techniques applied, the most common was ‘adding objects to the environment’ or ‘restructuring the physical environment’, e.g. a new feature is added or current one is adapted in the physical environment – these techniques represent the core change delivered as part of an environmental intervention. Other common techniques were ‘restructuring the social environment’, ‘prompts or cues’, and ‘demonstration of the behaviour’. 12 studies involved the community in the

design for the intervention, to varying degrees. 109 of 120 green spaces that received an intervention co-design with the community experienced an increase in use. However, all studies except one (Cohen et al., 2013, which was rated unclear) were rated using the Cochrane Risk of Bias tool (Higgins et al., 2011) as highly biased. Furthermore, the quality of evidence was classified as very low (except Cohen et al., 2013, which was rated as moderate) using the GRADE approach (GRADE Working Group, 2004). The results were encouraging, but the lack of transparency in reporting and high risk of bias in most studies limits the extent to which there can be confidence in the findings. Moreover, because multiple behaviour change techniques were typically employed individual effective techniques could not be identified. In this way, the aims of this chapter were successfully achieved, however, given the poor quality of evidence it was not possible to identify what might comprise an effective environmental intervention based on previous literature.

Chapter 3 looked to address this issue in part by conducting a statistical analysis to determine which park features predicted park satisfaction and park use. The relationship between park features and park satisfaction has not previously been studied. In the fully adjusted models it was found that amenities, incivilities and usability (as part of the NEST tool) were significantly related to park satisfaction, and incivilities were significantly negatively associated with park use. Ethnicity or socioeconomic status were also tested as moderators of the relationship between park features, park satisfaction and park use, but no significant interactions were found. Finally, no evidence of mediation by park satisfaction in the relationship between park features and park use was found. Overall, the results suggested the quality of the park – or, more specifically amenities, incivilities and usability – is

related to park satisfaction and to park use. Structural factors such as proximity and size, which previous research has focussed on with inconsistent results, were found to not have a significant influence. This is in line with the suggestion that the current mixed findings are a result of variation in quality, which is not often accounted for. This study has contributed to this current evidence gap. Furthermore, individual characteristics such as ethnicity, education, financial status and level of deprivation, had no impact on park satisfaction or use. Therefore, it is suggested environmental interventions should be more impactful than interventions targeted at individuals. Because the incivilities domain was a significant predictor of both satisfaction and use, it is suggested that the removal of incivilities is prioritised. Improvements to amenities and usability should also be focussed on. The aims of the study were therefore met, but some results did not meet expectations. Ethnicity and socioeconomic status were found to not moderate the relationship between park features and park satisfaction and park use, when the reverse was expected. This was based on previous literature indicating a moderating role for ethnicity and socioeconomic status in the relationship between surrounding green space and health outcomes. It may be that these groups do not have access to high quality parks that support use and therefore promote health. Indeed, a significant difference was found in park satisfaction and in park use between White British and Pakistani ethnicities in that Pakistani mothers reported lower satisfaction with their park and less use, which might point to this explanation.

In Chapter 4, a qualitative study was completed in which the preferences of residents for features in their local park were considered. When asked about their preferences for park features, participants spoke about recreational facilities and amenities, natural and non-natural features, incivilities and safety (in terms of visibility and

adjacent roads) within the park. When speaking about recreational facilities and amenities, participants described the loss of amenities such as toilets and cafes, and when asked about what they might change in the park, responses included more benches and bins. This links back to the finding in Chapter 3 that such amenities were important for park satisfaction. Furthermore, participants also spoke about disliking litter, graffiti and vandalism in the park, which is in line with the finding in Chapter 3 that the presence of incivilities in a park was associated with lower park satisfaction and park use.

The social component of park use is made clear in this study: participants spoke about how the social environment impacted on preferences – for example seeing that the park is well-used was encouraging for participants, but anti-social behaviour within the vicinity of e.g. the playground, impacted negatively. Differences between users and non-users were observed here: users perceived their park as well-used, their peer group appeared to make use of the park, and they often visited as part of a group. This was not the case for non-users, who felt they did not have a group to use the park with and expressed the desire to join one. In this way the social aspect of park use may have the same if not greater effect than physical features alone. The aim of the chapter was met as liked and disliked features in a park were identified.

The final chapter of this thesis (Chapter 5) was a pilot study to describe and evaluate the early stages of the co-design of an environmental intervention in a green space with a deprived community in Bradford. In the study, issues in a local park were identified and prioritised by groups of local stakeholders and residents.

Community ownership was a key issue for stakeholders and indeed this carried through to the joint meeting also. Other priorities for stakeholders were tackling vandalism and repairing damaged equipment, improving naturalness, and tackling

litter. Besides community ownership, issues concerning the maintenance of natural features and of the equipment in the park also came out in Chapter 4 in interviews in the low-quality park (the study park of Chapter 5), and indeed litter and vandalism were issues in both the interviews of Chapter 4 and the analysis of Chapter 3 (within the incivilities category). Residents also prioritised litter and maintenance in their meeting, but also specifically referred to the playground equipment, to the lake, and desired 'more places to play/ things to do'. This may be linked to the results in Chapter 3, where 'usability', or the amount of activities available was significantly related to park satisfaction. The priorities were combined in a joint meeting to: 'Friends' group and working together with the council, the lake, the lodge, play opportunities and appearance (including, litter, naturalness and planting, maintenance, surfaces, and vandalism). Feedback forms were provided at the end of each meeting, and responses were generally positive, but there is potential for improvement in the future. Respondents appeared to agree with the issues that had been prioritised, but also suggested a greater variety in materials, and a greater number and diversity of people present at the meetings. The most noticeable difference between the groups was the approach to the meeting, whether 'formal' for stakeholders and 'informal' for residents. It is therefore important that Better Place recognise the different expectations present. Also recommended was the presence of an experienced facilitator to manage the meetings, a resident 'champion' who could gather support and enthusiasm for the process within the group and the wider community, and ensuring that the process is accessible to all. Altogether, the aim of the chapter was met as the priorities for change were successfully identified and refined in the group meetings. The adapted approach that was employed in the chapter was also effective in this way, and the photographs and quotes appeared to

be useful for participants. Finally, the findings from the feedback questionnaire and observations showed the participants found the approach acceptable.

6.3 Methodological limitations

In Chapter 2 the BCTTv1 is used to identify and describe the behaviour change techniques that comprise the environmental interventions in the included studies.

One of the conclusions made is that the multiple number of techniques employed in any one intervention prevents the identification of singly effective techniques.

However further to this, it is recognised that the taxonomy itself is limited in its ability to categorise potential techniques employed in an environmental intervention.

The two current techniques that refer to environmental change ('adding objects to the environment' and 'restructuring the physical environment') remain broad in their scope and therefore cover a number of different changes that could be made. Adding new items to the environment can potentially refer to many things in the context of an environmental intervention into green space (e.g. adding a new play area, sports facilities, trees), and similarly adjusting the current environment is applicable to a number of potential changes such as upgrading present amenities and facilities. At present this is the most widely-used and comprehensive taxonomy available, but it is recognised it lacks the detail required to fully map out all changes that might be carried out in an environmental intervention.

The limitations of the NEST used in Chapter 3 to audit the quality of the parks are also recognised. For example, the items referring to natural features in the tool are currently limited: wildlife and biodiversity are not currently captured in the tool, yet research has previously demonstrated a relationship between these features and well-being (Dallimer et al., 2012). Furthermore, the tool does not capture specific items related to safety such as lighting and visibility, and it is known that safety in a green

space is important for encouraging use (Bedimo-Rung et al., 2005; Hartig et al., 2014). These factors are not fully recognised in the tool and require further investigation. In addition, the tool only measures physical features, however the findings of Chapter 4 and previous research (McCormack et al., 2012) indicate the social environment within the park and the wider community can also shape the perception of a park and frequency of use. This component is currently not measured by the tool, and so the influence of this on satisfaction and use is missed.

Chapter 4 was also somewhat limited in scope as most of the participants interviewed were women (12 female, 4 male) and had young children. Only adults were interviewed and so the thoughts of young people were not captured, and only one participant was of retirement age. It is therefore recognised that the findings are largely focused on a particular demographic, and this could be widened to include a variety of age groups and equal split of genders. This is echoed in Chapter 5 also, where participants from the previous study were invited to represent residents of the area in a residents' group meeting. All those that participated were women with young children (or grandchildren of the same age). This suited the purposes of Better Place, with which the study was aligned (whose target group is children aged 0-3), however, other demographic groups that were not present in this study may have produced different results.

6.4 Future Research

There are a number of directions to take for future research from this thesis. As stated in the previous section, the BCTTv1 that was applied in Chapter 2 is a comprehensive taxonomy for coding behaviour change interventions, but it could be expanded much more to allow for detailed identification of various changes that might be made in an environmental intervention in a green space. At present the

techniques that are listed and refer to environmental change are limited: many of the diverse changes that were made in a green space within the included studies were covered by one or two techniques only. Recent research has developed a typology of environmental changes to change behaviour, however, this focuses on changes to the micro-environment, such as changing the position and placement of products (Hollands et al., 2017). Opportunity for future research to develop a taxonomy of environmental interventions into green space remains.

In Chapter 3 the role of park quality on satisfaction and use is explored, finding amenities, incivilities and usability were key predictive features. The research was limited to Bradford, and so further research is necessary to replicate findings elsewhere. There remains little research into park satisfaction, and so further research into its relationship with park quality and park use is also warranted. The limitations of the audit tool as discussed might be addressed by expanding the number of items measured, particularly those related to natural features and safety, in line with current research. Alongside this, it would also be worthwhile exploring how different types of green space vary in terms of features and how the relationship with satisfaction and use might differ. At present, the spaces that were audited for Chapter 3 ranged from small play areas to larger natural areas to recreation grounds. In this way, places that were listed and perceived as a 'local park' by respondents to the survey could potentially be quite different in nature. The definition of a park remains broad in this sense within the Chapter and covers both smaller recreation and amenity spaces up to large and natural, even 'wild' spaces. Within the audit tool certain items may be more applicable to certain types of spaces, and so the adaptation of the current tool to allow for a broader range of features and types of spaces to be recognised would be useful for building understanding.

Additionally, not only should the physical features of a park be considered when measuring park quality, but also the social environment. As stated, in Chapter 4 the importance of the social environment in shaping perceptions of the park was highlighted. Furthermore, when investigating park quality, it may be worthwhile not only capturing physical features present but also capturing details regarding social aspects. This might include data regarding sense of community, social capital and social support in the area. Future research could achieve this by combining the tool with household or in-situ surveys, or the development of a new audit tool that encompasses both aspects.

An investigation into whether park quality is linked to health outcomes that might be impacted by park use, such as incidence of asthma, diabetes, BMI, anxiety and depression is also warranted; current research in this area is limited. Related to this, new technological methods such as GPS tracking could be used to objectively measure time in green space and link this to health outcomes, or ecological momentary assessment could be used to assess various outcomes in green space in real-time. At present, use of green space often relies on self-report measures which can be unreliable and so the emergence of technology such as this is valuable in confirming previous findings.

Considering the findings of Chapters 3 and 4 in terms of differences in park satisfaction and use by ethnicity, and differences between non-users and users in their perception of the park, it would be worthwhile exploring potential barriers and motivators for use. It is important to understand the barriers to use for non-users as this knowledge can be used to design more effective interventions. They represent an important group to target, as opposed to encouraging those who already use the

park to use it more. An understanding of motivation for use may also be useful in aiming to increase frequency of use for both groups.

Furthermore, it is suggested that an environmental intervention with an additional group-based intervention may be more effective than an environmental intervention alone, as this would particularly target non-users. In this way both the physical and social environment is targeted. Future research might investigate how interventions into the physical and social environment compare, both separately and combined. Given the findings in Chapter 4, the social element of an intervention might particularly appeal to non-users, who are typically a target group.

Chapter 5 described the early stages of the co-design of an environmental intervention, using an approach adapted from AEBCD. There are few evaluations of co-design of interventions in open space, and in light of growing support for community involvement, future research might lie in testing if this approach is applicable to similar situations and contributing to this limited evidence base.

6.5 Concluding Comments

This thesis has provided evidence that might be used to inform evidence-based environmental interventions insofar as the results of previous relevant research have been described, park features that are predictive of park use and satisfaction have been identified, and preferences for park features have been explored. An adapted co-design approach has also been piloted whereby priorities for intervention have been identified with input from local stakeholders and residents. It is widely accepted that green space has a beneficial impact on physical and mental health and well-being, and so understanding how to encourage use is crucial. Collectively these studies have contributed to our understanding of how an effective environmental intervention into green space use might be designed.

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Appendix A: Search strategies

Medline Week 4 July 4 2016

1. exp Adult/
2. (adult or adults).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
3. (visitor or visitors).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
4. people.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
5. (user or users).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
6. Randomized Controlled Trials as Topic/
7. randomized controlled trial/
8. randomised control* trial.mp.
9. randomized control* trial.mp.
10. Random Allocation/
11. randomized.mp.
12. randomised.mp.
13. intervention stud*.mp.
14. (intervention or interventional or process or program*).mp.
15. (environment* adj (change* or intervention*)).mp.
16. (renovation or renovations).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
17. (improvement or improvements).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
18. (pretest or pre test or posttest or post test).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
19. ("pre- and post-comparison" or "pre- and post-comparisons").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
20. (pre post or prepost).mp.
21. comparative stud*.mp.

22. (pre intervention or post intervention).mp.
23. exp control groups/
24. control group.mp.
25. (quasi-randomised or quasi-randomized or quazi-randomised).mp
26. (quasi-experiment or quazi-experiments).mp.
27. natural experiment.mp.
28. (non-randomised or nonrandomised or non-randomized or nonrandomized).mp.
29. exp Environment Design/
30. (urban adj green adj space).mp.
31. green space.mp.
32. (open adj space).mp.
33. (public adj space).mp.
34. (public adj open adj space).mp.
35. (park not parkin*).mp.
36. (city adj park).mp.
37. (public adj park).mp.
38. (urban adj park).mp.
39. ((trail* or urban) adj trail*).mp.
40. utili?ation.mp.
41. "use".mp.
42. usage.mp.
43. (count or counts).mp.
44. (visit or visits).mp.
45. 1 or 2 or 3 or 4 or 5
46. 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28
47. 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39
48. 40 or 41 or 42 or 43 or 44
49. 45 and 46 and 47 and 48

Global Health Week 30 2016

1. (adult or adults).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
2. (visitor or visitors).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

3. people.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
4. (user or users).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
5. randomized controlled trial/
6. randomised control* trial.mp.
7. randomized control* trial.mp.
8. randomized.mp.
9. randomised.mp.
10. intervention stud*.mp.
11. (intervention or interventional or process or program*).mp.
12. (environment* adj (change* or intervention*)).mp.
13. (renovation or renovations).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
14. (improvement or improvements).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
15. (pretest or pre test or posttest or post test).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
16. ("pre- and post-comparison" or "pre- and post-comparisons").mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]
17. (pre post or prepost).mp.
18. comparative stud*.mp.
19. (pre intervention or post intervention).mp.
20. control group.mp.
21. (quasi-randomised or quasi-randomized or quasi-randomized or quazi-randomised).mp.
22. (quasi-experiment or quazi-experiments).mp.
23. natural experiment.mp.
24. (non-randomised or nonrandomised or non-randomized or nonrandomized).mp.
25. (urban adj green adj space).mp.
26. green space.mp.
27. (open adj space).mp.
28. (public adj space).mp.
29. (public adj open adj space).mp.
30. (park not parkin*).mp.
31. (city adj park).mp.
32. (public adj park).mp.
33. (urban adj park).mp.

34. ((trail* or urban) adj trail*).mp.
35. utili?ation.mp.
36. "use".mp.
37. usage.mp.
38. (count or counts).mp.
39. (visit or visits).mp.
40. 1 or 2 or 3 or 4
41. 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24
42. 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34
43. 35 or 36 or 37 or 38 or 39
44. 40 and 41 and 42 and 43

PsycINFO Week 4 July 2016

1. (adult or adults).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
2. (visitor or visitors).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
3. people.mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
4. (user or users).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
5. randomised control* trial.mp.
6. randomized control* trial.mp.
7. randomized.mp.
8. randomised.mp.
9. exp intervention/
10. intervention stud*.mp.
11. (intervention or interventional or process or program*).mp.
12. (evaluat* or intervention or interventional or treatment).mp.
13. (environment* adj (change* or intervention*)).mp.
14. (renovation or renovations).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
15. (improvement or improvements).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
16. (pretest or pre test or posttest or post test).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]

17. ("pre- and post-comparison" or "pre- and post-comparisons").mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures]
18. (pre post or prepost).mp.
19. comparative stud*.mp.
20. (pre intervention or post intervention).mp.
21. exp control group/
22. control group.mp.
23. (control* or (before and after stud*) or follow up assessment).mp.
24. exp quasi experimental methods/
25. (quasi-randomised or quasi-randomized or quasi-randomized or quazi-randomised).mp.
26. (quasi-experiment or quazi-experiments).mp.
27. natural experiment.mp.
28. (non-randomised or nonrandomised or non-randomized or nonrandomized).mp.
29. interrupted time series.mp.
30. time series.mp.
31. multiple baseline.mp.
32. exp environmental planning/
33. exp recreation areas/
34. (urban adj green adj space).mp.
35. green space.mp.
36. (open adj space).mp.
37. (public adj space).mp.
38. (public adj open adj space).mp.
39. (park not parkin*).mp.
40. (city adj park).mp.
41. (public adj park).mp.
42. (urban adj park).mp.
43. ((trail* or urban) adj trail*).mp.
44. utili?ation.mp.
45. "use".mp.
46. usage.mp.
47. (count or counts).mp.
48. (visit or visits).mp.
49. (frequency or frequencies).mp.
50. 1 or 2 or 3 or 4

51. 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31

52. 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43

53. 44 or 45 or 46 or 47 or 48 or 49

54. 50 and 51 and 52 and 53

Embase August 2016

1. (adult or adults).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

2. exp visitors/

3. (visitor or visitors).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

4. people.mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

5. (user or users).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

6. exp randomized controlled trial/

7. randomised control* trial.mp.

8. randomized control* trial.mp.

9. randomized.mp.

10. randomised.mp.

11. intervention stud*.mp.

12. (intervention or interventional or process or program*).mp.

13. (environment* adj (change* or intervention*)).mp.

14. (renovation or renovations).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

15. (improvement or improvements).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

16. (pretest or pre test or posttest or post test).mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

17. ("pre- and post-comparison" or "pre- and post-comparisons").mp. [mp=abstract, title, original title, broad terms, heading words, identifiers, cabicodes]

18. (pre post or prepost).mp.

19. comparative stud*.mp.

20. (pre intervention or post intervention).mp.

21. exp control group/

22. control group.mp.

23. (quasi-randomised or quasi-randomized or quasi-randomized or quazi-randomised).mp.
24. (quasi-experiment or quazi-experiments).mp.
25. natural experiment.mp.
26. (non-randomised or nonrandomised or non-randomized or nonrandomized).mp.
27. parks/
28. (urban adj green adj space).mp.
29. green space.mp.
30. (open adj space).mp.
31. (public adj space).mp.
32. (public adj open adj space).mp.
33. (park not parkin*).mp.
34. (city adj park).mp.
35. (public adj park).mp.
36. (urban adj park).mp.
37. ((trail* or urban) adj trail*).mp.
38. utili?ation.mp.
39. "use".mp.
40. usage.mp.
41. (count or counts).mp.
42. (visit or visits).mp.
43. 1 or 2 or 3 or 4 or 5
44. 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26
45. 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37
46. 38 or 39 or 40 or 41 or 42
47. 43 and 44 and 45 and 46

Appendix B: Grey literature sources**Websites searched**

Website Name	URL
Natural England	http://naturalengland.org.uk/
Public Health England	https://www.gov.uk/government/organisations/public-health-england
Greenspace Scotland	http://www.greenspacescotland.org.uk/
Public Health Wales	http://www.physicalactivityandnutritionwales.org.uk/
OPENspace	http://www.openspace.eca.ed.ac.uk
Centre for Research on Environment, Society and Health (CRESH)	http://cresh.org.uk/
Active Living Research	http://activelivingresearch.org/

Appendix C: Interview topic guide

Interview Questions

As the interviews will be semi-structured in nature, the questions will not be entirely decided prior to the interview. Instead, some initial questions are outlined with a view to elaborating further on the topics within the context of each individual interview.

INTRODUCTION

- ❖ How would you describe this park to others?

PRIOR TO WALK: Pattern of use

- ❖ How often do you visit this park?
- ❖ Does this change across the day/week/ seasons?
 - Why does the pattern of use change over these timescales?
- ❖ Has your pattern of use changed in any way since moving to this area? If so, why did this change?
 - Explore any life events that have brought about a change in frequency/type of use
 - Any changes to the park that have changed pattern of use?
- ❖ Do you come alone or with family/friends/others?
- ❖ What do you usually do whilst you are here?
 - What do you do, and those who accompany you (if applicable)?
- ❖ Do you feel this pattern of use is mirrored across the local community?
 - How do other groups make use of the park? Is this different from you?
- ❖ Do you make use of any other parks?
 - What types and in what way? Alone or with others?
 - Does the pattern of use of others differ to this park?

- ❖ *Can you take me on your 'usual route' around the park?*

GO TO: Visit areas of the park they usually make use of on a typical visit (repeat questions as necessary) (take photograph/notes where appropriate)

- ❖ Can you tell me more about this feature?
 - Why do you use this feature?
 - Do you like/ enjoy this feature? Why?

- What do you think of the quality of this feature?
- What impact does this feature have on your use of this park as a whole? Is this reflected across the community?
- Is it commonly used by others also? Who else uses this feature?
- Is this considered a safe, functional feature?

GO TO: Visit areas of the park that are not well used/ not used at all (repeat questions as necessary) (take photograph/notes where appropriate)

- ❖ Can you tell me more about this feature?
 - Why do avoid/ not use this feature?
 - Do you dislike/ avoid this feature?
 - What do you think of the quality of this feature?
 - What impact does this feature have on your use of this park as a whole? Is this reflected across the community?
 - Is this feature avoided by others also? Who might typically use this feature?

GENERAL QUESTIONS:

- ❖ How satisfied are you with this park?
- ❖ What other green spaces are there nearby that you might alternatively use?
- ❖ How does this park compare to the other green spaces nearby?
- ❖ How well used is this park on the whole? Why do you think this is?
- ❖ Would you recommend use of this park? Why?
- ❖ What would encourage you to use this park more? Is there anything you would want to change?
- ❖ How accessible do you find this park?
- ❖ Do you have anything further to add?

Thank you for your time.

Appendix D: Stimuli materials

Example quotes

“But yeah, you know if somebody was here every day to pick litter up, I think it would be a lot better. See the pond. This is what puts me off because my grandson likes I don’t even know if they’re ducks but the ducks over there as you can see people just chuck whatever but people need to clean that river as well. Look there to compared to down there. It is an issue this because it doesn’t look nice and no, just litter everywhere.”

“I think they need a bit more for like younger children cause I’ve noticed some places are doing a bit for younger children and a bit for the older children. I think they’ve got that in Lister Park so that would be ideal here because this is more, there’s a small space for little kids but I think it could do with more being here and then children could like, have got a lot more to look forward to and come to so it would be better.”

“I prefer to come here. I think because there’s a pond and the ducks and that are there. I think, I suffer with depression but if you come to a place like this, especially like, I wouldn’t sit here because when it gets busy, it’s noisier, I prefer to sit that end where it’s quieter and just sit and watch the ducks or whatever and it helps calm me so, I get relaxed.”

“That’s how it is, it’s like all these benches you don’t get chance to sit on them with your kids, it’s usually just lads that sit on them having a drink or smoking. Used to be like a park ranger, even he don’t come no more, on motor bike, he don’t drive through no more.”

“Yeah yeah he’ll go in there [playground], yeah he does go in there. It is always busy in there, there is always a few kids in there morning til night there’s always a few kids in there. But I just think for the size of the space, it’s a small park. It’s small especially with how many kids around here, there’s hundreds.”

“I was speaking to a parent in the park just now and she was um it’s nice in the morning and it’s more quiet in the mornings that way you can use it but in the afternoon with all these teenagers going around on quadbikes and smoking, we don’t

feel comfortable. We don't feel comfortable because there'll be a lot of fighting between one gang and another gang and that's really worries us as well. So we literally have to come down with our children in the morning to avoid the afternoon walk."

"I like the swans, the ducks, these are not swans by the way, you can get two pairs of swans in here that are literally gorgeous and um I like the birds, the trees they're nice. The park is nice for the kids, they enjoy everything about it. The tennis courts and the cricket courts, they're nice. But what I like is the bowling over there."

"This is nice, the tennis courts are nice. Because we've got individual tennis courts and football courts so each team can play individual, that is good about it. I like this bit, I like this middle bit, where they've got the exercises and the football pitch here. That is good as well, they didn't have them before, you know those exercises? They didn't have them before and this is good if someone wants to get active and comes for a morning walk or in the afternoon they can keep active by doing press ups or these balance-y things and that's really good. That's good about it as well."

"I think everything is used in this park. I sometimes come down here and just watch them and they use everything, they use everything. I think it is good for, there are many options to choose from. I think they like trying out new things, and this is something different, something different."

"So they could do with a face lift and more activities for all age actually. That would really help. Cos yeah main feature is like park but that's for kiddies isn't it. The teenagers need something to do as well. In our days there used to be a lot of footballs playing around, lots of kick about with balls and stuff. And they do now but you won't see it as much because first it used to be on the grass but now they tend to use the tennis courts and then all this space is just there and it's not really being used."

"Yeah it's like I say, I mean, like you know it's people don't want to come and walk round parks you know what I mean when there's gangs and groups of lads sat down on the benches. Not that you're ever gonna walk and just, some people just feel unsafe like that you know what I mean. I mean, I can look after myself but even so when I walk, like I say I come through snicket and there were like 5 lads sat in there now."

Example photographs





Appendix E: Feedback questionnaires

Stakeholder feedback form

1. What are your overall impressions and feelings about the meeting today?

Excellent	Good	Average	Poor
Very Poor			

Please comment:

2. What do you think of the use of photographs and quotes as a way to reflect upon your experiences with Bradford Moor park?

Excellent	Good	Average	Poor
Very Poor			

Please comment:

3. Do you feel that the priorities agreed at the end of the day reflect your own experiences with Bradford Moor park and how it could be improved?

Yes No

Please comment:

4. Reflecting on the issues raised today, how would you like to see the park change?

5. What could be improved if this meeting were to be run again?
6. Is there anything else that you would like to add about any aspects of this project so far?

Many thanks for your comments and thoughts.

Residents feedback form

1. What are your overall impressions and feelings about the meeting today?

Excellent Good Average Poor
 Very Poor

Please comment:

2. Did you think the photographs and quotes were a good representation of how Bradford Moor park is viewed in your community?

Excellent Good Average Poor
 Very Poor

Please comment:

3. How did it feel to meet other residents and talk about your experiences?

Excellent Good Average Poor
 Very Poor

Please comment:

4. How did you feel about the emotional mapping exercise as a way to reflect on your experiences and identify the issues in Bradford Moor park?

Excellent

Good

Average

Poor

Very Poor

Please comment:

5. Do you feel the issues agreed at the end of the meeting reflect your own experiences of what needs to be improved in the park? Please comment

6. Reflecting on the meeting today, what changes would you like to see in Bradford Moor park?

7. What could be improved if the meeting was run again?

8. Do you have any other comments?

Many thanks for your comments and thoughts.

Mixed feedback form

I am a: (Please tick one)

Stakeholder

Local resident

Please give us your overall impressions and feelings about:

9. The stimuli material (photographs and quotes) – has your opinion changed at all?

Excellent

Good

Average

Poor

Very Poor

Please comment:

10. Talking about and sharing different experiences with both stakeholders and residents

Excellent

Good

Average

Poor

Very Poor

Please comment:

11. Discussing and deciding with both stakeholders and residents the priorities for change

Excellent Good Average Poor

Very Poor

Please comment:

12. What are your impressions of the outcome of the discussion of the next steps for the group?

Excellent Good Average Poor

Very Poor

Please comment:

13. Did you feel comfortable taking part in the meeting and able to contribute your own thoughts and experiences?

Excellent Good Average Poor

Very Poor

Please comment:

14. Was there anything that you didn't get a chance to say that you wanted to contribute to the discussion?


15. What could be improved if the meeting was run again?


16. Do you have any further comments?

Many thanks for your comments and thoughts.

Appendix F: HRA Decision

Go straight to content.





Is my study research?

I To print your result with title and IRAS Project ID please enter your details below:

Title of your research:

IRAS Project ID (if available):

You selected:

- 'No' - Are the participants in your study randomised to different groups?
- 'No' - Does your study protocol demand changing treatment/ patient care from accepted standards for any of the patients involved?
- 'No' - Are your findings going to be generalisable?

Your study would NOT be considered Research by the NHS.

You may still need other approvals.

Researchers requiring further advice (e.g. those not confident with the outcome of this tool) should contact their R&D office or sponsor in the first instance, or the [HRA](#) to discuss your study. If contacting the HRA for advice, do this by sending an outline of the project (maximum one page), summarising its purpose, methodology, type of participant and planned location as well as a copy of this results page and a summary of the aspects of the decision(s) that you need further advice on to the HRA Queries Line at HRA.Queries@nhs.net.

For more information please visit the [Defining Research](#) leaflet

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