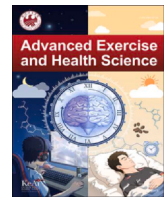




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# Barriers, facilitators, and factors influencing the perceived feasibility of family-based physical activity: The role of socioeconomic status

Scarlett M. Fountain\*, Simon B. Cooper, Ryan A. Williams, Caroline Sunderland, Ali Bowes, Karah J. Dring

Sport Health and Performance Enhancement (SHAPE) Research Centre, Department of Sport Science, School of Science & Technology, Nottingham Trent University, Nottingham, UK

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## ABSTRACT

The facilitators and barriers to family-based physical activity, child and parent perceptions of the factors influencing their perceived feasibility of family-based physical activity, and the impact of socioeconomic status on these, are relatively unexplored. This study aimed to determine the barriers and facilitators to, and factors influencing the perceived feasibility of, family-based physical activity, with consideration of the impact of socioeconomic status. Focus groups and separate parent and child interviews were conducted with 24 families ( $n = 79$ ; 37 parents, 42 children) in the East Midlands, UK, who were categorised into low (deciles 1–3; 5 families), middle (deciles 4–7; 8 families), or high (deciles 8–10; 11 families) socioeconomic status using the UK index of multiple deprivation score, 2019. Regardless of socioeconomic status, parental role modelling was a key facilitator, whilst high cost and lack of free time were barriers for all families. In addition, low socioeconomic status families discussed child role modelling as a facilitator, and the access to and provision of local facilities as a barrier to physical activity, whilst this was a facilitator for middle-high socioeconomic status families. Regardless of socioeconomic status, when discussing factors influencing the perceived feasibility of family-based physical activity, differing levels of fitness between children and parents was a factor mentioned across generations. All parents thought family-based physical activity would allow for quality family-time, whilst younger children (8–12 years old) expressed that family-based physical activity sessions would feel safe. Thus, family-based physical activity may offer a promising opportunity to increase physical activity in children and parents concurrently, allowing for quality family-time, while providing a safe environment for younger children to exercise whilst utilising parent and child role modelling. Multi-level family physical activity programmes embedded within the community, which incorporate low-cost activities, work- and school-life balance strategies and support for parents' fitness are crucial to support families (from a range of socioeconomic backgrounds) in increasing their physical activity levels. The design and development of future physical activity programmes should consider establishing family-based physical activity with younger children (8–12 years old) with the integration of team sports.

## 1. Introduction

Currently, 53% of children are physically inactive in the United Kingdom,<sup>1</sup> with observational data revealing that children are mostly inactive outside of school time.<sup>2</sup> Additionally, parents with dependent children are more inactive than non-parent counterparts,<sup>3</sup> which is alarming since physical inactivity increases overweight, obesity and associated

cardiometabolic disease risk.<sup>4</sup> Family-based physical activity interventions present an opportunity to increase physical activity levels in children and their parents concurrently.<sup>5</sup> However, little is known regarding how to engage children and their parents in physical activity interventions, including the barriers and facilitators families experience towards engagement with physical activity and their perceptions of the factors influencing their perceived feasibility of family-based physical activity.<sup>6</sup>

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\* Correspondence to: Department of Sport Science, School of Science and Technology, Nottingham Trent University, Clifton Campus, Clifton Lane, Nottingham NG11 8NS, UK.

E-mail address: [scarlett.fountain2015@my.ntu.ac.uk](mailto:scarlett.fountain2015@my.ntu.ac.uk) (S.M. Fountain).

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Although a small number of studies have explored family-based physical activity, the most common approach has involved asking families to reflect on such experiences retrospectively, after completing an intervention designed for them without their insight.<sup>7–9</sup> As a result, academics know little about families' perceptions of the factors influencing their perceived feasibility of being active together when designing and developing family physical activity interventions. This presents a key gap in the literature, as pre-intervention insights could help identify the facilitators and barriers to engagement in family-based physical activity and support long-term adherence. In addition, without this understanding, future family physical activity interventions may lack ecological validity and thereby further prevent long-term engagement.<sup>9</sup>

Evidence on the effectiveness of including families' perceptions into intervention design remains limited. One study used focus groups with parents and children separately, within a large community-based project to explore perspectives of the interest, goals, priorities and barriers to physical activity<sup>10</sup>. Deatrick et al.<sup>10</sup> found that children and their parents often interpret the meaning and accessibility of physical activity differently. However, when physical activity was framed more broadly, as a normative and gender-neutral goal like completing 150-min of moderate to vigorous physical activity per week, families were more likely to view this as achievable<sup>10</sup>. These findings can aid in supporting parents and children to become physically active. However, it is important to consider parents' and children's perspectives specifically on the factors influencing their perceived feasibility of being active together, as a potential avenue to increase engagement in physical activity across generations, including the barriers and facilitators they face, to design effective family physical activity interventions.<sup>11,12</sup>

Adults and children from lower socioeconomic backgrounds are significantly less likely to be physically active than those from higher socioeconomic groups, with only 54 % of adults and 44 % of children from lower socioeconomic backgrounds meeting physical activity recommendations in the UK.<sup>13,14</sup> Alliot et al.<sup>15</sup> previously reported that adolescents of low socioeconomic status experience more barriers to physical activity, including access to and provision of local facilities. However, to the authors knowledge, there is no evidence that considers the barriers and facilitators families face from different socioeconomic backgrounds. Parents have reported their perceptions on the barriers to, importance of, frequency, and nature of, family physical activity<sup>6</sup>. Following telephone interviews, most parents felt that the activities they took part in with their children were predominantly sedentary, such as playing board games<sup>6</sup>. While physical activity increased on the weekends, it rarely included the whole family-unit due to busy lifestyles and diverse interests.<sup>6</sup> In this instance, children's perspectives and considerations across socioeconomic status have been overlooked. Future research should establish the differences in barriers, facilitators, and children's and parents perceptions of the factors influencing their perceived feasibility of participation in family-based physical activity of families from different socioeconomic backgrounds.<sup>6,15</sup>

The present study had two main aims; (1) what factors do families perceive as enabling or limiting participation in physical activity, and how do these perceptions differ across socioeconomic status in the context of family-based physical activity? (2) what factors do children, and their parents, believe influence their perceived feasibility of being active as a family, and how do these perceptions differ across socioeconomic status?

## 2. Materials and methods

### 2.1. Study design

For this study, a 2-phase approach was adopted that incorporated family focus groups followed by separate interviews with a parent and a child (see Fig. 1). This was part of a larger cross-sectional study, that included 2 visits separated by at least 7 days. The larger cross-sectional study examined the associations between physical activity, physical fitness, and adiposity, and risk factors for cardiometabolic diseases and cognitive function in children (aged 8 – 16 years) and

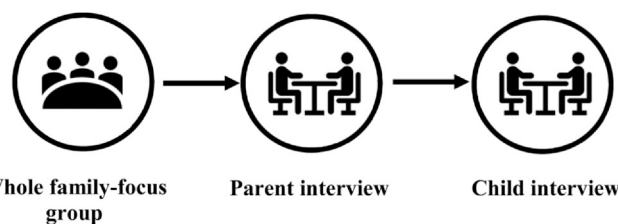


Fig. 1. Overview of the whole-family focus groups and separate parent and child interviews.

their parents separately, as well as the associations of parental physical activity, physical fitness, and adiposity, with risk factors for cardiometabolic diseases, cognitive function, physical activity, physical fitness, and adiposity in their children. Visit 1 involved parents and children completing a demographic questionnaire to record age, gender, ethnicity and postcode for the determination of socioeconomic status via the Indices of Multiple Deprivation (IMD) 2019;<sup>16</sup> the focus group and parent and child interviews were conducted at the end of visit 2.

#### 2.1.1. Recruitment

Following ethical approval, participants were recruited from the East Midlands, UK, via email, telephone calls, word of mouth, poster advertisement, and in-person recruitment via attending local sports clubs, community and family groups, and information events held at local schools. The following inclusion criteria was applied: families with at least one child aged 8–16 years and a heterogeneous background in terms of socioeconomic status, determined using the IMD score 2019.<sup>16</sup> A purposive sampling approach was employed to recruit participant families, and a structured sampling log was used to track participant recruitment, monitor sample characteristics and guide decision-making to ensure maximum variation in the sample. Written informed consent, via parental consent, and child assent was obtained prior to participation in the study.

#### 2.2. Socioeconomic status classification

The UK IMD score 2019<sup>16</sup> was used as an indicator of socioeconomic status for this study. This method was chosen as it reflects area-level deprivation and is relevant to the availability and accessibility of local facilities, which is applicable to the barriers and facilitators families face when engaging with physical activity. However, this method of socioeconomic status classification does not capture family-level socioeconomic status. Families were ranked according to their corresponding IMD score, and the ranked data were categorised into deciles (decile 1 being the most deprived and 10 being the least deprived), which were then categorised into three groups (low socioeconomic status, middle socioeconomic status, or high socioeconomic status). Families in the 'low socioeconomic status' group were from deciles 1–3, families in the 'middle socioeconomic status' group were from deciles 4–7, and families in the 'high socioeconomic status' group were from deciles 8–10. For the present study, 24 families completed the focus groups and interviews ( $n = 79$ ; 37 parents, mean age:  $45.00 \pm 6.57$  years; 42 children, mean age:  $12.12 \pm 2.34$  years), as this was the point at which data saturation was reached. A total of 5 families were in the low socioeconomic status group, 8 families in the middle socioeconomic status group, and 11 families in the high socioeconomic status group. Table 1 presents an overview of the families who participated in the focus groups and interviews, split by socioeconomic status.

#### 2.3. Data collection procedures

Focus group and interview questions were carefully designed prior to the study commencing. Questions were peer-reviewed and piloted within the research team, who are experts in qualitative data collection with children and adults. Focus groups and interviews were conducted

**Table 1**

Descriptive overview of family composition, mean age, gender and ethnic background of children and their parents in respective socioeconomic status groups.

Descriptive Variable	Low Socioeconomic Status (n = 5 families)	Middle Socioeconomic Status (n = 8 families)	High Socioeconomic Status (n = 11 families)
Mean Family Composition	One Parent and One Child	Two Parent's and Two Children	Two Parent's and Two Children
Mean Child Age, years (range)	13 (9–14)	11 (8–15)	13 (8–16)
Mean Parent Age, years (range)	42 (36–55)	44 (31–57)	46 (35–60)
Child Gender, n (%)	Male 2 (29) Female 5 (71)	Male 8 (47) Female 9 (53)	Male 6 (33) Female 12 (61)
Parent Gender, n (%)	Male 2 (33) Female 4 (67)	Male 4 (33) Female 8 (67)	Male 9 (47) Female 10 (53)
Children's Ethnic Background, n (%)	Asian 1 (14) Mixed Ethnicity 1 (14) White 5 (71)	Mixed Ethnicity 2 (12) White 15 (88)	Mixed Ethnicity 2 (11) White 16 (89)
Parent's Ethnic Background, n (%)	Asian 1 (17) White 5 (83)	Asian 1 (8) White 11 (92)	Asian 1 (5) White 18 (95)

with participants by the lead researcher, recorded on a Dictaphone and transcribed verbatim. The lead researcher has experience in conducting qualitative interviews with children and adults and has previously undergone training in non-directive interviewing techniques, active listening and the importance of maintaining a neutral verbal and non-verbal stance during focus groups and interviews. The lead researcher recognised their own positionality as a physically active individual and without children and took actions to mitigate potential influence on the research. Reflexivity was maintained throughout, to support ongoing self-awareness and reflection on the lead researcher's role during focus groups and interviews. The family focus group was first, followed by separate parent and child interviews. Given that focus groups consisted of the entire family, they were no smaller than 2 and no larger than 4 participants. These group sizes were chosen so that discussions were not hindered by too few or too many participants, since too few participants may lead to limited discussion, and too many may prevent participants the opportunity to present their perspective.<sup>17</sup>

### 2.3.1. Whole-family focus group

The focus groups consisted of five questions, all with relevant probes. An opening question asked participants whether they took part in physical activity, including the mode of physical activity, the frequency, and what could help them to participate if they are currently physically inactive. The questions then moved into details relating to the factors that enable and limit physical activity participation, including their awareness of local available opportunities to engage with physical activity (see below for guiding questions utilised during focus groups). The whole-family focus groups lasted between 10 and 20 min.

1. Do you take part in physical activity? If so, how regularly, and can you tell me about sports, modalities and length of these?
  - a. If you don't take part in physical activity, can you talk me through why? What could help you participate in physical activity?
2. Thinking about your current level of physical activity, would you say that this is the correct level for you, or would you prefer to do more or less?
3. Can you talk me through the reasons you take part in physical activity?
4. Can you explain who enables physical activity participation for you?
5. Can you talk me through the physical activity opportunities available to you?
  - a. What about the barriers to physical activity?

### 2.3.2. Parent interviews

Parent interviews were conducted based on family size, and therefore if one parent was present, this was conducted as a single parent interview, and if two parents were present, these were conducted as dyadic interviews. Parents took part in the interviews following the

whole-family focus groups, whilst children were taken to a separate room with 2 researchers. To gauge parent's perspectives of the aspects influencing their perceived feasibility of family physical activity, parents were asked five questions. An opening question asked if parents preferred to take part in physical activity with or without their children. The subsequent questions delved into further detail of whether parents preferred physical activity participation alone, with their children, or prefer to be involved in their children's physical activity participation in other ways, and factors they believed would affect physical activity participation with their children (see below for guiding questions utilised during interviews). The parent interviews lasted between 5 and 20 min.

1. Can you talk me through whether you prefer to take part in physical activity with or without your children?
2. Can you talk me through whether you would prefer to play a team sport with your friends, your children, or both?
3. Can you explain that when your children are taking part in physical activity, do you prefer to watch them, or do you prefer to participate in physical activity at the same time as them, and not watch?
4. Can you talk me through whether you feel there is an influence of who is running a physical activity session on motivation to take part?
5. If you could choose any form of physical activity to take part in with your children, what would it be?
  - a. Can you talk me through what you would include in a session?

### 2.3.3. Child interviews

Child interviews were conducted based on family size, and therefore if one child was present, this was conducted as a single child interview, and if two children were present, this was conducted as a dyadic interview. There was one instance with three children participating at once, and thus this was conducted as a focus group interview. Children took part following the parent interviews. Prior to interviews commencing, child assent was reaffirmed. To gauge children's perspectives of the aspects influencing their perceived feasibility of family physical activity, children were asked five questions. An opening question asked if children prefer to take part in physical activity with or without their parents. The subsequent questions delved into further detail of whether children preferred being physically active alone, with their parents, or preferred their parents to be involved in alternative ways. Questions also covered factors they believed would affect physical activity participation with their parents (see below for guiding questions utilised during interviews). The child interviews lasted between 5 and 15 min.

1. Can you talk me through whether you prefer to take part in physical activity with or without your parents?
2. Can you talk me through whether you would prefer to play a team sport with your friends, your parents, or both?

3. Can you explain that when you are taking part in physical activity, do you prefer your parents to watch you, or do you prefer your parents to participate in physical activity at the same time as you, and not watch?
4. Can you talk me through whether you feel there is an influence of who is running a physical activity session on motivation to take part?
5. If you could choose any form of physical activity to take part in with your parents, what would it be?

a. Can you talk me through what you would include in a session?

#### 2.4. Data analysis

Focus groups and interviews were transcribed by the lead researcher and anonymised by removing identifiable characteristics from the data, with transcripts for each focus group and interview checked against the recordings to ensure accuracy prior to analysis. Transcripts were split into either low, middle, or high socioeconomic status, and subsequently analysed in the respective groups. Qualitative content analysis, with an inductive and semantic approach, was undertaken by the lead researcher.<sup>18,19</sup> This analysis was deemed most appropriate since it allows themes to be identified from the data which are exclusively representative of the perceptions of the participants and is significant for exploratory work in an area where little is known. The analysis involved a recurrent process of submerging oneself in the data and obtaining the sense of the data (preparation phase), interpreting the content of the text through the systematic classification process of coding and identifying themes which represented similar patterns of communication (organising phase), and reporting the analysis process and results through themes and a story line (reporting phase).<sup>18</sup> To ensure consistency in the analysis, a coding table was developed and initially piloted on a subset of transcripts and was continuously refined throughout the analysis process in response to emerging data and patterns. The lead researcher also engaged in regular peer debriefing to discuss coding and theme interpretations and to mitigate potential bias. Decisions about grouping codes into themes were made iteratively, with close attention to conceptual coherence within groupings and clear distinctions between them. Theme development was informed by both the frequency with which topics appeared in the dataset, as well as their relevance to the research question. In addition, a detailed examination of language, context and underlying meaning was undertaken, to ensure that themes accurately reflected the content and nuances of the dataset.<sup>18,19</sup>

### 3. Results

The key themes in relation to the barriers and facilitators of family-based physical activity from a whole-family perspective, with a consideration of socioeconomic status and its potential impact for family-based physical activity, are presented. Children and parents' perceptions of the factors influencing their perceived feasibility of family-based physical activity, and how perceptions differ across socioeconomic status, are conversed separately.

An analysis of the focus groups identified 3 main themes that illustrated families' experiences of the facilitators to physical activity participation: parent and child role-modelling, physical and mental health benefits and local facility provision; and 2 main themes for the barriers families face to physical activity participation: cost, access and quality of local facilities, and lack of free time. Analysis of the parent and child interviews identified 1 main theme that ran across both groups: parent ability to perform at the same level as the children. The parents also identified the following 3 factors influencing their perceived feasibility of family-based physical activity: perceived enjoyment and quality family time, children may impact intensity of session and adverse and favourable weather; and the children also identified

two factors influencing their perceived feasibility of family-based physical activity: feeling safe and team-based sport is most favourable.

#### 3.1. Whole-family perspective of facilitators to family-based physical activity participation

The facilitators to physical activity participation differed across socioeconomic status groups, with parental role-modelling and the perceived health benefits of physical activity being key facilitators for all families; families from the low socioeconomic status group also discussed how child role-modelling is a facilitator. Local facility provision was indicated as a facilitator by families in the middle and high groups, but not in the low socioeconomic status group (see Fig. 2).

##### 3.1.1. Parent and child role modelling

Of all the sub-themes examining the facilitators to family physical activity, role modelling was the most common facilitator across all groups. All families, regardless of socioeconomic status, discussed how both mothers and fathers are central to children's physical activity participation, and role modelled through their own physical activity participation. Children felt their parents were motivators for their own physical activity participation:

"I think I motivate myself, but I think definitely the family motivates me as well. If I see like mum's been out for a run, then I will go for a walk or a run" (Family 10 daughter, high socioeconomic status)

"Swimming is family [motivated]" (Family 5 son, middle socioeconomic status)

"Yeah, swimming definitely is, isn't it because it's kind of come through my side of the family really. Ermm there's an element of involvement there" (Family 5 father, middle socioeconomic status)

Parents were also seen to take on the role model lead in all socioeconomic status groups by giving verbal encouragement to their children on the importance of being physically active, one child from the low socioeconomic status group described that "my parents want me to go out more and do more activities" (family 1 son, low socioeconomic status) when discussing what influences physical activity participation for them.

Whilst all families discussed this, for the high socioeconomic status families, there were additional discussions about parental involvement in sport in other forms. Parents' in this group were identified as having active involvement in sport, such as being club captain, and was viewed as a motivating factor that encouraged their children to be physically active through role modelling.

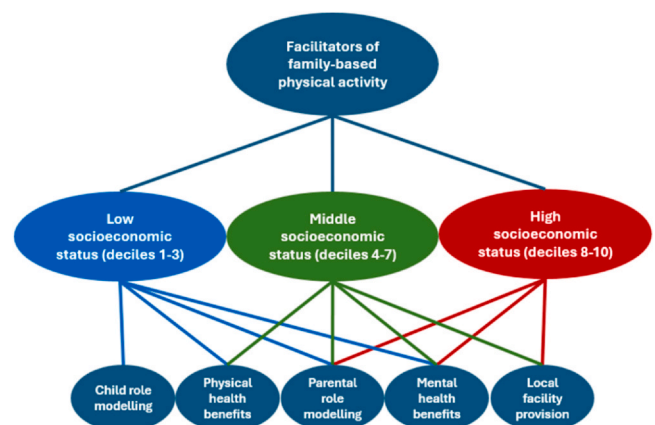


Fig. 2. Whole-family perspective of the facilitators to family-based physical activity, split by socioeconomic status.



I run part of the netball team as I am club captain so erm yeah I push a lot of it. I do encourage him to do as much as he can but he's not as keen on it are you" (Family 8 mother, high socioeconomic status)

Families in the low-middle groups in this study did not discuss parental involvement in sport in this manner as encouraging for children, particularly as they were not involved in sport in this way.

An alternative form of role modelling was indicated by families in the low socioeconomic status group only and included children acting as role models for their parent. Parents in the low socioeconomic status group explained that as their children are physically fitter, their desire to continue participating in physical activity derived from "feeling like I want to be able to feel like keeping up with the kids and just sort of my own fitness" (family 2 mother, low socioeconomic status).

### 3.1.2. Physical and mental health benefits

It was noted by all families that enhanced mental health was a highly valued outcome of participating in physical activity and was the primary reason for physical activity participation. Families described this by giving examples such as: "switching off with exercise" and the "social aspects of exercise as well" (family 11 father, high socioeconomic status). Furthermore, families emphasised that physical activity is important for having a mental break from day-to-day life, including work and home life, whereby physical activity is an approach to release these stressors.

"So especially because a lot of my work is at home behind a computer, I feel real slump, you know, and my body temperature dips, and I feel a bit sluggish, and I've got no energy. And that's when I know if I just go and have a quick workout I'll feel so much better in myself, and even just getting out to walk the dog, you know it's good for your mental health" (Family 16 mother, low socioeconomic status)

"It's a way for me to release all the stress from work and from dealing with children" (Family 24 mother, high socioeconomic status)

Whilst all families highlighted the mental health benefits of physical activity, families from the low and middle socioeconomic status groups were more overt in discussing the physical health benefits of physical activity, including that physical activity promotes an optimum body composition and general health and fitness. Parents emphasized that maintaining an optimum weight status was a key motivator for them to participate in physical activity.

"Well, there is a health issue obviously and there's a weight issue as well. I am trying to lose my weight and it is difficult you know if you are not doing physical activity" (Family 1 father, low socioeconomic status)

### 3.1.3. Local facility provision

Both the middle and high socioeconomic status groups described their local facility provision as easily accessible and freely available. Families from these groups provided valuable insights on the excellent provision of private local leisure centres, sports clubs, and free for use facilities in local parks that promote many physical activity opportunities. For example, an emphasis was placed on the numerous nearby local green spaces and excellent facilities.

"We are quite lucky to have a lot of leisure centres and we have also got a gym membership but we don't very often use it do we but daddy uses more than we do. So I think we are probably quite lucky living in the city don't you think? So yeah, we are extremely lucky having everything so close by" (Family 3 mother, middle socioeconomic status)

"I mean there is swimming pools nearby, there's quite a few, and then there is martial arts I used to go to, there's a park, we have

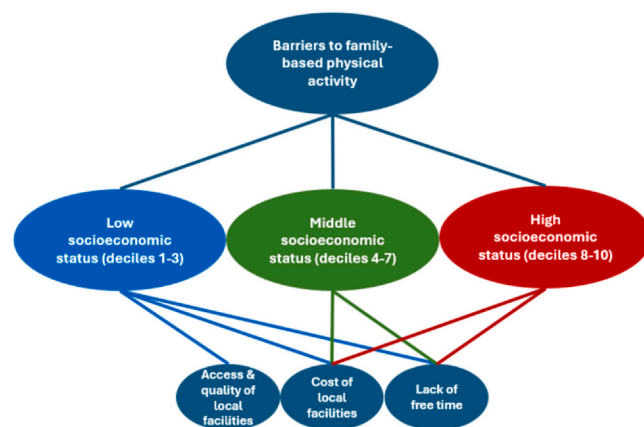


Fig. 3. Whole-family perspective of the barriers to family-based physical activity, split by socioeconomic status.

loads of local parks, there is one behind my house, loads of other ones quite close, we are on a new housing estate, it's not very new anymore" (Family 8 son, high socioeconomic status)

For the children in the high socioeconomic status group that attended fee-paying schools, it was noted how the school facilities and access to extracurricular clubs increased children's involvement in both recreational and competitive sport. As a result, parents and children from these families had greater overall similar interests in sport which overlapped into their family time.

"Swimming I think it was like kind of mummy and daddy cos we started really small, and then dancing it was probably you [mother] as well as I started at 3 and I have just carried on" (Family 15 daughter 1, high socioeconomic status).

### 3.2. Whole-family perspective of barriers to family-based physical activity participation

Given the significance of local facility provision as a facilitator for the high and middle socioeconomic status groups, unsurprisingly it was highlighted as a key barrier for families in the low socioeconomic status group. The high cost of local facilities and clubs and lack of free time were significant barriers discussed by all socioeconomic status groups (see Fig. 3).

#### 3.2.1. Lack of free time

Life commitments, such as work and school, including fitting physical activity around family responsibilities and home life were described as factors affecting the opportunity to participate in additional physical activity for all families due to these responsibilities leaving little free time. Families from the middle socioeconomic status group further explained "we do a lot in the holidays but we don't do much when its school as we don't get time" (family 6 daughter, middle socioeconomic status) highlighting the increased opportunity to engage in family activity in the school holidays.

"We try to [do more physical activity], but I think she struggles more cos she has a lot more house and family responsibilities while I am busy tapping away at my computer at home" (Family 1 father, low socioeconomic status)

"Erm I'd probably like to do more [physical activity], but erm just with other commitments with work and things I probably can't fit in anymore" (Family 11 father, high socioeconomic status)

Whilst all families agreed that life commitments were a barrier to family physical activity participation, families from the low socioeconomic status group further explained that most of their children attended regular sports clubs that were not in the local neighbourhood. Because of this, these parents were prioritising their children's physical activity by spending time

travelling to clubs, restricting physical activity opportunities for themselves.

“Yeah, that group [youth club] does the gym don’t they, but that is only once a week. Erm what else is near us? Oh there is that boxing, near where he [son] goes to squirrels? Kickboxing is in the leisure centre” (Family 2 mother, low socioeconomic status)

“Oh yeah” (Family 2 son, low socioeconomic status)

“Yeah but the other clubs we drive to don’t we” (Family 2 mother, low socioeconomic status)

### 3.2.2. Cost, access and quality of local facilities

Considering the importance of local facility provision as a facilitator for families in the middle-high socioeconomic status groups, this was a primary barrier to physical activity participation for all families in the low socioeconomic status group. Families specifically addressed the lack of up to date and age appropriate free-for-use facilities in local parks and green spaces, and although families have access to local green spaces and parks, these were described as smaller in size, creating fewer physical activity opportunities: “oh there are parks” (Family 2 mother, low socioeconomic status), “but only small ones that are in walking distance” (Family 2 son, low socioeconomic status). Families in the low socioeconomic status group also valued having local authority owned leisure centres in proximity, yet these were described as not fully equipped nor great for promoting physical activity opportunities of interest.

“We do have a leisure centre, although it’s not brilliant. Yeah, it could. I always think we could benefit from a really good leisure centre” (Family 16 mother, low socioeconomic status)

“What leisure centre?” (Family 16 daughter, low socioeconomic status)

“Like with a pool. You know, we don’t really have any nice pools, do we!” (Family 16 mother, low socioeconomic status)

Families in the low socioeconomic status group further described the high cost of the activities at local authority owned leisure centres preventing them from participating in their physical activity of choice. One parent commented that “I used to play table tennis but err yeah we are considering restarting that and going there but there is a cost issue” (Family 1 father, low socioeconomic status). Although families in the middle and high socioeconomic status groups identified local facility provision as a facilitator, they agreed with the low socioeconomic status families that the cost of local sports facilities and clubs were high and were aware of how costs at local authority owned and private leisure centres can increase during the summer months, preventing families from being physically active together.

“It’s the cost implication side of things as well” (Family 13 mother, high socioeconomic status)

“We’re trying to get her [daughter] in as well, we are trying to do swimming all 3 of us, during the week, nowhere! It’s either schools or lanes so there’s no like free swim” (Family 13 father, high socioeconomic status)

“The only free swims you get are during the summertime and they get really expensive” (Family 13 daughter, high socioeconomic status)

Families from the middle socioeconomic status group also commented on how activities and sports clubs for children tend to have an upfront cost, problematic if children’s activity levels wane.

“I think we have all of those [leisure centres and clubs] but I mean at the minute it’s affording it all so erm yeah, but I am hoping new year and new me anyway, cos these kids, I don’t wanna pay for something and then they just don’t go. If I pay for something, I am going” (Family 7 mother, middle socioeconomic status)

### 3.3. Parents perspectives of the factors influencing their perceived feasibility of family-based physical activity

From the individual parent interviews, the main factors discussed by all parents in relation to the factors influencing their perceived feasibility of participating in family-based physical activity include functional considerations, such as parents’ ability to perform at the same level as children, and children’s misbehaviour. Further discussions revealed that parents portray family-based physical activity as a means of obtaining quality family time and would encourage them to participate in family-based physical activity. Given the significance of cost, access and the quality of local facility provision as a barrier for low socioeconomic status families, parents in this group spoke of the challenges around participating in physical activity during the winter months, particularly as participating in family-based physical activity outdoors was the most likely opportunity for these families (see Fig. 4).

#### 3.3.1. Parents’ ability to perform at the same level as children

All parents expressed how parental ability to keep up with the children during a family-based activity session could hinder the session for the children, particularly as children were described as having greater fitness levels. One parent discussed how the children are “much more quicker and they are fitter and they’re much more active than me so I cannot keep up with them” (Family 1 father, low socioeconomic status). However, this was seen to also be encouraging for parents.

“Hmm with now [prefer exercising with children] I think it was harder when they were younger cos you couldn’t get the pace up that you needed to get to, but now I almost think it’s a good choice to keep up with them” (Family 6 mother, middle socioeconomic status)

Therefore, low moderate vigorous physical activities could be utilised in the first instance until parents are able to keep up with their children, or supporting parents with their fitness alongside family-based physical activity would be avenues to mitigate the difference between parent and child fitness levels, and ensuring family-based physical activity can take place.

#### 3.3.2. Perceived enjoyment and quality family time

Parents from all groups explained how they thought family-based physical activity is now “more about enjoying it with the kids” (Family 4 mother, middle socioeconomic status) allowing for quality family time and would encourage them to participate in regular family-based physical activity. Many parents further explained that this enjoyment as a family unit comes from a shared experience: “Erm but I do really enjoy going for a run with her [daughter] erm from a father daughter

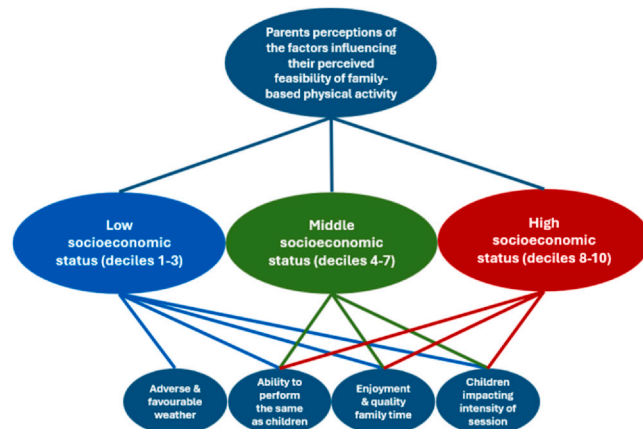


Fig. 4. Parents perceptions of the factors influencing their perceived feasibility of family-based physical activity, split by socioeconomic status.

type set up" (Family 11 father, high socioeconomic status), but the age of the children can impact this, with enjoyment declining as children grow older, possibly due to differences in interests.

"now that they [children] are older you know I can't necessarily do things with him [son] because the things sports he loves aren't what I would be able to enjoy with him" (Family 10 mother, high socioeconomic status)

### 3.3.3. Children may impact intensity of session

Most parents emphasised how children's ability to maintain good behaviour during a family-based physical activity session would negatively impact the intensity of the session for them. Middle socioeconomic status parents discussed this more overtly, explaining that when children misbehave during family-based physical activity, they "walk away thinking I actually haven't done a lot" (Family 5 father, middle socioeconomic status). Parents from the high socioeconomic status group considered this further by explaining their role as a parent includes helping the children if needed, preventing parents getting the most out of the session as they are spending a lot of time teaching the children rather than focusing on their own performance.

"Yeah it [family-based physical activity] kinda restricts you in what you can do and how long you can do it for erm and yeah you find out you are helping her [daughter] more than you would be focusing on yourself" (Family 13 father, high socioeconomic status)

Therefore, incorporating a range of activities into family-based physical activity would be a practical avenue to combat children's misbehaviour and enhance children's engagement, negating the risk of children losing concentration and disrupting the session for parents.

### 3.3.4. Adverse and favourable weather

Since the cost, access to, and provision of local authority owned indoor leisure centre facilities was a key barrier for low socioeconomic status families, low socioeconomic status parents spoke of participating in family-based physical activity outdoors, in free local parks, as the most likely opportunity. Because of this, adverse weather conditions were expressed as a factor that could hinder family-based physical activity participation. Parents shared the challenges around taking part in family-based physical activity in the winter seasons, explaining it was much more likely that the better summer weather would increase the feasibility of participating in family-based physical activity. One parent mentioned that "occasionally we will go in the summer, we will go as a family to the park and take a ball and kick a ball around, erm do a bit of exercise that way" (Family 1 father, low socioeconomic status), and referred to winter as "difficult, it's cold and shorter days" (Family 1 father, low socioeconomic status).

## 3.4. Children's perspectives of the factors influencing their perceived feasibility of family-based physical activity

Children agreed with parents on that parent's ability could possibly hinder a family-based physical activity session for them. Further discussions during the child interviews revealed that regardless of socioeconomic status, there was a general agreement between children on the following: younger children would feel safe and familiarity participating in physical activity with their parents, and team-based sport is the most favoured mode for family-based physical activity (see Fig. 5).

### 3.4.1. Parents' ability to perform at the same level as children

All children mentioned that parent's ability to keep up with the children during a family-based physical activity session could hinder the session for them. Children perceived themselves as having greater fitness levels and ability than their parents, and thus parents would struggle to perform at the same level as the children, lowering the overall intensity and enjoyment of the session for the children. The

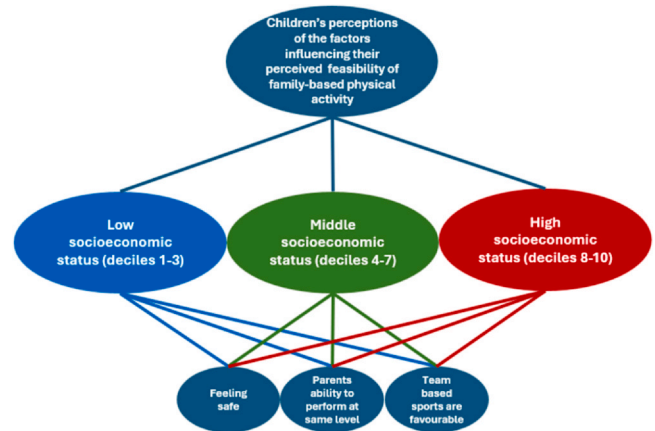


Fig. 5. Children's perceptions of the factors influencing their perceived feasibility of family-based physical activity, split by socioeconomic status.

older children in particular discussed feelings of embarrassment at the thought of being physically active with their parents, and in this instance, children also thought that parents have greater incapacities relating to exercise performance.

"We have tried at the gym doing the gym sessions, but it is too embarrassing, and I just prefer if it was by myself or with friends as they [parents] don't have the same ability" (Family 12 daughter 1 aged 15, high socioeconomic status)

"Probably yeah just friends as I feel like your friends are more like to your ability" (Family 12 daughter 2 aged 12, high socioeconomic status)

"Yeah and you can like be more competitive than with your parents" (Family 12 daughter 1 aged 15, high socioeconomic status)

### 3.4.2. Feeling safe

In particular, the younger children distinguished that having parents participate in physical activity with them would increase familiarity, enjoyment and create a safe environment for physical activity participation as opposed to if they were participating alone, or without their parents.

"I mean rugby I would rather have my parents play with me because like I mean my friends are not as good as my parents, no offence to them, erm also like my dad knows how I play and what I can do and what I can't do and what my brain thinks" (Family 4 son aged 11, middle socioeconomic status)

"Sometimes I get insulted for doing something wrong and I really don't like it and if my parents are there they are obviously not going to insult me because they know me" (Family 8 son aged 10, high socioeconomic status)

The younger children in the high socioeconomic status group revealed that the feeling of not being lonely and having companionship with a familiar face such as their parents would increase enjoyment.

"I do play [sport] with my friends quite a bit already and also team games it would be quite good if like more people you know [parents] are on your team" (Family 9 son aged 12, high socioeconomic status)

In these instances, the children referred to the most likely opportunity of participating in family-based physical activity as starting a new sport together, and thus vouched that commencing a new sport with their parents would increase familiarity, safety and enhance companionship as opposed to if they were commencing alone.



### 3.4.3. Team-based sport is most favourable

Many of the children included in the present study participated in individual sports and spoke on their opinions of participating in these sports concurrently with their parents, deeming it to be embarrassing, particularly due to the older age and incapability of parents. One child mentioned: "Gymnastics I would rather them watch cos I'd actually throw up watching them if they did gymnastics cos like it is not for 50-year-olds" (Family 4 son aged 11, middle socioeconomic status), when discussing this concept with their sibling.

Considering this, all children revealed that parents participating in physical activity with them is dependent on the mode of sport, and in particular team sports were the most desired mode for family physical activity due to the increase in socialising and bonding of the family unit. Seeing as all think that children have greater capabilities, and participating in individual sports concurrently with their parents was less favourable, a team sport that parents and children are less familiar with, which they can start and learn together, was believed by children as the most likely for participation in family-based physical activity.

"But then there are some things that are harder to play as a family as there is a big difference in quality. Like I wouldn't dance with her [sister] cos it would be a big difference where I might not cycle with mum but I could play tennis with dad" (Family 10 son aged 14, high socioeconomic status)

"I would like to try fencing as I have never done it, but dodge ball would be my go-to right now" (Family 8 son aged 10, high socioeconomic status)

## 4. Discussion

This is the first study to consider whole-family perspectives on the barriers and facilitators to family-based physical activity, together with both parents and child perspectives on the factors they believe influence their perceived feasibility of participation in family-based physical activity, alongside a consideration of socioeconomic status. The primary findings of this study include that irrespective of socioeconomic status, families experienced similar facilitators to physical activity (parental role modelling, physical and mental health benefits), and similar barriers (cost and free time). However, the provision and upkeep of local facilities was a key barrier for low socioeconomic status families, which in contrast was a key facilitator for middle and high socioeconomic status families. When discussing the factors influencing their perceived feasibility of family-based physical activity with parents and children separately, differing levels of fitness between children and parents was discussed by all, as well as children's misbehaviour discussed by parents, were noted as potential hindrances to be mitigated. However, parents believed family-based physical activity would facilitate quality family-time, whilst younger children expressed that they would feel safe in a familiar environment with family-based physical activity.

Whilst considering the facilitators of physical activity, most families reported improved physical and mental health as positive outcomes of participating in physical activity. The mental health benefits of physical activity were reported by families from all groups, as well as the low-middle socioeconomic status families discussing weight control and enhanced physical fitness more overtly. However, the physical health benefits of physical activity are not derived by socioeconomic background and therefore are applicable to all families from differing socioeconomic backgrounds; in the present study the high socioeconomic status families focused primarily on the mental health benefits of physical activity as this was their key motivator for physical activity participation. In accordance with prior research, mental health benefits are recognised key motivators that facilitate physical activity participation in children, adults, and parents respectively.<sup>6,20,21</sup> Therefore, the findings from the present study are not only consistent with

literature in children, adults and parents, but also link with the notion that physical activity behaviours are strongly shaped by both the individual and interpersonal levels of the Social Ecological Model.<sup>22</sup> Not only does motivation for being physically active develop from individual factors (such as understanding the health benefits of being physically active), but also the interpersonal relationships between children and their parents. Supportive family dynamics, whereby children and their parents provide encouragement for one another on the physical and mental health benefits of being physically active, could greatly increase the chances of physical activity across generations.

The two most cited barriers from all families, regardless of their socioeconomic status, were the high cost of a physically active lifestyle and free-time availability to participate in physical activity. Parents from the low socioeconomic status group highlighted that they spend their free time prioritising their children's physical activity due to travelling further distances because of the poor local facility provision, with all families highlighting that life commitments, such as work and school, are a barrier to physical activity participation. These barriers are commonly reported amongst parents and children separately,<sup>23-26</sup> and thus it is expected that high cost and free time limit physical activity opportunities for families. The findings from the present study reflect the systemic constraints on physical activity participation for families regardless of their socioeconomic status, reinforcing the need for multi-level interventions which incorporate low-cost activities, strategies for work- and school-life balance and support for families in integrating physical activity into their busy routines.

The provision of local facilities was discussed differently by families in middle and high socioeconomic status families when compared with low socioeconomic status families. Low socioeconomic status families felt that local facilities are a barrier to physical activity, whereas families in the middle and high groups felt these were a facilitator. Families in the low socioeconomic status group highlighted that local green spaces were present; however, these are small and lacking in facilities, and local authority leisure centres are not fully equipped nor great for promoting physical activity opportunities. Prior evidence has shown that the accessibility of facilities declines with level of deprivation according to a national level database of indoor exercise facilities in England, resulting in fewer resources for physical activity participation for those in low socioeconomic status areas,<sup>27</sup> as well as low-income individuals having the lowest accessibility levels to facilities.<sup>28</sup> The present study reinforces earlier findings to provide evidence that these barriers exist for families but also supports the community level of the Social Ecological Model, which recognises that environmental conditions (such as poorly maintained local facilities) significantly constrain physical activity opportunities.<sup>29</sup> Collectively, these findings highlight the need for targetable community-level and policy-level interventions which are suitable for families from a range of socioeconomic backgrounds.

Families from all socioeconomic status groups recognised that parents take an active role model lead by giving verbal encouragement to their children on the importance of being physically active, as well as modelling through their own physical activity participation. The Family Ecological Model suggests that parents play an important role in increasing their children's physical activity through various mechanisms, such as verbal encouragement and modelling through their own participation in physical activity, so children can adopt healthy behaviours and achieve an optimum health status,<sup>30-33</sup> which are consistent findings in the present qualitative study. However, the present study also builds on the finding from the Family Ecological Model to suggest that children also role-model physical activity behaviours for their parents; a concept discussed by low socioeconomic status families in the present study. Parents felt their desire to participate in physical activity arose from feelings of wanting to keep up with their active children. Children and parents acting as role models for one another are promising findings as the parent-child dyad suggests there is a modest bi-directional relationship between parent and offspring physical activity levels.<sup>34,35</sup>



Therefore, future interventions may wish to focus on family-based physical activity which offers an opportunity to utilise parent and child role-modelling simultaneously, to increase physical activity levels in children and parents.

When discussing the factors influencing their perceived feasibility of family-based physical activity participation with parents and children separately, all described children as physically fitter, and thus the differing levels of fitness between children and parents was highlighted as a factor that could negate the chances of family-based physical activity taking place. This may be since children predominantly participate in organised sport with peers of the same age and capabilities, largely in school and club settings,<sup>36,37</sup> and therefore parents were perceived as lacking in similar capabilities as children. Therefore, starting with low moderate physical activities, or supporting parents with their fitness alongside family-based physical activity until parents can keep up with their children, would be avenues to ensure family-based physical activity can happen. However, parents believed this insight would encourage them to work harder, and thus family-based physical activity could be an avenue to increase the overall exercise intensity for parents, as opposed to if they were participating alone, resulting in enhanced health benefits. Conversely, most parents perceived children's misbehaviour as a factor that would negatively impact the intensity of the session for themselves, with high socioeconomic status parents sharing their thoughts on younger children losing concentration easily during a family-based physical activity session. To combat this, a range of activities could be utilised to enhance children's enjoyment and engagement long-term, which could negate misbehaviour and lack of concentration.<sup>38</sup>

Children from all groups deemed team-based sports as the most desirable for family-based physical activity. This may be since the team-based element of such sports factor in many social benefits such as improved social interaction and social network across childhood and adulthood, leading to greater enjoyment.<sup>39,40</sup> Therefore, children in the present study felt that team-based sports could increase social interaction within the family unit,<sup>39</sup> leading to superior enjoyment, as opposed to if they were participating in alternative modes of physical activity as a family. Furthermore, many children felt a less familiar team sport would be most applicable for participating in family-based physical activity, especially as children and their parents can learn together, enhancing the social interaction.<sup>39</sup> Future family-based physical activity interventions should focus on incorporating team-based elements in an intervention, with an aim of being less familiar to both parents and children, that would not only lead to greater health benefits through increased physical activity, but also greater socialising and stronger relationships within the family unit and improved family well-being.<sup>40</sup>

Nevertheless, the older children from all socioeconomic status groups stated they would feel embarrassed at the thought of being physically active with their parents whilst the younger children specified, they would feel safe in a familiar environment with family-based physical activity. Many parents discussed the initial point and deemed that enjoyment declines as children grow older, perhaps due to the differences in interests with older children. Younger children are known to feel greater security with their parents,<sup>41</sup> whereas adolescents tend to seek more independence regarding how they lead their lives.<sup>41,42</sup> This could explain the difference in interests between parents and older children and thus, family-based physical activity may not work for families all the time, but commencing early when children are younger and identifying activities that are both appropriate for the family's preferences and practical to carry out within their available facilities, would be an avenue to encourage longer term engagement as a collective.

#### 4.1. Limitations

This study provides key concepts of family-based physical activity, including the barriers, facilitators, and factors influencing perceived feasibility, although it has some limitations. Firstly, the families that participated in the study may perceive physical activity as more important than those who did not participate, and thus these findings may not reflect families that

feel physical activity is less important, reducing the generalisability of the findings. Secondly, social desirability bias may have influenced the information which families reported during the focus groups and interviews. Since physical activity is a socially desirable behaviour, families may have downplayed or over exaggerated the barriers and facilitators they face with physical activity participation. However, the lead researcher ensured to use open ended and non-direct questions when discussing these concepts with families, to minimise such influence. Furthermore, the lead researcher self-described themselves as physically active and without children, and as a result, this may have influenced families' responses when discussing the barriers to physical activity participation. The lead researcher did however take steps to mitigate this, including maintaining a neutral tone during focus groups and interviews so that families felt comfortable discussing their thoughts. There is a lack of families in the low socioeconomic status group compared to those in the middle and high groups due to recruitment being difficult in this population. Therefore, bias towards perceptions being underrepresented in the low socioeconomic status group compared to the middle-high socioeconomic status groups may exist in the present study. Finally, the IMD 2019<sup>16</sup> was utilised to categorise families into the low, middle, and high socioeconomic status groups. While this approach does not capture individual or family-level socioeconomic details, it does reflect local area deprivation which is more relevant to the accessibility and availability of local facilities for physical activity, which is central to the aims of the present study. This method has however previously been reported to have limited sensitivity for identifying individuals who are income or employment deprived.<sup>43,44</sup> We did not collect additional individual socioeconomic status data and thus future work could benefit from including more detailed socioeconomic status data.

## 5. Conclusions

Based on the perceptions of those involved in the focus groups and interviews conducted in the present study, family-based physical activity may offer a promising avenue for increasing physical activity in children and their parents concurrently, thus warranting further investigation. Specifically, multi-level family-based programmes (programmes that address multiple areas) embedded within the community, which incorporate low-cost activities, strategies to balance work- and school-life and support for parents' fitness are crucial to negate the barriers associated with physical activity participation in families from a range of socioeconomic backgrounds. These programmes should consider establishing family-based physical activity with younger children (8–12 years old) and integrating a range of team sports which can be performed indoors and outdoors, to negate the barriers associated with access to and provision of facilities for low socioeconomic status families, and concerns pertaining to children's engagement and enhancing family well-being. Overall, family-based physical activity interventions could offer an opportunity to utilise both parent and child role modelling, to model physical activity behaviours and provide verbal encouragement on the enhanced physical and mental benefits of physical activity which could enhance long-term engagement.

## Ethical approval

The study is in agreement with the declaration of Helsinki. Ethical approval was granted by Nottingham Trent University's Ethical Advisory Committee (application no. 718).

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## Declaration of competing interest

Simon Cooper is an Editorial Board member of Advanced Exercise and Health Science. He was not involved in the editorial review or

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