PLOS ONE

A socio-ecological examination of the primary school playground: primary school pupil and staff perceived barriers and facilitators to a physically active playground during break and lunch-times.

--Manuscript Draft--

Manuscript Number:	PONE-D-21-28206
Article Type:	Research Article
Full Title:	A socio-ecological examination of the primary school playground: primary school pupil and staff perceived barriers and facilitators to a physically active playground during break and lunch-times.
Short Title:	Barriers and facilitators to a physically active primary school playground
Corresponding Author:	Michael Graham Teesside University Middlesbrough, UNITED KINGDOM
Keywords:	
Abstract:	Using the socio-ecological model as a conceptual framework, the objective of this study was to determine playground users (primary school staff and pupils) perceptions of the barriers and facilitators to a physically active school playground. Results from a series of qualitative interactions with children (9 to 11 years old) and structured interviews with adult teachers revealed key differences in the child and adult perceptions of the playground and the purpose of break-times. A number of inter-related environmental boundaries and school policies were identified as restrictive to children's explorations and activity levels during 'free play' periods, which centred on resource availability, accessibility and health and safety. Further, traditional playground hierarchies act to promote and prevent physical activity engagement for different groups (e.g. gender and age). This study provides an opportunity for primary schools to reflect on primary school playground strategies and practices that are implemented at each level of the socio-ecological model to encourage a more effective use of the playground during school break-times.
Order of Authors:	Michael Graham
	Kevin Dixon
	Liane B Azevedo
	Matthew D Wright
	Alison Innerd
Additional Information:	
Question	**Response**
Financial Disclosure Enter a financial disclosure statement that describes the sources of funding for the work included in this submission. Review the submission guidelines for detailed requirements. View published research articles from *PLOS ONE* for specific examples. This statement is required for submission and **will appear in the published article** if the submission is accepted. Please make	The author(s) received no specific funding for this work.

sure it is accurate. **Unfunded studies** Enter: *The author(s) received no specific funding for this work.* **Funded studies** Enter a statement with the following details: • Initials of the authors who received each award • Grant numbers awarded to each author • The full name of each funder • URL of each funder website • Did the sponsors or funders play any role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript? • **NO** - Include this sentence at the end of your statement: *The funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.* • **YES** - Specify the role(s) played. * typeset	
Competing Interests Use the instructions below to enter a competing interest statement for this submission. On behalf of all authors, disclose any competing interests that could be perceived to bias this work—acknowledging all financial support and any other relevant financial or non-financial competing interests. This statement is required for submission and **will appear in the published article** if the submission is accepted. Please make sure it is accurate and that any funding sources listed in your Funding Information later in the submission form are also declared in your Financial Disclosure statement. View published research articles from *PLOS ONE* for specific examples.	The authors have declared that no competing interests exist.

NO authors have competing interests Enter: *The authors have declared that no competing interests exist.* **Authors with competing interests** Enter competing interest details beginning with this statement: *I have read the journal's policy and the authors of this manuscript have the following competing interests: [insert competing interests here]* * typeset	
Ethics Statement Enter an ethics statement for this submission. This statement is required if the study involved: • Human participants • Human specimens or tissue • Vertebrate animals or cephalopods • Vertebrate embryos or tissues • Field research Write "N/A" if the submission does not require an ethics statement. General guidance is provided below. Consult the submission guidelines for detailed instructions. **Make sure that all information entered here is included in the Methods section of the manuscript.**	The study received ethical approval from the School of Health and Life Sciences ethics sub-committee at Teesside University (Application Number: 250/18). The study received written head teacher consent, written parent consent and written and verbal pupil assent prior to data collection.

Format for specific study types **Human Subject Research (involving human participants and/or tissue)** • Give the name of the institutional review board or ethics committee that approved the study • Include the approval number and/or a statement indicating approval of this research • Indicate the form of consent obtained (written/oral) or the reason that consent was not obtained (e.g. the data were analyzed anonymously) **Animal Research (involving vertebrate animals, embryos or tissues)** • Provide the name of the Institutional Animal Care and Use Committee (IACUC) or other relevant ethics board that reviewed the study protocol, and indicate whether they approved this research or granted a formal waiver of ethical approval • Include an approval number if one was obtained • If the study involved *non-human primates*, add *additional details* about animal welfare and steps taken to ameliorate suffering • If anesthesia, euthanasia, or any kind of animal sacrifice is part of the study, include briefly which substances and/or methods were applied **Field Research** Include the following details if this study involves the collection of plant, animal, or other materials from a natural setting: • Field permit number • Name of the institution or relevant body that granted permission	
Data Availability Authors are required to make all data underlying the findings described fully available, without restriction, and from the time of publication. PLOS allows rare exceptions to address legal and ethical concerns. See the PLOS Data Policy and FAQ for detailed information.	Yes - all data are fully available without restriction

A Data Availability Statement describing where the data can be found is required at submission. Your answers to this question constitute the Data Availability Statement and **will be published in the article**, if accepted. **Important:** Stating 'data available on request from the author' is not sufficient. If your data are only available upon request, select 'No' for the first question and explain your exceptional situation in the text box. Do the authors confirm that all data underlying the findings described in their manuscript are fully available without restriction?	
Describe where the data may be found in full sentences. If you are copying our sample text, replace any instances of XXX with the appropriate details. • If the data are **held or will be held in a public repository**, include URLs, accession numbers or DOIs. If this information will only be available after acceptance, indicate this by ticking the box below. For example: *All XXX files are available from the XXX database (accession number(s) XXX, XXX.*). • If the data are all contained **within the manuscript and/or Supporting Information files**, enter the following: *All relevant data are within the manuscript and its Supporting Information files.* • If neither of these applies but you are able to provide **details of access elsewhere**, with or without limitations, please do so. For example: *Data cannot be shared publicly because of [XXX]. Data are available from the XXX Institutional Data Access / Ethics Committee (contact via XXX) for researchers who meet the criteria for access to confidential data.* *The data underlying the results presented in the study are available from (include the name of the third party*	All relevant data are within the manuscript and its Supporting Information files

and contact information or URL). • This text is appropriate if the data are owned by a third party and authors do not have permission to share the data. * typeset	
Additional data availability information:	

Title: A socio-ecological examination of the primary school playground: primary school pupil and staff perceived barriers and facilitators to a physically active playground during break and lunch-times.

Short Title: Barriers and facilitators to a physically active primary school playground

Authors

Michael Graham[1], (corresponding author) Michael.graham@tees.ac.uk Orcid [0000-0002-3178-3226]

Kevin Dixon[2], Kevin.dixon@northumbria.ac.uk Orcid [0000-0001-6109-4547]

Liane. B. Azevedo[3], L.azevedo@hud.ac.uk Orcid [0000-0001-9966-9414]

Matthew. D. Wright[1], M.wright@tees.ac.uk Orcid [0000-0002-4909-4162]

Alison Innerd[1], A.innerd@tees.ac.uk Orcid [0000-0002-5479-6652]

Affiliations

1 School of Health and Life Sciences, Teesside University, Middlesbrough, UK

2 Sport, Exercise and Rehabilitation, Northumbria University, Newcastle, UK

3 School of Human and Health Sciences, University of Huddersfield, Huddersfield, UK

Abstract

Using the socio-ecological model as a conceptual framework, the objective of this study was to determine playground users (primary school staff and pupils) perceptions of the barriers and facilitators to a physically active school playground. Results from a series of qualitative interactions with children (9 to 11 years old) and structured interviews with adult teachers revealed key differences in the child and adult perceptions of the playground and the purpose of break-times. A number of inter-related environmental boundaries and school policies were identified as restrictive to children's explorations and activity levels during 'free play' periods, which centred on resource availability, accessibility and health and safety. Further, traditional playground hierarchies act to promote and prevent physical activity engagement for different groups (e.g. gender and age). This study provides an opportunity for primary schools to reflect on primary school playground strategies and practices that are implemented at each level of the socio-ecological model to encourage a more effective use of the playground during school break-times.

1. Introduction

High rates of physical inactivity have been reported among children of primary school age in the UK [1] and worldwide [2,3]. Physical activity in this age group is important for a number reasons; such as improved cardio-metabolic health [4,5], bone health [6], and mental health [7]. However, physical activity is a complex and multi-dimensional behaviour determined by numerous biological, psychological, sociocultural and environmental factors [8-12].

Ecological models of health (and physical activity) are one such method in considering a wide range of determinants. The socio-ecological model, originally developed by Brofenbrenner [13] and adapted by Sallis Bauman & Pratt [14], focusses attention on the key individual, interpersonal, environmental and policy agencies that have an active role in health and physical activity promotion.

There is evidence to suggest interventions will fail to make long term, sustainable changes to daily moderate to vigorous physical activity (MVPA) if they fail to adequately consider the interactive characteristics between individuals and their environment at the intra-personal (individual), inter-personal (social), environmental and organisational/policy level [15,16]. For example, implementing changes at an individual level by encouraging engagement in physically active pursuits during break-times will only work if appropriate environmental and policy level changes are also implemented at the school. However, many childhood physical activity interventions do not consider the multi-level influences on children's behaviour during the intervention [17].

Despite the inconsistency associated with the design of physical activity interventions, it is universally accepted that interventions within the school environment are important, and for good reason [18]. Children between 5 and 11 years of age can spend up to 30 hours per week within the school environment [19] making it an ideal setting to promote physical activity. Within a school day, school break-times are reported to be the most favourable periods of the day for children [20], providing periods of time for children to *"catch up"* with their friends [21]

which can positively impact on the integration and adjustment to the school environment [22]. However, as Baines and Blatchford [20] have indicated, schoolteachers (as part of the wider institution) and external policy makers tend to hold contrasting views. That is to say, school break-times are perceived by adult decision makers as a relatively unimportant pause in an otherwise busy day.

Notwithstanding, it is largely accepted that the 'free' play behaviours of children can be shaped by the contexts in which they are placed, and the wider geography of the environment, such as the human and physical dynamics of the space [23]. For instance, a previous playground observation study [24] found that increasing the amount of play features on a playground can increase the usage rate of these areas by 5 to 7%, per added feature for boys and girls, respectively. Colabianchi et al. [24] observed 20 recently refurbished urban school playgrounds and predicted that an increase of 10 items on the playground (e.g. sports courts) would increase usage by 50% in boys and 70% girls. However, previous systematic reviews of school break-time interventions have found both positive and negative effects on physical activity levels [25,26]. For example, there was no consistent effect in outcomes reported in multicomponent interventions (n=22) (including teacher training, line markings, staff and student training), or structured break-time interventions (n=7) (including sports coaches, organised games, PE activities introduced to break-times), with both positive and negative results reported on physical activity levels [26]. Whilst interventions which introduced loose playground equipment (n=5), though fewer in number, found consistent positive effects on PA levels [26]. However, a recent observation study highlighted that the type of equipment provided can have a negative effect on physical activity levels, such as providing equipment that is too advanced for the children's motor skill ability [27]. Therefore, it is likely the variety of effectiveness reported in the aforementioned studies are the result of contextual, organisational and cultural differences, and the funding and resources available for use during this period of the day.

In the UK, the Department for Education (DfE) provides eligible primary schools with funding from the Primary Physical Education and Sports Premium (PPESP) with the aim of enhancing the health and well-being of pupils. There is a growing amount of support for the use of the PPESP to enhance children's play and activity by making changes to the outdoor environment [28,29]. Furthermore, one of the five key indicators aligned to the aim to support the engagement of all pupils in regular physical activity is *'encouraging active play during break-times and lunchtimes'* [29]. Whilst the funding model and its key aims appear laudable and transparent, the extent to which the experiences and viewpoints of children are considered when designing suitable and sustainable outdoor play spaces remains unclear.

According to Jones [30], many fail to consider the 'otherness' of childhood when trying to understand children's engagement with activities during break and lunch-times, and in the design and development of a playground environment children will enjoy. Jones argues that when adults revisit their own childhood experiences they are 'filtered' by the experiences they have had since their adult becoming [30]. This is not to say these experiences are wholly irrelevant, but they cannot be straightforwardly applied or transferred to children lives today. As previous researchers have suggested, children operate with a different, more flexible and unfiltered negotiation of their world [30,31]. Previous well-intentioned methods of increasing physical activity in children has perpetuated a "controlling and oppressive way" [32] of coercing children to engage in physical activities. With this in mind, we join a growing list of scholars who argue that many adult prescribed and adult facilitated interventions can be counterproductive [33-35] and call for the meaningful inclusion of children and key supervising staff in the design of childhood play spaces in primary schools.

Notwithstanding, the activities and spaces available to children during school break-time are often designed, chosen, and enforced by adults, leading to the creation of play spaces using the method of "seeing through the child's eyes" [30]. Although there seems to be a genuine attempt from the adult population in the primary school environment to promulgate activities

that might be attractive to children [27] there must be some acknowledgement of the 'unbridgeability' [30] between adult and child experiences.

Therefore, the aim of this study is to develop a deeper understanding of user's (children and supervising staff) perceptions of the current playground environment available to children during break and lunch times. Furthermore, to fully comprehend the interwoven and implicit subcultural constrictions and enablers of playground action, child and staff perceptions of the barriers and facilitators during designated physically active break-times are explored. Using the socioecological model, which recognises the interdependent relationship between the intra-personal (individual), inter-personal (social), and the environment, we explore some of the reasons why children engage, like and dislike specific areas of the playground. To the author's knowledge, this is the first socio-ecological investigation of the UK primary school playground environment that has aimed to identify barriers and facilitators of physical activity at each level of the socioecological model. In what follows, we argue that understanding how these factors interact and influence physical activity levels of children during school lunch and break-times can be used by policy makers and individuals in positions of seniority (e.g. head teachers, trusts, funding authorities, local authorities) when planning school playground provisions [16] and in the design of playground interventions.

2. Methods

The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist [36] was used to provide transparency and to ensure accurate reporting of the empirical data [37]. The methods that follow are a brief overview of the procedures used in this study.

2.1 Recruitment

Following ethical approval to conduct structured interviews with adults, and focus group activities with children in primary school educational settings (School of Health and Life Sciences ethics sub-committee at Teesside University, Application Number: **250/18**), five schools from the lowest 10% on the Index of Multiple Deprivation (English indices of

154 deprivation: Department for Communities and Local Government) from the Tees Valley in the
155 North East of England were contacted via email. Schools were selected using the list of local
156 schools (www.gov.uk) and were initially chosen for convenience of location and their urban
157 setting. Schools were eligible to take part if they had a minimum of one year five and one year
158 six class. Schools which matched this criteria were then contacted with details of the study.
159 Four schools returned expressions of interest and were contacted further to discuss the project
160 requirements and complete the school management consent forms. Head teachers from three
161 schools (Table 1) returned managerial consent. Study information and the relevant consent
162 forms were provided for eligible staff, parents of eligible pupils and pupils themselves (assent
163 forms). Staff consent and pupil assent were completed immediately prior to data collection.

Table 1. School demographics

	Children on record (n)	Female/male (%)	No. of focus groups per school	% free school meals
School A	565	51 / 49	2	47
School B	520	49 / 51	3	49
School C	303	52 / 48	4	68

164

165 **2.2 Participants**

166 School staff that were in an active role within the playground or in physical activity promotion
167 within the school (PE specialist, health leads, heads and assistant heads, school classroom
168 teachers, playground supervisors and school sports coaches) and children from years five and
169 six (9 to 11 years old) were eligible to take part.

170 Children took part on focus group activities which were conducted over the course of one
171 school term. Staff were given the option of participating in a face to face structured interview
172 or completing the interview asynchronously using an open-ended questionnaire format. Table
173 2 reports the number of staff and children recruited in the study.

Table 2 Number of staff and children recruited

	Male	Female	Total (n)
Staff (n)	N/A	N/A	11

Pupils (n)	31	34	65

Abbreviations: N/A = not available.

2.3 Data collection

Data collection activities were conducted by members of the research team (MG and AI) that had previous training and experience of working with primary school aged children in a both a prescriptive (teaching and coaching) and facilitative role (research activity).

2.3.1 Data collection – Child

Focus groups, inclusive of a number of data collection activities has been used as an effective way to gather opinions and experiences of the children [38]. Focus groups are a rich method of revealing attitudes, experiences, and perceptions of the target audience [39]. They are particularly useful in the early childhood context, providing an effective means to involve children in research that they are directly implicated in and by. The research team used a variety of age-appropriate data collection techniques, such as visual prompts, mapping techniques and drawing activities. Techniques such as these, can spark children's interest and maintain concentration whilst providing opportunities for children to more effectively engage with the task [40-42].

The focus group discussions were designed to last for a maximum of 60 minutes, as recommended by previous research on the topic [38] and were conducted in a segregated, quiet, informal space within their familiar school environment. To be confident in successful data collection and provide a positive experience for the children we limited group size to eight children [41]. At the start of each focus group, children were welcomed and introduced to the focus group facilitators and read the summary of the information previously provided to them. School staff were not present during the child activities as it was felt that the presence of these authoritative figures might have affected the honesty in responses.

198 All focus group discussions were digitally recorded using audio devices. Noticeable changes
199 in body language or persistently repeated opinions were recorded in the facilitator notes to aid
200 in transcription, to support the outputs from the variety of focus group activities and to ensure
201 accuracy of the adult perception (i.e., the research team) of the child's experience/response.
202 Children were told the devices *"are here to record the discussions we have today about your*
203 *playground. They will only be used by the research team and the recordings will not be shared*
204 *with anyone else".* Nevertheless, there were a few occasions where the children sought
205 confirmation of anonymity; *"will my teacher see this*?" This highlighted the power imbalance
206 between adults and children within this setting. Reinforcing the anonymous nature of their
207 responses and explaining that the role of the facilitators in this activity was to listen to their
208 experiences and stories and not to judge or discipline the children [38] served the purpose of
209 removing any anxiety of 'getting into trouble' for speaking openly, and reduced the inherent
210 power imbalance between adults and children with the facilitator from this point on being
211 perceived by the children as part of the group, maximising interaction and honesty.

212 During transcription, individual responses were coded by participant number only (e.g., pupil
213 1, pupil 2 etc.) through the recognition of a change of voice. Focus group activities continued
214 until facilitators believed the groups had reached a saturation point [43], at which point the
215 subsequent activities described below were introduced.

216 The first task required children to highlight on an A3 map of their playground, areas they liked
217 and disliked, and provide reasons for their responses (Figure 1). Mapping techniques and
218 visual prompts have been identified as an innovative and useful way for children to express
219 their views about the use of the spaces they occupy [38,42]. Children were encouraged to be
220 creative and draw on the maps if they wished. This activity was designed to gain a wider
221 contextual understanding of the children's perception of the playground environment [16].

222

223 Figure 1 Aerial playground mapping activity

Children were then asked to write the skills they perceived as necessary to use each playground area on sticky paper notes and place them on the map over the corresponding playground area. On completion of this task, children then removed the sticky notes and placed them in a line from the most to least important, in terms of being able to use the playground effectively (Figure 2). The outputs from this task were used to identify any specific skills that children perceived as necessary to be able to be physically active in each of their previously identified playground zones.

Figure 2 Skill requirements of playground areas and order of importance

For the next task children were given an A4 piece of paper and a selection of pens and pencils and were asked to draw the image that came into their head when thinking of a playground supervisor (Figure 3). Previous studies exploring the effect of the management and supervision of playground activities on the level of PA during break-times have found contrasting results [27,44,45]. This suggests that the roles, actions and behaviours of playground supervisors can have either positive or negative connotations on children's behaviour [46]. Using creative approaches, such as drawing, can be more effective in interpreting a child's perception of their experiences and emotions [47]. To help them get started with the task children were first asked to write some words down that described their experiences of playground supervisors in their school playgrounds.

Figure 3 Playground supervisor drawings

The final focus group activity was designed to allow children complete anonymity and remove themselves entirely from the confinement of restrictive adultist opinion. Children were given one piece of A5 paper and asked to *"write one wish for the playground that would make it better and help you be more active during break-time"*. The children were then asked to fold

their piece of paper in to a small square and post it into *'the secret box'*. Previous work has suggested a 'secret box' activity removes the fear children have of sharing their thoughts and opinions [40].

The facilitator's role in these tasks was to look for clarity in the responses and activity outputs, to ensure the children had considered each of the task requirements, and stimulate further discussion amongst the group. The discussions were used to get more accurate interpretations of the outputs during audio transcription.

2.3.2 Data collection - Staff

Staff were first offered a one-to-one interview to discuss the a priori themes of the project; *barriers* and *facilitators* to a physically active playground during school break-time. However, gatekeepers at each of the schools expressed a concern from teachers on allocating time from their day to meet with the researcher. Furthermore, there was a concern that senior leaders at the school would be able to identify who had and hadn't taken part in the project. For this reason, staff were given the option of interview or questionnaire. All participating staff chose to complete the questionnaire in their own time and were asked to be as detailed as possible in their responses on the questionnaire, using additional pages if needed. Staff were offered the option of providing contact details if they were happy to be contacted further for any responses requiring clarification. No member of staff provided these details.

2.4 Thematic data handling and analysis

Qualitative data for both focus groups and asynchronous interviews were analysed using the process of thematic data analysis as described by Braun and Clarke [48]. This 6 stage approach allows a more detailed contextual examination of the pre-identified ideas, assumptions, and ideologies underlying these a priori themes without sacrificing its flexibility to provide "a rich and detailed, yet complex account of the data" [48; pg.5] that is both theoretically and methodologically sound; and can be widely used across a range of epistemologies and research questions [49].

2.4.1 Child Focus Groups

The first task for data analysis involved two researchers reading through every focus group activity the children had completed to begin to identify recurring themes across each of the groups (stage 1 - familiarisation with the data). Each activity was then reviewed again, and initial features of the data coded in a systematic fashion to collate data relevant to each code (stage 2 – generation of initial codes). Activities were reviewed a third time whilst listening to the associated audio recording from the matched focus group to ensure the children's written points had been interpreted accurately. Audio recordings were not transcribed "verbatim" but were used to ensure that valuable detail relating to the context and the specific nature of the written responses were captured [50]. Exerts from the audio recordings which matched and supported the focus group activity outputs were transcribed verbatim (by each researcher) and transferred to the table of responses and coded accordingly. As codes were collated, potential themes began to emerge and all relevant codes (and associated data) were transferred under these themes (stage 3 – search for themes). On completion, themes and the associated data items (audio transcriptions and written text) were then reviewed to check for accuracy of interpretation and for any repetition across themes (stage 4 – review of themes).

The latent themes that emerged as a result of the aforementioned analysis were grouped under the component titles of the socio-ecological model; individual, interpersonal, physical environment and policy (stage 5 – Definition and names of themes). The multi-level framework that the socio-ecological model provides, allows for a constructionist and interpretative examination of the range of socio-cultural factors that can influence physical activity levels during school break-times [16,48]. This final activity facilitated the creation of the final thematic map and the final interpretive report (stage 6 – production of report) [48].

2.4.2 Staff Asynchronous Interview Forms

Completed staff forms were read in full prior to analysis to identify commonality across all responses and to become familiar with the data. Data was then coded and handled following the same processes described above. Responses from the child focus groups and staff responses that did not recur frequently but that had particular resonance due to the language used were grouped under the same code ('valuable insight').

3. Outcomes

A total of 65 children were recruited and provided parental consent and initial assent. At the time of data collection four children were absent and three withdrew assent prior to the start of the focus groups. The remaining 58 children (52% female) participated in focus group activities.

Eleven members of staff from across the three schools returned consent to take part in the study. Figure 4 and Figure 5 display the final thematic map for children and staff, respectively. The thematic map is inclusive of the a priori themes (barriers and facilitators) and the deductive themes from each of the data collection activities (playground map, essential skills, supervisor drawings and discussions) and their association to each of the socio-ecological model components. The secret box activity was also analysed in respect to the socio-ecological model but did not contribute the themes identified in the thematic map.

Figure 4 Final thematic map showing the socio-ecological barriers and facilitators to a physically active playground from the school children's perspective

Figure 5 Final thematic map showing the socio-ecological barriers and facilitators to a physically active playground from the school staff perspective

A full list of the secret box responses can be seen in Table 3. Responses are separated for children and staff and divided into small and large wishes dependent on the resources (physical and monetary) needed or the surface area required [16]. Further, the wishes are separated into categories based on their desired outcomes (i.e., physical environment,

individual/interpersonal or policy). Children's wishes focussed on play, adventure, and fun. Wishes were predominantly concentrated on the provision of new equipment and longer break-times. Staff wishes for the school playground focussed on a wider development of playground structure, policy changes, management and support.

Table 3. School children and staff magic wish responses.

		Children	Staff
Physical environment	Small items	• Cargo nets • Monkey bars* and gym equipment • Slides* • Swings* • Seesaw • Tyres • Bikes and scooters* • More equipment* • Make it more fun • Trampolines* • Something fun – like hunts • Fairer games • Spider net climbing frame	• Scooters and bikes • Be able to use the grass • More equipment* • New fresh games
	Large items	• Obstacle course • VR booth • More options for indoor play* • Climbing wall with buzzers • Running track • A field so we can do rugby • Make a basketball pitch • More playground things • Swimming pool • Big massive slide • Big Bouncy castle	• A school field for summer to avoid confrontation • New grassy area • Overhaul of the outside area - more engaging • MUGA on the concrete area (less injuries) • More outdoor to explore • A more interesting environment to explore • More space • A sheltered area
Individual and Social		• I wish to make everyone happy on the playground • More exciting games with more people • Do dangerous stuff	• Self-regulation • Personal power and resilience – to cope with losing
Policy		• More options for indoor play* • More time* • Tag rugby coach • Less tolerance to bullies • More time on the ball-court • To be able to use key stage1 (5 to 7 years old) playground*	• Training for staff* • Training for playground leaders* • More equipment • Involve staff more

*Items occurred multiple times in magic wish responses (multiple = three or more)

4. Discussion of research findings

The following is a further presentation of focus group outcomes, discussed in light of theory and research on the individual, interpersonal, environmental and policy influences (barriers and facilitators) on children's physical activity engagement during school break and lunch-times and is subdivided according to the components of the socio-ecological model.

4.1 Individual and interpersonal factors (children)

From the perspective of the children, individual level facilitators of physical activity focussed predominantly on the intrinsic desires to have fun (*"Because my friends push me on the low swings, it's fun"; "it is fun to try new things"; "me and my friends play games here…the maze game because it is fun"*; *"we play tag, it's very fun")*, for the enjoyment of activities (*"I like it because I get to play football"; "I like playing there because I can play leapfrog"; "I like it cause we can play tennis and get tennis rackets")* and the belief they will do well in a specific activity (perceived competence) (*"…football is a good sport for me"; "…because I likely do well"*).

Thus, congruent with the work of Snow et al. [35] who conducted focus groups on 8 to 10 year old girls, children in this study cited fun, physical competence and mastery of skills as a major influence on the engagement in play. In terms of physical competence, Barbour [51] suggested that the type of activities children take part in are a result of similarities in movement ability and movement skill competency, with children of low physical competence reluctant to approach activities requiring a higher level of ability. Evidence suggests that when fundamental movement skills are taught to younger children (4 to 9 year olds), increases in confidence in their ability results in participation in physical activity during other parts of the day [52]. As children age they are more aware of their ability, or lack thereof, and as a result less likely to participate in activities they desire for fear of embarrassment [52,53]. The desire for actual physical competence in Snow et al. [35] and the engagement (or disengagement) in specific activities due to perceptions of physical competence in this study are slightly difference concepts. However, the aspirations for and perceptions of competency were driven by the same yearning for a sense of social belonging.

Children in this study identified that they took part in activities that they *"would likely do well at"* but also participated in activities and occupied playground areas for social reasons, irrespective of any assessment of physical competence and in the absence of a specified activity *("this is where my friends are"; "because most of my friends play here"*; *"because my friends are here…"*). Parrish et al. [52] focus group findings from children aged 9 to 11 highlighted that children were more likely to take part in games their friends were playing, even if they had a desire to play something else. One group of children in this study, when discussing the activities on their playground highlighted:

> *"let everyone take part and be nice, we don't really care what skills you have we just like letting people play, it's just about friendship"*

Previous research suggested that there is more than a simple gender preference operational when children select areas of the playground to "play" in [27]. The influence of physical competence, perceived physical competence and friendship identified here, re-enforces this assumption and highlights the potential impact of positive peer relationships and social position as a driver for physical activity engagement. During analysis, there was a clear interaction between findings at each level of the socio-ecological model. However, this interaction was particularly evident between the individual and interpersonal items in the model. Many of the 'individual' factors children gave for liking and disliking areas were driven by the desire for 'social' interaction or 'social' play. For example, the individual desire for quiet and relaxation (*"I like it because it's a good place to private talk")* and for playing games (*"me and my friends play games here"* and *"I play tag with my friends"*), were grounded by positive peer relationships.

The desire for children to engage in social games, requiring more than two people could be perceived as a method employed by the children in this study at increasing the 'quality' of their friendships

"because we get to run around and play bulldogs", "we sometime get to play football tennis", "we play football and sometimes tig", "we play hide and seek".

However, the opportunity for social play was also often linked to less desirable playground experiences *("there are too many footballs", "there are a lot of fights and it stops playing", "play is too rough"*) and traditional playground hierarchies (*"the boys take the ball court most of the time", "because other year groups use it", "a lot of fights with year 6's")* which could be considered as barriers to physical activity for individuals who avoid competitive games for fear of conflict and to avoid the hegemonic masculinity [54] of the sporting (predominantly football) culture of the primary school playground [55].

Hegemonic Masculinity is a term popularised by sociologist R.W. Connell [54], to explain the recurring socially constructed practices that promote the dominant social position of males and the subordinate position of females across the life cycle. Within a school playground environment children can become invested in activities that help them to construct and maintain a gender identity [56,57], with the environment and their peers often enabling their construction of 'masculinities' and 'femininities' [57]. Although the presence and the magnitude of the effect of these practices are likely school dependent, due to the varied management/supervision of the playground between schools, football and fighting is an activity that many boys continue to use to solidify their masculinity [56].

Some of the girls in this study identified hegemonic masculinities that are displayed during break-times. As an example, the following conversation between three participants is worth citing at length. On this occasion we use pseudonyms to enable the reader to distinguish between participants.

Pupil 1*: "we don't like playing here because you get hurt and the boys kick the footballs at you" (Girl)*

Pupil 2*: "there is loads of fights" (Girl)*

Pupil3*: "No…" (Boy)*

Pupil1*: "YEAH THERE IS" (Girl)*

Pupil 2*: "have you seen how many fights happen" (Girl)*

Pupil 1*: "there was a fight here" (Girl)*

Pupil 3*: "oh yeah there was a fight there the other day" (Boy)*

Pupil 3*: "we have fights constantly" (smiling) (Boy)*

Pupil 1*: "I hate it" (Girl)*

One boy in this group can initially be observed trying to address these statements by perhaps claiming either the absence of fights or trying to explain the reason for fights, before he is interrupted. He then concedes and becomes somewhat proud with a contented claim of *"WE have fights constantly".* Whether he actively participates in this behaviour or not, this statement could be perceived as attempt to associate himself to these hegemonic masculine behaviours deemed important for his social status.

Football has been [55] and continues to be [33,58] the predominant activity dominating playground space. Similarly, the schools participating in this study had playgrounds which were monopolised by the established football space (marked and worn out pitches, caged football zones, painted goals on walls). The domination of the playground space for football leads to a desperate rush by children at break-times, to preside over the remaining playground space. Thomson [33] observed children claiming possession of playground space by marking areas with their coats and school bags for their activities and any attempt at invasion from others resulted in retaliation and conflict. This issue becomes exacerbated during winter months when access to the play spaces hosting these dominant playground games is prohibited, directing these activities into the already contested areas of the playground.

4.2 Individual and interpersonal factors (adult supervisors)

Similar individual level facilitators were identified from staff outputs with play, exploration and enjoyment identified as key to children's participation in activities.

> *"Children like to climb on the rocks and tyres"; "children often look to play their own games…"; "children like freedom and unstructured play"*; *"children enjoy playing football"; "children enjoy the ball court and playing football"*

Although adults (staff) in this study seem to understand the individual value of play, they identified more frequently with the extrinsic values of peer relationships and social development:

> *"teamwork and collaboration"; "ability to listen to others"; "…take turns and play fair", "need to understand the rules"; "social is important to feel comfortable playing in front of others"*

Previous research exploring children's geographies has highlighted that the intrinsic value of play is not acknowledged by teachers and policy makers [35] and that opportunities for play, particularly outdoor play is decreasing with increased emphasis on classroom based, adult organised activities [59,60]. Furthermore, adults colonise children's places and create safe and easy to monitor play spaces which often means the naturally sporadic and exploratory play behaviours of children [33,61] are perceived as disruptive and undesirable, and are consequently dealt with 'accordingly' (*"children need to be guided on how to play safely", "children need to be aware they will be punished (equipment removed) for bad behaviour").*

The staff opinions on the 'correct' use of the playground could be interpreted from a dualist perspective, whereby there is either a right or wrong way of 'playing'. Although one cannot argue that children will benefit from *"teamwork and collaboration"* and an *"ability to listen to others"* throughout their child, adolescent and indeed adult becoming; the adult regulation and enforcement of these qualities goes against the nurturing concept of physical literacy [62]. Children develop a natural, more flexible interaction with the environments that surround them and can be very creative and innovative when adapting architectural features of the

playground such as bins, bollards, fencing, walls etc. [33]. Objects in the environment are not inanimate features to which we ascribe an abstract concept but are meaningful in a sense that they 'engage' with us, indicating how we can interact effectively with them [63]. Children in this study identified areas of the playground that to the researcher looked unusable. However, children circled these areas for the inanimate objects (bollards, rocks) that existed there (for example, *"I like playing here cause I can play leapfrog"*). However, these behaviours are often stifled by staff on the playground perceiving their use as inappropriate and unsafe (*"children given free choice often decide on inappropriate games"; "children need to follow the rules and understand what they can and can't do"*), and because they do not fit in with their framework of rules. Jones [30] suggested adult constrictions, desires and agenda restrict children's lives and their practices when discovering their identity in a changing environment.

Children learn very early on the notion of rule keeping and are generally faced with a daily list of 'don'ts' before entering their play space [33]. Crease [64] explains that infants go through a number of stages in their becoming, described as first 'I move', then 'I can', and finally 'I can do'. A large proportion of children in this study were faced with physical barriers, boundaries and rules which reduced their freedom to 'move' and therefore unable to explore the 'I can' and subsequently the 'I can do…'

4.3 Environment and policy level

As previously mentioned, the large open spaces identified in this study were predominantly grass fields and expansive concrete areas. Children highlighted these areas as positive for their promotion of team games, playing with friends and their soft surfaces. However, the children also highlighted that these areas often flood in wet weather leading to prohibited access due to adverse conditions. The data from the children and staff suggest that this is an

issue that needs addressing at policy level with adequate investment in facilities for all weathers:

Children

> *"sometimes not allowed here when it is wet or muddy", "can't use it when it is full of snow", "not allowed in when it is snowing", "we are not allowed on the grass when it is wet", "we are not allowed on when it is icy or snowy cause we might fall over and get hurt", "when it rains there are puddles for weeks"*

Staff

> *"space is a problem when the grass is wet, children are confined to the hard area which prevents children playing"; "bad weather prevents physical activity at break times"; "not being able to use the field when it is wet has a negative impact as children are not allowed footballs on these days", "rock area is dangerous when it is wet"*

As one child said "*if it is raining, why not put a roof on the MUGA".* Similar findings from Australian children, also recognised the need for 'weather protection' [65], demonstrating that despite very different weather conditions, the play restrictions being enforced on children in primary school playgrounds is an issue experienced internationally.

The appearance of staff members on the playground acting like shepherds tending their disobedient flock may be driven more by the inadequate investment at a policy level in the children's physical, social and emotional development during this important period in a child's day [59]. This was further highlighted by a number of staff members who identified a lack of staff resources prevented them from engaging in anything other than crowd control (*"there is lots of activity and a lot to monitor for just two members of staff", "not enough staff being able to supervise and keep children safe", "staff are limited, we already have some staff on the playground but not all the time and they can't cover everywhere"; staff are occupied dealing*

518 *with behaviour so seldom able to engage with activities"*). This is in contrast to self-report
519 findings from national (UK) school surveys from 1995 to 2017 which identified that there are
520 now more adults supervising than there has been in the previous twenty-two years [59].
521 Although these numbers are likely school dependent, the actions of the supervisors may be
522 more important than the numbers available [27]. Children highlighted the potential for teachers
523 to act as facilitators ("*some teachers won't come out but 'Miss D' played like Mr Fox or*
524 *something with us before but not many (teacher) do")* but are too often restricted by the number
525 of staff available (*"sometimes there is only one member of staff on duty so we have to stay*
526 *where the teacher can see them so they are safe and don't get hurt"; "….but I do get it cause*
527 *there are only like two dinner nannies"; "that's the part we are not allowed down, well we are*
528 *sometimes but not all days when we don't have teachers, because when it (the bank) goes*
529 *down the teachers can't see us"*).

530 Children at participating schools had a mix of teachers, teaching assistants, 'dinner nannies'
531 and 'playground friends' that helped monitor the playground during break-times. Children
532 highlighted they would like their teachers to be more involved during break-time but highlighted
533 they wanted teachers based on 'sportiness' (*"…because they are good at sport", "teachers*
534 *are not that sporty", "Mr T and Mr L are the sportiest but there are no more sporty ones", "our*
535 *teachers are not that sporty, there is only like three and they are not that sporty").*

536 Although in the current study we were unable to distinguish between staff positions within the
537 school (head teacher, teacher, teaching assistant etc.) due to the anonymous nature of the
538 staff responses; previous research has found that head teachers from different schools have
539 very different ideas about the value and role of break-time [20] and therefore, the behaviours,
540 actions and opinions of the staff (from staff and child perspectives) in the current study may
541 be a result of (or lack of) the agenda at senior management levels.

542 Overall, staff perceived their role as a combination of encouraging a supportive and safe
543 environment *("supervisors should be at their station, organising resources and facilitating",*

544 *"adult presence ensures that children feel safe and are used for advice and support if needed"*)
545 and promoting engagement in physical activity *("my role is to keep children safe and happy*
546 *and to encourage some children to be active"*). However, the perception from children was
547 that the role of playground staff is for safety and the enforcement of rules and boundaries
548 (*"sometimes we do use here for bulldogs, but the younger ones are doing it now so we are*
549 *not allowed", "if we go on there the teachers can't see us and we'll get dirty", "dinner nannies*
550 *say we can only play with your own year group…it's so annoying…", "they look after us, stop*
551 *fighting and help people who are hurt"*).

552 The active interest of the adult members of staff in the school were explored during the
553 playground supervisor and playground activities tasks. When asked about the staff who were
554 present on their playgrounds during break and lunch-times, this is just a sample of the words
555 the children used to describe them:

556 *Safe; loving; try to keep us safe from bully's; caring; angry; helping; laughable;*
557 *sharing; bossy; hardworking; respectful; kind; mad; safety; hate.*

558 Although mostly positive, the variety of qualities cited by the children gives an idea of the
559 variety of adult personas that occupy children's playgrounds during break-times. It is therefore
560 important that these staff members understand the importance of their behaviours and the
561 positive influence they can have on the social and physical activity behaviours of the children
562 who occupy the playground space.

563 From the variety of staff and child accounts provided in this study and in previous studies
564 [16,33] on the level and role of staff interaction during break-times it seems that, beyond child
565 safety, there is no standardised, universally accepted requirement for behaviour of playground
566 staff in the primary school setting. This allows for a large variation in the day to day
567 management of the school playground, dependent largely upon the member of staff who
568 happens to be 'on duty' that day (mood, personality, personal agenda, etc.).

All the schools in this study were in receipt of the PPESP. Only one school in this study mentioned break-times as part of their planning, with structured lunchtimes with a sports coach, lunch supervisors and pupil leaders to target inactive children during break-time reported. Whilst this one school's acknowledgement of break-times as a period of time that would benefit from investment, the plans and ideas mentioned previously were alongside the provision for the daily mile, access to new sports and activities and a lunchtime wake up dance activity – all of which was allocated a combined £750 from the £19,520 PPESP allocated to this school.

Whilst the physical activity levels of children during break-times is much more complex [66] the lack of valuable and sustainable investment in playground provision is worrying and in contrast to the recommendations provided by the DfE [29]. A continuation in the marginalisation of break-times for more curricular focussed adult led activities (i.e., PE); alongside a reduction in time provided for break-times [20] and inadequate investment in the primary school playground provision, will lead to further reductions in exploratory play and reduced opportunity to develop physical literacy. Furthermore, without recognition of the importance of break-times in children's physical, social and emotional development and the provision of a sustainable intervention, the current playground behaviours will continue to re-enforce the adult-child power distribution [30].

5. Summary and conclusion

This study aimed to use the socio-ecological model to explore school children's and school staff perception of the school playground and identify reasons for enjoyment, engagement and dissociation with specific playground areas. There have been limited studies exploring the socio-ecological model components within a school context [16] and to our knowledge this is the first use of this framework to qualitatively explore the complex contexts presented to UK primary school children during their 'free play' time.

This qualitative evaluation has identified differences between the adult and child perception of the primary school playground. These differences affirm the need to actively include children in future playground planning. Many schools ask their pupils *'what should we do?'* Or *'what would you like on the playground?'* However, for most, this is where this partnership ends. This does not go unnoticed by the children who have invested a part of themselves in these tasks *("the teacher said we could get like a science area outside to grow plants and things but she never did it…I don't know why").* It is important to follow up on these activities and feedback to the children on the actions been taken, even if the outcome may be perceived as undesirable, so that they feel that their opinions are heard and of value [41].

This somewhat unconscious stance of power and knowledge is often overlooked in environments where the focus is on making well-intentioned changes to the environment 'for the children's sake'. However, the issue still remains and we, as adults know little about the child's becoming and cannot accurately see things from a child's perspective [30].

Effective injury prevention efforts at school are important and should address several factors (i.e., Individual, interpersonal, environmental and policy). However, improvements to the physical environment of the school through regular safety assessments, good quality maintenance, and repairing hazards immediately after they are identified [67], can contribute to the safety of the school children without the need to restrict children's access to specific areas. Although the safety of children should be paramount, children should also be allowed some freedom to choose the activities they wish to take part in, to be able to begin to explore the concept of becoming physically literate. Physical literacy, focuses on the lived body, the embodied dimension of human existence [63], therefore nurturing this aspect of children's lives will make a distinctive contribution to their becoming.

As mentioned previously, football dominated the playground, monopolising the space available. Cashmore and Dixon [68] explain that football is inescapable, a sport ingrained into the fabric of communities. It would seem that this is also the case within primary school

playgrounds, where football remains the activity dominating the available space. Therefore, as many children engage in this activity during break-times, it can be considered an important and effective catalyst for physical activity participation. However, the barriers that this dominance presents to children, either not interested in football or who have yet to demonstrate an acceptable skill level, cannot be overlooked [33,58,69]. Conversely, as previous focus group studies with children have suggested, it is the lack of alternative space that is the main concern [69] and removing the facilities for football would remove opportunities for the large numbers of children who currently use football as a means of being physically active. Therefore, provision of additional space and/or more effective use of the current space, alongside more inclusive and enjoyable activities for boys and girls is needed.

The findings from this qualitative evaluation provides an opportunity for primary schools which match the description of the schools participating in this study, to reflect on primary school playground strategies and practices that are implemented at policy level. However, this study is not without its limitations. Firstly, restricting recruitment to year five and year six children may have overlooked the barriers that exist in the younger key stage 2 children, particularly 7 year olds, who will have just been introduced to this new playground. This limits the ability to generalise this study's findings to children of different age groups who are likely to have a different playground experience. As this study did not receive any funding there was a limit to the number of schools and participants the research staff could manage in the time frame. However, limiting the sample to two year groups from four schools allowed for a more comprehensive data acquisition, evaluation and synthesis. Regarding the concept of the 'adult filter', the authors of this study cannot remove their own subconscious adult filter and adult embodiment; however, the comprehensive, flexible and robust methods employed during child focus groups, in addition to the use of respondent validation techniques is a strength of this study and minimises any inaccuracies in the adult interpretation. Furthermore, the use of two authors throughout data collection, transcription and analysis enhances the trustworthiness of the findings presented in this study. In addition, due to staff concerns with interviews

(mentioned previously) all staff responses were completed using questionnaires, limiting a more in-depth investigation of the answers provided. It is hypothesised that a more comprehensive response and discussion would be possible using interview methods, and every effort should be made to remove the barriers perceived by members of staff in this study in future studies. Finally, this data was collected prior to the COVID-19 pandemic. During the pandemic in the UK, primary schools changed the structure of break-times, increasing the number of breaks for fresh air throughout the day. This change in structure might have affected children and staff perceptions of the value of break-times. Future research should explore the effect the COVID-19 pandemic had on the perceptions of school break-times during and post pandemic.

By attempting to understand the effect of the various complex interactions that exist within primary school playgrounds will help raise awareness within schools of the implications of supervisory interactions, judgement and management of behaviour, on the health and wellbeing of pupils [70].

References

1. Sport England (2019). Active lives children and young people survey 2017/18. Accessed January 2020.
2. Guthold R, Cowan MJ, Autenrieth CS, Kann L, Riley LM. Physical activity and sedentary behavior among schoolchildren: a 34-country comparison. The journal of paediatrics. 2010;157(1): p.43-49
3. Steene-Johannessen J, Hansen BH, Dalene KE, Kolle E, Northstone K, Møller NC, et al. Variations in accelerometry measured physical activity and sedentary time across Europe – harmonized analyses of 47,497 children and adolescents. International Journal of Behavioural Nutrition and Physical Activity. 2020;17(38)

4. Ekelund U, Anderssen SA, Froberg K, Sardinha LB, Andersen LB, Brage S. Independent associations of physical activity and cardiorespiratory fitness with metabolic risk factors in children: the European youth heart study. Diabetologia. 2007;50(9): p.1832-1840
5. Peplies J, Börnhorst C, Günther K, Fraterman A, Russo P, Veidebaum T, et al. & on behalf of the IDEFICS consortium. Longitudinal associations of lifestyle factors and weight status with insulin resistance (HOMA-IR) in preadolescent children: the large prospective cohort study IDEFICS. International journal of behavioral nutrition and physical activity. 2016;13: p.97
6. Poitras VJ, Gray CE, Borghese MM, Carson V, Chaput JP, Janssen I. et al. Systematic review of the relationships between objectively measured physical activity and health indicators in school-aged children and youth. Applied Physiology, Nutrition, and Metabolism. 2016;41(6): p.S197-S239.
7. Biddle SJ, Ciaccioni S, Thomas G. Vergeer, I. Physical activity and mental health in children and adolescents: An updated review of reviews and an analysis of causality. Psychology of Sport and Exercise. 2019;42: p.146-155.
8. Escalante Y, García-Hermoso A, Backx K, Saavedra JM. Playground designs to increase physical activity levels during school recess: a systematic review. Health Educ Behav. 2014;41(2): p.138-144
9. Sterdt E, Liersch S, Walter U. Correlates of physical activity of children and adolescents: a systematic review of reviews. Health Education Journal. 2014;73(1): p.72-89.

10. World Health Organization (2018) Global Action plan on physical activity 2018-2030: More active people for a healthier world. Geneva
11. Wilkie HJ, Standage M, Gillison FB, Cumming SP, Katzmarzyk PT. Correlates of intensity-specific physical activity in children aged 9–11 years: a multilevel analysis of UK data from the International Study of Childhood Obesity, Lifestyle and the Environment. BMJ Open. 2018;8:e018373
12. Tsuda E, Goodway JD, Famelia R, Brian AS, Collins ME. The Relationship Between Motor Competence and Sedentary Behavior on the Preschool Playground. Research Quarterly for Exercise and Sport. 2016;87(Supplement 2): p.A33.
13. Bronfenbrenner U. Toward an experimental ecology of human development. American psychologist. 1977;32 (7): p. 513
14. Sallis JF, Bauman A, Pratt M. Environmental and policy interventions to promote physical activity. American Journal of Preventive Medicine. 1998;15: p.379-97
15. Golden SD, Earp JA. Social ecological approaches to individuals and their contexts: twenty years of health education & behavior health promotion interventions. Health education & behavior. 2012;39(3):364-72.
16. Hyndman B, Telford A, Finch C, Benson A. Moving physical activity beyond the school classroom: a social-ecological insight for teachers of the facilitators and barriers to students' non-curricular physical activity. Australian J Teach Educ. 2012;37(2): p.1-24

17. Hyndman B, Chancellor B. Engaging children in activities beyond the classroom walls: a social–ecological exploration of Australian primary school children's enjoyment of school play activities. Journal of Playwork Practice. 2015;2(2): p.117-141.
18. Wechsler H, Devereaux RS, Davis M, Collins J. Using the school environment to promote physical activity and healthy eating. Preventive medicine. 2000; 31(2), S121-S137
19. Gråstén A, Watt A, Liukkonen J, Jaakkola T. Effects of School-Based Physical Activity Program on Students Moderate-to-Vigorous Physical Activity and Perceptions of Physical Competence. J Phys Act Health. 2017;14: p.455-464.
20. Baines E, Blatchford P. School break times and young people's social lives: A follow up national study. Executive summary, Department of Pscyhology and human development, UCL institute of Education, London. 2019
21. Mulryan-Kyne C. The school playground experience: opportunities and challenges for children and school staff. Educational Studies. 2014;40(4): p.377-395.
22. Blatchford P, Pellegrini AD, Baines E. The child at school (2nd ed): Interactions with peers and teachers. Routledge, London, 2016.
23. Holloway SL. Changing children's geographies. Children's Geographies. 2014;12(4): p.377-392.
24. Colabianchi N, Maslow A, Swayampakala K. Features and amenities of school playgrounds: A direct observation study of utilization and

745 physical activity levels outside of school time. The international
746 journal of behavioral nutrition and physical activity. 2011;8(32).
747 25. Parrish AM, Okely AD, Stanley RM, Ridgers ND. The effect of school
748 recess interventions on physical activity. Sports medicine.
749 2013;43(4): pp.287-299.
750 26. Parrish AM, Chong KH, Moriarty AL, Batterham M, Ridgers ND.
751 Interventions to change school recess activity levels in children and
752 adolescents: A systematic review and meta-analysis. Sports
753 Medicine. 2020;50: pp. 2145–2173.
754 27. Graham M, Wright M, Azevedo LB, Macpherson T, Jones D, Innerd
755 A. The school playground environment as a driver of primary school
756 children's physical activity behaviour: A direct observation case
757 study. Journal of Sports Sciences. 2021;4: pp.1-13
758 28. Youth sport trust (2018) How to spend it: A guide to Primary PE and
759 Sport Premium. Published 2nd March 2018: Accessed: 31st Jan
760 2020. Available from
761 https://www.youthsporttrust.org/resources/primary-pe-sport-
762 premium
763 29. UK Department of health Physical activity: applying all our health.
764 October 2019. Available from
765 https://www.gov.uk/government/publications/physical-activity-
766 applying-all-our-health
767 30. Jones O. 'True geography [ ] quickly forgotten, giving away to adult-
768 imagined universe'. Approaching the otherness of childhood.
769 Children's Geographies. 2008;6(2): p.195-212

770 31. Kellett M. Children as active researchers: a new research paradigm
771 for the 21st century? Economic and Social Research Council: 2005.
772 accessed 26th November 2019
773 32. Matthews H. Rising four: Reflections on the state of growing up.
774 Children's Geographies. 2005;3(13): p.271-273
775 33. Thomson S. Do's and don'ts: children's experiences of the primary
776 school playground. Environmental Education Research. 2007;13(4):
777 p.487-500.
778 34. Ridgers ND, Fairclough SJ, Stratton G Twelve-Month Effects of a
779 Playground Intervention on Children's Morning and Lunchtime
780 Recess Physical Activity Levels. Journal of Physical Activity and
781 Health. 2010;7(2): p.167-175
782 35. Snow D, Bundy A, Tranter P, Wyver S, Naughton G, Ragen J et al.
783 Girls' perspectives on the ideal school playground experience: an
784 exploratory study of four Australian primary schools. Children's
785 Geographies. 2019;17(2): p.148-161.
786 36. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting
787 qualitative research (COREQ): a 32-item checklist for interviews and
788 focus groups. International Journal for Quality in Health Care.
789 2007;19(6): p.349–357
790 37. Thomas J, Harden A. Methods for the thematic synthesis of
791 qualitative research in systematic reviews. BMC Med Res Methodol.
792 2008;8:45
793 38. Agar M, ManDonald J, Basch CE, Bertrand JT, Brown JE, Ward VM
794 et al. Exploring children's views through focus groups. In Greene S.,

and Hogan D Researching Children's' Experience. Sage publications, London. 2005

39. Gray, D. Doing Research in the Real World 4th Edition. Sage. 2018

40. Punch S. Interviewing strategies with young people: the secret box, a stimulus material and task-based activities. Children and Society. 2002;16(1): p.45-56

41. Gibson F. Conducting focus groups with children and young people: strategies for success. Journal of research in nursing. 2007;12(5): 473-483

42. Veitch J, Salmon J, Ball K. Children's active free play in local neighbourhoods: a behavioural mapping study. Health Educ Res. 2008;23(5): p.870-879

43. Forero R, Nahidi S, De Costa J, Mohsin M, Fitzgerald G, Gibson N. et al. Application of four-dimension criteria to assess rigour of qualitative research in emergency medicine. BMC Health Serv Res. 2018;18: p.120

44. McKenzie TL, Crespo NC, Baquero B, Elder JP. Leisure time physical activity in elementary schools: analysis of contextual conditions. J Sch Healt. 2010;80(10): p.470–477

45. Caro HEE, Altenburg TM, Dedding C, Chinapaw MJM. Dutch primary schoolchildren's perspectives of activity-friendly school playgrounds: A participatory study. Int J Environ Res Public Health. 2016;13(6): p.526

46. Chancellor B, Hyndman B. 'Adult Decisions on Students' Play Within Primary School Playgrounds'. In Hyndman B. Contemporary School

Playground Strategies for Healthy Students; Springer, Singapore: p.37-55. 2017

47. Hill M, Laybourn A, Borland M. Engaging with primary-aged children about their emotions and well-being: Methodological considerations. Children and Society. 1996;10(2): p.129-144

48. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006;3(2): p.77-101

49. Nowell LS, Norris JM, White DE, Moules NJ. Thematic Analysis: Striving to Meet the Trustworthiness Criteria. International Journal of Qualitative Methods. 2017;16(1).

50. Rutakumwa R, Mugisha JO, Bernays S, Kabunga E, Tumwekwase G, Mbonye M. et al. Conducting in-depth interviews with and without voice recorders: a comparative analysis. Qualitative Research. 2019;20(5): pp.565-581

51. Barbour AC. The impact of playground design on the play behaviors of children with differing levels of physical competence. Early Child Res Q. 1999;14(1): pp.75-98

52. Parrish AM, Yeatman H, Iverson D, Russell K. Using interviews and peer pairs to better understand how school environments affect young children's playground physical activity levels: a qualitative study. Health education research. 2012;27(2): p.269-280

53. Jones D, Innerd A, Giles EL, Azevedo LB. Association between fundamental motor skills and physical activity in the early years: A systematic review and meta-analysis. Journal of Sport and Health Science. 2020;9: p.542-552

54. Connell RW. Gender and power: Society, the person and sexual politics. Cambridge: Polity Press. 1987
55. Renold E. 'All they've got in their brains is football.' Sport, masculinity and the gendered practices of playground relations. Sport, Educ Soc. 1997;2: p.5–23
56. Epstein D, Kehily M, Mac An Ghaill M, Redman P. Boys and girls come out to play: Making masculinities and femininities in school playgrounds. Men and masculinities. 2001;4(2): p.158-172
57. Paechter C, Clark S. Learning gender in primary school playgrounds: findings from the Tomboy Identities Study. Pedagogy, Culture & Society. 2007;15:3: p.317-331
58. Pearce G, Bailey RP. Football pitches and Barbie dolls: young children's perceptions of their school playground. Early Child Development and Care. 2011;181(10): p.1361-1379
59. Baines E., and Blatchford P. School break times and young people's social lives. Research Briefing 1, UCL Institute of Education, London. 2019
60. Saunders TJ, Chaput JP, Tremblay MS. "Sedentary Behaviour as an Emerging Risk Factor for Cardiometabolic Diseases in Children and Youth." Canadian Journal of Diabetes. 2014;38(1): p.53–61
61. Mackintosh KA, Ridley K, Stratton G, Ridgers ND. Energy cost of free-play activities in 10-to 11-year-old children. Journal of Physical Activity and Health. 2016;13(s1): p.S71-S74.

62. Whitehead M. Definition of physical literacy and clarification of related issues. ICSSPE Bull J Sport Sci Phys Educ. 2013;65: p.29-34
63. Whitehead M. Physical Literacy: Philosophical Considerations in Relation to Developing a Sense of Self, Universality and Propositional Knowledge. Sport, Ethics and Philosophy. 2007;1(3): p.281-298
64. Crease RP. The pleasure of popular dance. Journal of the Philosophy of Sport. 2002;29(2): p.106-120.
65. Hyndman B, Telford A. Should educators be 'wrapping school playgrounds in cotton wool' to encourage physical activity? Exploring primary and secondary students' voices from the school playground. Australian J Teach Educ. 2015;40(6): p.60-84
66. Ridgers ND, Stratton G, Fairclough SJ. Physical activity levels of children during school playtime. Sports Med. 2006;36(4): p.359-71
67. Salminen S, Kurenniemi M, Råback M, Markkula J, Lounamaa A. School environment and school injuries. Frontiers in public health. 2014;1: p.76.
68. Cashmore E., Dixon, K. eds. Studying football. Routledge, London. 2016
69. Martínez-Andrés M, Bartolomé-Gutiérrez R, Rodríguez-Martín B, Pardo-Guijarro MJ, Martínez-Vizcaíno V. "Football is a boys' game": children's perceptions about barriers for physical activity during recess time. International journal of qualitative studies on health and well-being. 2017;12(sup2):1379338

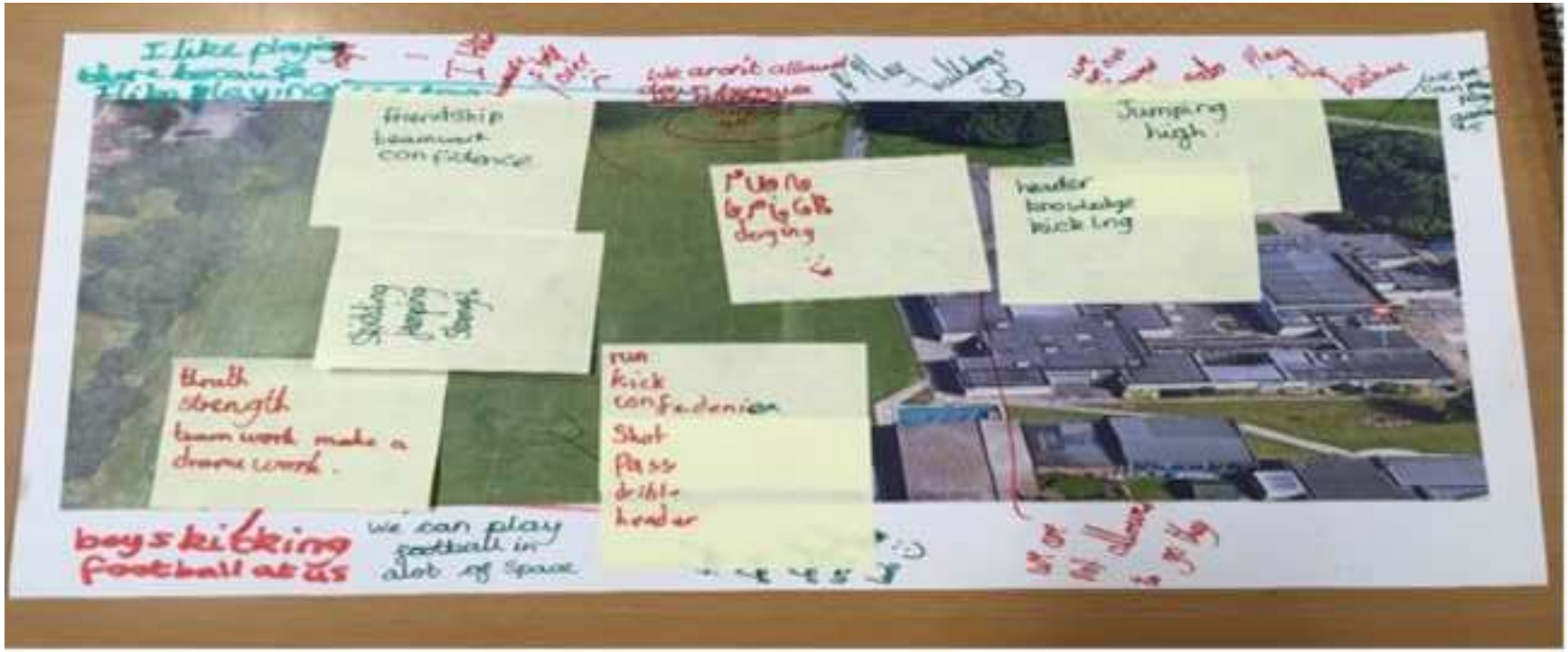
70. Chancellor B, Hyndman B. The rush to judgement: Mapping moral geographies of the primary school playground. Global Studies of Childhood. 2017;7(1): p.38–50

Fig.1

Click here to access/download;Figure;Fig.1.tif

Fig.2

Click here to access/download;Figure;Fig.2.tif



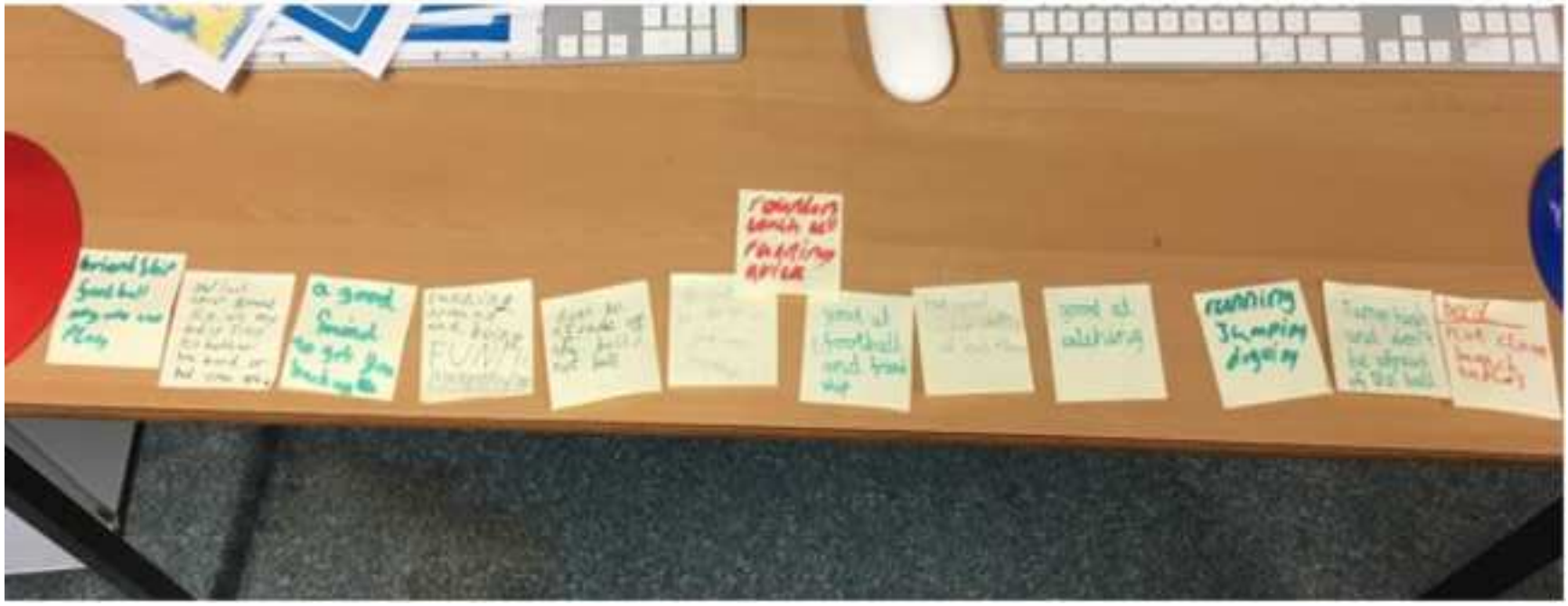


Fig.3

Click here to access/download;Figure;Fig.3.tif

Fig.4

Fig.5