A Realist Case Study Inquiry of English Primary School Physical Activity Initiatives

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Concern that children are not engaging in enough physical activity (PA) to bring about health benefits is a crisis globally. This paper aims to examine primary school-based PA initiatives from within an English context. A qualitative inquiry was adopted and underpinned by the socio-ecological model. The study was presented through a realist case study of three selected primary schools to reveal a collection of context-mechanism-outcome statements across five levels of the socio-ecological model (individual, interpersonal, institutional, community and policy). The findings highlighted a multi-layered interaction of PA within the school setting as well as the school's own relationships with external influences. Three key components emerged from the research findings; these included the 1) teacher's unintentional facilitation of simple PA in classroom settings, 2) innovative uses of community networks as an additional resource to schools and 3) the uncovering of a complexity of external influences from home, community and policies on school-based initiatives.

Keywords: Primary schools; physical activity; realist case study; socio-ecological model; stakeholder interactions

Introduction

Age-appropriate physical activity (PA) is known to have social, cognitive, psychological, and physical developmental benefits during childhood and is integral to a child's entitlement to good health (Högman et al., 2020; Janssen & Leblanc, 2010). Childhood is a critical period for forging healthy behaviours in PA which can later track into positive behaviours in adulthood (Arundell et al., 2013; Telama et al., 2014). Recognition of the importance of childhood PA is apparent in policies that aim to influence practice; for example in the UK, evidence includes the Chief Medical Officer Guidelines for PA (DoH, 2011), the Childhood Obesity Action Plan (HM Government, 2016), the School Sport Activity Action Plan (DfE, 2019) and the Primary PE and Sport Premium (DfE, 2019). However, the role PA might have in addressing health has often

led to confusing government messaging and the conflation of terms such as PA, movement, sport, and Physical Education within policy (Kirk, 2020).

The predominant definition of PA within the exercise and health science disciplines is "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen et al., 1985, p. 126). However, this paper adopts Piggin's (2020, p. 5) broader definition, that encapsulates the importance of the cerebral, social, political and contextual aspects of PA as "People moving, acting and performing within culturally specific spaces and contexts, and influenced by a unique array of interests, emotions, ideas, instructions and relationships" and to recognise sedentary time (ST) as an equally important characteristic of daily movement behaviours (Dumuid et al., 2021).

Despite the well-researched health benefits and multiple published interventions that target increasing children's PA, further research is needed in the school context that explores population level PA (see Andermo et al., 2020). For example, the recent Global Matrix 3.0 study indicated overall PA around the world was graded between D+ and C- (low/poor grade, (Aubert et al., 2018). England, for example, scored C- in overall PA because only 62% of boys and 36% of girls aged 9 and 10 years met the recommended guideline of 60 minutes of daily PA (Standage et al., 2018; Steene-Johannessen et al., 2020).

The primary phase of schooling is a critical period for a child's development (Cope et al., 2015) and provides the context in which this paper is situated. Furthermore attendance is compulsory in most Western culture schools and provides an opportunity to access whole societal groups (Hills et al., 2015). A recent systematic review examined 112 school-based interventions targeting PA promotion in children aged 5 to 12 years; interventions included curriculum, recess time, PA homework,

and/or multiple component programmes (Jones et al., 2020). The review found limited evidence of intervention effectiveness in terms of promoting PA or reducing ST, which suggests current approaches are not working. An accompanying rapid realist review recognised the school environment as a complex system with multi-level interactions and identified school leadership, policy, workforce structure, programme characteristics and school environment as playing pivotal roles (DeFever & Jones, 2021).

In this paper we present findings from a case study that incorporates three primary schools located within one English city. The purpose of the study was to explore the complex interactions of stakeholders involved in school-based initiatives that promote PA among children (Tremblay et al., 2017). The case study methodology is underpinned by a socio-ecological model (SEM) (Mcleroy et al., 1988) to demonstrate the multi-level interactions of the stakeholders within and around the schools' settings and follows a rapid realist review that provides a synthesis of current knowledge within this same model.

Theoretical Framework

Social cognitive theories that target behavioural change at an individual level have been the most predominant theory underpinning school PA interventions (Jurg et al., 2006). Although it is crucial to understand changes in individual reasoning and behaviour, the SEM explores the broader influences at various levels of society within a given environment. The fundamental principle of SEM is that behaviour has multiple levels of influence, often involving interactions within the levels of intrapersonal (biological, psychological), interpersonal (interaction within the proximal social network), institutional (the primary organisational network), community (institution beyond the primary institution) and public policy (local, state and national) (Mcleroy et al., 1988). This is a particularly important insight for school-based initiatives, where the behaviour

of children, who are still classed as dependants, is directly impacted by influences from school staff and family members (Domville et al., 2018; Mwaanga et al., 2018). A recent rapid realist review, using the five-level socioecological model by McLeroy et al. (1988) and Defever and Jones (2021), identified important factors at an intrapersonal (i.e., child), interpersonal (i.e., teachers), institutional (i.e. program content, school administration, school environment), community (i.e., home and neighbourhood), and policy level. Several country level frameworks are also underpinned by the SEM, for example in the United States the Comprehensive School Physical Activity Programme (Erwin et al., 2013) and in the UK the recently proposed Creating Active School Framework co-developed through stakeholder engagement (Daly-Smith et al., 2020).

Akin to the principles of SEM, the realist methodology incorporates a theory-driven inquiry process to formulate a set of 'programme theories' using the configuration summarised as context + mechanism = outcome (CMO); an outcome happens because of causal influences (mechanisms) that are activated under certain context (Pawson & Tilley, 1997). Exploring the mechanisms, which are often hidden and interact in complexity, helps researchers understand and explain an outcome (intended and unintended) observed within a phenomenon (Jagosh et al., 2013). The philosophical foundation of realist inquiry essentially falls under realism, and more specifically critical realism, which features an integration of positivist ontology with a constructivist epistemology perspective (Maxwell & Mittapalli, 2010). Delanty (1997) proposed that Critical Realism combines three principles within a philosophy of social science; 1) causal explanation is attainable; 2) social reality is largely an interpretative reality by social actors and 3) social actors evaluate their social reality. Hence, empirical testing of theories cannot be predictive but exclusively explanatory and social theory is affected by and caused by subjective values and actions.

Methods

Study design and sample selection

The study design incorporated a realist inquiry case study to ascertain multiple snapshots of daily school routines across two academic terms in three primary schools. The realist inquiry case study aimed to collect and analyse multiple data sources and interpret the data from a holistic account of key interactions and resultant outcomes (Greenhalgh et al., 2009).

This study was the second part of a two-phase project. The first phase was a contextual mapping exercise, that offered a novel approach to researching PA engagement amongst Key Stage 2 children aged between 7 and 11 years, by taking a snapshot from different sources of school-based PA initiatives implemented in the city's primary and junior schools (Defever and Jones, 2021). From this study, schools were contacted again for further inquiry. Three primary schools expressed their interest and consequently agreed to participate in further research. Table 1 briefly describes the characteristics of each participating school.

Insert Table 1 here

The SEM provided a framework to capture the multi-level nature of interactions, namely by school staff and children aged between 7 and 11 years. Data came from field notes taken during a whole day, week-long shadowing of a selected cohort from four classes of year groups 3 to 6, and a series of interviews with school staff and focus groups with a sub-sample of children from the same cohorts. Decisions surrounding the cohort selection, schedule for the week-long visits, interviews and focus groups were mutually agreed by school staff to minimise disturbance to the school routine. The key

deciding factors included ensuring the coverage of Key Stage 2 children, minimising the disruption of the class and appropriateness of timing in the term to shadow a cohort's typical week (avoiding special occasions such as residential week away and final preparation of standardised assessment tests, etc.). Data collection spanned two terms over two academic years: summer term (May – July 2016) and autumn term (September – November 2017). The study design was based on a similar study of a realist evaluation of a school-based PA intervention (Chalkley et al., 2018).

Ethics

Ethical approval for the study was obtained from the lead researcher's institutional ethics committee. Headteachers returned informed written consent as the gatekeeper of their school. Informed written consent from the school staff and the parents/guardians of child participants were returned prior to the commencement of data collection. A sub-sample of children were asked to complete an assent form before participating in the study. All study participants were reminded that they had the right to change their minds about their participation and were free to withdraw from the study at any time without providing a reason. Schools and participants were assured of their anonymity; participants were given pseudonyms and affiliation to schools de-identified for additional protection.

Semi-structured interviews

A series of interviews with school staff and focus groups with children were completed in the week following each week-long school visit. Headteachers, Physical Education (PE) specialists/coordinators and teachers of the participating cohort were asked to partake in a face-to-face semi-structured interview to explore aspects related to PA school-based initiatives. Interview questions covered topics about the characteristics of

their school and their cohorts, their own perspectives on school-based PA initiatives and the priorities in their respective roles. Questions were initially prepared based on the findings from the context-mapping study (Defever and Jones, 2021) and adjusted accordingly based on the field notes and the direction of conversation at the time of interview. The first author conducted the interviews and focus groups; notes were taken during the conversation to make reference to who spoke at what time point, mark any points to prompt further and any conversational dynamics not captured in audio (e.g. participants' facial expression, reasons for pauses, and general body language).

Semi-Structured Focus Groups

A sub-sample of children, chosen at random by the teachers, participated in a semi-structured focus group to capture their perspectives. Ground rules were explained at the start and throughout each focus group session (e.g. to raise your hand to speak, only the participant with the "magic pen" can speak; respect each other's opinion.). The number of children in each focus group was dependant on assent and the teacher's discretion. Group size ranged from three participants to 14 in one setting. Challenges facilitating the focus groups included keeping children focused on the topic, managing tendencies of the children to distract each other, or talk simultaneously, and encouraging each participant, without pressure, to engage and share their thoughts.

Field notes

During the school visits, a field notes template was used to capture nuances otherwise difficult to detect from the interviews and focus groups. Taking field notes is a common method of documenting real-life observations (Patton, 2015). Adopting different forms of data collection allies with the principles of realist methodology as it encourages multi-faceted views of the context-mechanism interaction, at all levels of SEM, which

ultimately trigger the observed outcome (Wong et al., 2017). The content of the field notes included factual data (e.g. time, day, description of the session) as well as subjective data (e.g. a sketch of the space, descriptive entry of interactions) and any noticeable remarks while on the school visit (Willis et al., 2018). Decisions on what observation was worth noting were based on the accumulated knowledge gained from the literature, the contextual mapping study (Defever and Jones, 2021; Jones et al., 2020), and the experience of directly visiting schools. The notes were used to adjust and modify the semi-structured interview and focus group questions to suit the context of each participating cohort (Gilmore et al., 2019).

Location of data collection

All interviews, focus groups and field notes were conducted on the school premises at a time deemed by the teachers as least disruptive to the daily schedule. This meant the exact location, date and time for interviews and focus groups often required flexibility and adjustments even at short notice. The length of interview with school staff ranged from 20 to 90 minutes. Focus groups with children ranged from 15 to 30 minutes. For safeguarding purposes, a teacher or support staff responsible for each cohort was present in the same room at the time of the focus groups, but they did not engage with the discussion.

Data management and analysis

All interview and focus groups, excluding one interview, were audio recorded. The first author transcribed all interviews and focus groups by listening to the recordings at least three times to familiarise with each participant's voices, making cross-reference to the notes, and to ensure they were transcribed verbatim. The transcripts were read multiple times to follow the six phase process of thematic analysis depicted by Braun and Clarke

(2006) to establish trustworthiness and transparency in the analysis. The thematic analysis included a combination of inductive and deductive techniques to make sense of the data (Trigwell et al., 2015). The initial process involved an inductive approach by segmenting the data and openly coding it to allow specific codes and categories to emerge. Subsequently, specific quotes, notes and conversations were assigned to each codes to allow wider themes to emerge from the data (Nowell et al., 2017). Consistent with the realist methodology, the SEM was then used to provide a conceptual framework for further analyses using the reductionist and deductive (theory driven) process (Bronfenbrenner, 1979). Overall, the analysis was a lengthy, complex and messy procedure; the process of going back and forth between inductive and deductive approach was repeated multiple times to continually refine the programme theory in the form of CMO configuration in several iterations.

Findings

The data collected included a total of 31.5 school days of field notes, 13 interviews with school staff and six focus groups with 53 children (28 boys, 25 girls). The data has been organised into levels of influence within the SEM, including individual (i.e., children), interpersonal (i.e., teachers), institutional (i.e., school leadership), community (i.e., home and community network) and national policies. At each level of influence, realist programme theories are presented in CMO configured "If…, then…" statements on Table 2. The following section presents the main findings in narrative manner of CMO.

Insert Table 2 here

Individual level: Children

In the classroom, children spent most of the time sitting, but there were mechanisms which allowed spontaneous movement. Field notes indicated that most of the children demonstrated the ability to stay on task for approximately10-20 minutes at a time. After this, children become fidgety, easily distracted, and displayed an urge to move. Children were given the opportunity to get up from their desks, voluntarily or facilitated by the teacher. Some classes were equipped with learning prompts (e.g., "word cards" on the wall and marking stations) and/or housekeeping (e.g., water bottles by the sink, pencil sharpener by the bin) allowing children to get up and access these as and when required. This method is suited to incorporate purposeful movement as well as to encourage children to make their own choice to move when needed. A child from the focus group shared how he dealt with the urge to move:

> I would just ask to go to the toilet… even if I don't actually need to go to the toilet, I just be like… have a little walk, then I kind of walk in and out the toilet and just walk back in… (Year 5 child)

Teachers recognised the decline in children's productivity level when they were sat for a prolonged period. Some would facilitate a short 5-to-10-minute break in the playground or in the classroom with simple activities (e.g. star jumps or dance videos) to provide fresh air and to "let off steam." The outcome of such short breaks was usually perceived as positive by the teachers, claiming that children become refreshed and ready to focus again:

> It's just to get the steam out, isn't it really? And it's all about, kind of, not hardcore aerobics, but the movement of the body. So, we do a similar thing but they just, kind of, run free… It's more of the fresh air. (Year 6 teacher).

Interpersonal level: Teachers

The case studies revealed several substantial influences on school-based initiatives at the interpersonal level, mainly by the class teachers. Ultimately, the teacher's priority

was the academic progression of the class; they perceive themselves as an educator and not as a facilitator for exercise:

> I don't see myself as a facilitator for exercise. I see myself as that person…, to obviously get them ready for SATs [assessments]. So, sort of like Year 6, ready and that's all based on academics I'm afraid. (Year 5 teacher).

Teachers were concerned with optimising children's learning and minimising disruption by managing the classroom behaviour. Through training and experience, teachers developed various skillsets and strategies to maintain the optimal balance of making learning fun and to contain any disruption. Although the primary objective for each strategy is to benefit children's learning, many of these strategies seemed to consequently facilitate PA and break up ST. The teacher's judgement was based on "trial and error"; when, what type, how often and for how long these types of breaks and facilitations were made. For example, one teacher said why she facilitates short bouts of classroom-based PA (e.g. star jumps, touching your head, shoulder and toes) between lessons:

> I don't mind having them little break because they're sedentary and they're sat there and it's hard for the child. …because they are like, sort of, zone out when they are still for ages. They are children, and they're meant to be busy bodies. And so, I do that, I was trained to do these things to regain their attention. (Year 3 teacher)

Teachers noted that in their pre-service training they were drilled to structure lesson plans in 10-to-20-minute blocks to align with the concentration span of the children. They reported being taught to utilise different areas of the classroom space (e.g., sit on the carpet for instructions, desk configuration by levels of competency, a quiet corner for reading, etc.) to section different styles of learning (e.g., teacher-directed, group or independent). The main outcome of such influence at the interpersonal level is an

optimised learning environment, but also there were unintended outcomes of facilitating PA.

Institutional level: School leadership

Based on the interviews with deputy and headteachers in this study, the decisions made regarding school-based PA initiatives fell under the broader decision of providing children with non-academic and extra-curricular opportunities. The context at this level is that, whilst academic attainment is inevitably crucial for the school, the philosophy of the schools wanted to also cultivate the non-academic development of their children. All three schools emphasised that schools should not be just about Mathematics, English or how well children do on tests, but a place to explore and discover what they are good at and what they like to do:

> Our children have limited life experiences in this small narrow inner-city area, so anything that gives them an opportunity to see or learn something different that would be outside of their normal experience, I will always say yes, because it' an enrichment of your understanding of the world... (Headteacher, School A).

While it is often expected for a school to provide a variety of extra-curricular opportunities, the reality is that school resources are severely restricted and may not have the assets to offer as many opportunities as they wish. Headteacher Lynn shared her strategy of topping up her school resources by accessing a corporate social responsibility scheme, for non-curricular opportunities for children. She regularly seeks out any trial or free "taster" sessions for any activities appropriate for her children:

> So we've had 18 Year 6s have [free sessions of] sailing, they've done full mornings of sailing… And lots of companies have, I can't remember what it's called, but corporate responsibility or social responsibility funding...I managed to get £150 toward the beach trip for our children … Many businesses have that, it's just tapping into it… (Headteacher, School C)

The mechanism of seeking resources outside school to provide opportunities can widen its capability to offer children new opportunities. The outcome of innovatively tapping into such resources include not only the short-term benefit of providing PA initiatives but also to build a sustainable relationship with the local community to offer opportunities which may potentially lead to life-long habit of participating in regular PA.

Community level: Home and local community

Because primary school children are dependants, the key context at this level of influence are the home and parents' commitments to support school-based PA initiatives. School staff consistently made reference to parents' support and their general perception on PA directly influences whether children engage in school-based PA or not. For example, the uptake on after-school activities is inevitably down to the parents' decision:

> … it's also changing the mindset of the parents, and their children… One of the issues we noticed is that… you have some children want to do it, but where they have siblings, the parent doesn't want to come and collect the sibling, go home and then come back again. And, because the parents don't want to do that. (PE coordinator)

Each family has influences such as socio-economic status, time commitment, cultural expectations, beliefs, values and priorities that may have positive or negative impact to carry-over the benefits of school-based PA opportunities at home. Resources such as time and financial support as well as parents' perceived danger for children to play outside in their neighbourhood may influence parents to keep their children indoors for their safety and for parents' convenience. Thus, different influences between home and school may cause conflicting messages. While the goodwill of the school may

compensate for the missed opportunities at home, there is a risk of responsibility being abdicated by parents to the school for complex reasons:

> …some parents, they do disconnect themselves with the school, it's almost the case of child out the door, relief, I can go off and do my own life... (Year 6 teacher)

This is a difficult task and often a dilemma experienced by the teachers, which need a careful approach not to interfere with parenting. One Year 6 teacher expressed that "…if their parents aren't going to encourage them to get moving, then maybe it's the school's responsibility…". A Year 3 teacher also noted, "there's fine line you know like by telling them [parents] off, and that can be very discouraging". Such complex, and often a very sensitive, relationship between school and home environment seems to have either a positive or negative impact on the outcome of school provisions:

> … it's just not about physical activity… Struggle to influence what the home beliefs or the culture of the home. So, if they live in a very sedentary family, that sits down, watch a lot of TV, you know, don't walk very far, don't go out very much, then that's quite a hard barrier to break through. (Headteacher, School A)

Another key community source which all three schools seemed to value was the local university-school partnership programme, where some PA initiatives were supported in the forms of *ad hoc* events and professional development training for school staff. The programme was praised highly by all participating schools as a single point of contact for current and new opportunities for school-based PA initiatives. The programme is a not-for-profit service from a local university and because of this, the services provided to the schools were perceived as value for money, credible and trustworthy: "Because it is run by the university, then I feel like it's got… credibility. They're not out to make money…" (Headteacher, School A). Furthermore, the partnership allows university students to have their placement experience in local schools. There is a sense of mutual

benefit between the schools and the university as schools receive free provision by the university students whilst the students benefit from the first-hand experience as practitioners and gain insight into the local community. The university students also act as a positive role model for the children. The partnership thus seems to work well to establish a sustainable community network for maintaining school-based PA initiatives. Similar to the outcome of utilising the corporate social responsibility scheme, the university partnership programme builds a sense of a community-wide initiative to encourage PA participation within school setting and also at a wider scale.

Policy level

The dominant context at policy level was related to the requirements of the national curricula and the academic attainment based on the national Standard Attainment Test (SAT) results. The state funded primary schools are required to deliver three core (Mathematics, English and Science) and nine foundation subjects as well as non-curricular activities:

> …particularly as they go further up the school years, literacy and numeracy, and then having to fit… geography, history, science, IT, French, all of these things as well… You know, there's loads of other things that we could do within our day as well, but we just simply don't have the time to do it. (PE coordinator).

The overall SAT results from Year 6 children is a tremendous pressure on schools, as the results are benchmarked publicly. The school inspection process, incorporates the SAT results, is a key influencing factor and often perceived negatively by school staff as a narrow evaluation of child's development. Inevitably, schools feel compelled to prioritise their resources based on the inspection criteria and focus on the prerequisites to obtain at least a "good" rating in the next school inspection:

> Nobody [from the inspectorate] comes in necessarily and looks and says 'oh, your reading is not good, but your PE is fantastic.' It doesn't work like that. It's

> the system you're working within that you know that you have to get those good outcomes in reading, writing, and maths. (Headteacher, School A)
>
> Until you can make Ofsted [the school inspectorate body]…whole school, not just the [SAT] results, PE's always in danger of being squeezed… and art, and music… and all those things that children need to be full rounded individuals. (Headteacher, School B)

These narratives illustrate a culture of academic pressure and forced prioritisation of the core curricula. As a result, Mathematics and English dictates the timetable and not enough perceived time is allocated to deliver all subjects. The outcome is the conflicting stance and hinderance from the schools' philosophies to provide children opportunities beyond the curricula, including PA.

Discussion

The school cases highlighted various mechanisms across multiple levels of influence which impact on promoting, implementing or impeding school-based PA initiatives. In line with the key principle of the realist methodology, the real-life implication of the case studies was to explore which school-based PA initiatives are likely to work within these school settings. Using the SEM, this research has demonstrated that interactions influencing the school-based PA initiatives are multi-faceted and complex. More importantly, these interactions are not exclusively contained within the school setting. There are influences from home environments, the wider community and national policy impacting on school-based PA initiatives. In this section, three main key findings are discussed further. While we recognise the valuable contribution of Physical Education on a child's PA experience, the subject retains a statutory place in the

primary level curriculum in the UK. For that reason, Physical Education has not been considered in this paper as part of a discussion on 'initiatives' to engage children in PA.

Unintentional facilitation of PA

Class teachers are in a position to facilitate PA opportunities because they have direct contact with the children, either in their conscience or unintentionally as a by-product of their primary intent (Erwin et al., 2011). One of the findings of this study was the unexpected simple movements elicited during class time; children regularly, but in short bursts, were able to move around the classroom. However, teachers did not perceive these movements as PA *per se*; rather, they perceived them as strategies for learning behaviour management, time efficiency, housekeeping tasks, and innovative teaching approaches. The unintentional outcome of such opportunities was twofold; one was the accrual of PA at varying intensity and the second being the disruption and breaking up of ST. This form of PA is different from the PA interventions that are extensively researched in school settings (Dobbins et al., 2013; Rafferty et al., 2016). The use of simple PA as a form of classroom management is a useful strategy for teachers to continue as the focus is to foster a better learning environment, thus the likelihood of teachers already adopting some of the strategies are high. Helping class teachers to realise that these classroom management strategies are indeed contributing positively to children's PA levels would empower and encourage teachers to engage in promoting PA throughout the school day, as they are already implementing these strategies.

Community networks

Another finding was that Headteachers seemed to innovatively utilise local organisations as key resources for additional PA opportunities. Examples of community networking demonstrated seeking free or cost-effective resources by tapping into the

cooperate social responsibility scheme and utilising local university partnership programmes. To our knowledge, community engagement through the cooperate social responsibility scheme has not been explored previously in the field of school-based PA intervention. Building networks within the local community has mutual benefit for the local organisations and the schools, by sharing some of the assets to help each party. One of the long-term aims of school-based PA intervention is to encourage PA participation as a life-long habit (PHE, 2015). Such networks could help to achieve sustainability of PA initiatives for school-aged children, rather than relying on national funding initiatives which invariably have an end point (Griggs and Randall, 2018). At the primary level, parents and teachers make decisions on behalf of children, and adults within the community have significant influence as role models to portray positive behaviour (Domville et al., 2018).

Uncovering the complexity of external influencers

Despite school and home being two distinct social environments, the SEM suggests that home and community environments can have substantial influences on school-based PA initiatives (Erwin et al., 2013). National policies can also direct schools' priorities and focus (Langille & Rodgers, 2010). These external influences have the potential to act either as enablers or barriers to school-based PA initiatives. The relationship between the external influencers and the school is bi-directional, meaning each component has some capacity to influence each another positively or negatively.

The home environment includes parents and relatives, their socio-economic status, ethnicity, cultural background and their perception towards PA. Families from different backgrounds exhibit different levels and types of support for their children (Trigwell et al., 2015). Todd *et al.* (2015) reported that teachers experience moral dilemmas on whether it is the teacher's responsibility to address social aspects of

children's well-being. The teachers who participated in this study consistently indicated that families have a significant responsibility on children's PA habit as does the school. Parental engagement is therefore crucial, but notoriously difficult (Gorely et al., 2011). Efforts could be targeted not only to encourage children to participate in school-based PA initiatives, but also to engage parents in school matters, in order to fulfil the socio-ecological approach to behavioural change (Christian et al., 2015; Högman et al., 2020). For example, organised school activities and trips within the locality can impact both children and parents to realise that they can easily replicate these activities in their own time.

Finally, Government policy has a significant impact on school matters. The impact of national policy on school-based PA initiatives is complicated and was frequently discussed in the interviews with school staff. Mwaanga *et al.* (2018) argue that the current UK education framework is based on the philosophical view of dualism of the mind and body as separate entity, and disputably the educational regulatory bodies deem the cognitive function as superior to the physical body function. The academic pressure imposed by the government and the less priority on PA opportunities by school inspectors indeed negatively impact school staff's perceptions on whether school-based PA initiatives are considered worthwhile or not (Domville et al., 2018).

Conclusion and Recommendations

This paper presents findings from three realist inquiry case studies on school-based initiatives to promote PA and reduce ST in primary schools. The use of the SEM, in conjunction with realist methodology, has neatly uncovered the black-box of complex stakeholder interactions made at interpersonal, institutional and external levels of influence and how they enabled or hindered school-based initiatives. While we

recognise the limitations of sample size and context-specific findings, this study has presented novel insights from extensive engagement with the participating schools; these included: teacher's unintentional facilitation of simple PA in classroom settings, innovative use of community networks as an additional resource to schools and uncovering the complexity of external influences from home, community and policy level on school-based initiatives.

To date, few UK school-based PA intervention studies have been demonstrated to be effective (Metcalf et al., 2012; Russ et al., 2015), or successfully translated from research into everyday practice (Arnold et al., 2016). One possible explanation for this is that educators and children are rarely involved in the development of school-based PA interventions, already jeopardising perceived ownership of the intervention, actual insight into implementation challenges, sustainability and effectiveness (Christian et al., 2015). Thus, our recommendations seek to engender collaboration at all levels: national, community/school and teacher/children. The first of which is for policy at a national level to recognise the complexity of child PA engagement and place PA promotion as a priority area for schools within a local community context. With neoliberal practices now common place in education (Connell, 2013) and more recently in health promotion agendas (Cope et al., 2015; Enright et al, 2020; Sperka and Enright, 2018) we advocate external organisations should start to work with schools and community settings in a more corporate socially responsible way (Leone et al, 2016; Weems et al., 2017). This may go some way to shift the focus on competition for selling PA services to primary schools, to a more a sustainable means of PA engagement. Furthermore, Government funding that facilitates PA as an outsourced activity, may have inadvertently deprioritised PA within the school culture, as teachers do not see PA as their in-house responsibility. Policy should therefore target improvements to PA both as a whole

school approach and engage other stakeholders (e.g parents) who have a crucial role in promoting positive PA behaviour outside the school.

Secondly, in order to achieve a positive PA culture in school, a reduction in children's ST, intentional or otherwise, should also be considered. Pre-service initial teacher education could help here by encouraging new entrants to the profession consider ways to embed PA as part of their curriculum planning and establishing active learning environments. Finally, we advocate for further empirical research into unintentional PA in classroom environments that supports a whole school approach to PA and reducing overall ST.

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