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"Is Everybody Comfortable?" Thinking Through Co-design Approaches to Better Support Girls' Physical Activity in Schools

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ABSTRACT

Of interest across the domains of sport, education and health in the UK and internationally is the challenge of engaging girls in physical activity. There has been increasing support for novel approaches that take seriously the notion of 'co-design': i.e. involving girls in decision-making processes that directly and indirectly affect their engagement with physical activity. Given this approach is still in its infancy, this study set out to explore pupils' experiences of a co-designed school-based physical activity programme – the UK Youth Sport Trust's Girls Active programme – and offers suggestions for enhancing future co-design interventions. We report analysis of 22 focus groups conducted with 143 pupils from eight of the ten schools that engaged in the Girls Active programme. Seeking to explore how co-design can be optimised, the analysis arrived at a conceptualisation grounded in comfort theory, articulated here across three sources of comfort and discomfort: material, social and practical. We discuss how orienting future co-design interventions around these sources of discomfort may be a useful way of avoiding several significant reasons why girls might disengage from physical activity in schools. Crucially, we suggest that pupils are uniquely placed to offer insight and foresight about experiences of discomfort, making a co-design approach a potentially powerful way to help navigate what can be a complex, changing and context-sensitive issue. Finally, important distinctions between co-design and co-production are discussed to encourage researchers in the field to carefully consider which of these approaches are most appropriate for their own work.

Introduction

Supporting girls' engagement with physical activity in schools is of significant interest within the domains of sport, education, and health internationally. In the UK, addressing gender disparities in physical activity has been part of policymaking ambitions for some time (PHE, 2014, PHE, 2016; DHSC 2019). It has led to, for example, the roll-out of Sport England's current *This Girl Can* campaign aiming to increase girls' activity levels, regardless of their size or ability (Sport England 2020). Such investments are justified on social justice grounds because sport and physical education (PE), as key opportunities for girls to engage in physical activity, have for too long been exclusionary spaces (Scraton 2018). Furthermore, girls' engagement in physical activity has taken on new significance

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This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (http:// creativecommons.org/licenses/by-nc-nd/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way. amidst public health concerns about obesity and rising inactivity in contemporary Western societies. Sport England's Active Lives Survey suggests only 43% of girls meet the physical activity guidelines compared to 51% of boys (Sport England 2019); a pattern supported by accelerometry data showing that girls appear to be less active and more sedentary than boys across Europe (Steene-Johannessen et al., 2020). Appreciating the health implications of gender disparities in physical activity aligns this issue with the health equity agenda (Coen 2018) which is central to several recent intervention studies intended specifically to improve girls' physical activity in schools (e.g. Sebire et al. 2019; Okely et al. 2017).

Building on the critical understanding of girls' experiences of physical activity in schools, there is a large amount of research and practice exploring proactive strategies to bring about positive change. While the foci of programmes and interventions have varied, one feature increasingly embedded within interventionist programmes is 'co-design'. The notion of co-design is not new, and we use the term broadly to describe an approach to developing and implementing interventionist programmes or services that have meaningfully involved, engaged, and empowered those for whom the programme or service is intended to serve. While it is helpful to locate co-design within a family of related concepts like co-production (Smith et al. 2022), and co-research (Cuevas-Parra, 2020) it is also important to be reminded of the dangers of conflating various 'co' terms to preserve their unique features and prevent 'buzzword' reductionism (Robert, Donetto, and Williams 2020; Williams et al. 2020). In our view, co-design is focused on harnessing local and contextualised expertise of the 'users' of programmes or services – in this case, teachers and young people. While co-design shares similar principles and values to the wider concept of co-production such as disrupting traditional power relations between researchers and the 'users' of programmes or services (Osborne, Radnor, and Strokosch 2016), we argue that co-design falls short of the more radical egalitarian rationale of co-production (Williams et al. 2020) by virtue of maintaining the centrality of researchers who remain more likely to define the boundaries and the end-goals of the process. Indeed, a crucial distinction between our use of co-design and the the various types of co-production outlined by Smith et al. (2022) is that our focus is on the collaborative process of developing interventionist ideas with knowledge users rather than producing the research itself with knowledge users. That is, neither the school pupils nor the teachers involved in Girls Active were involved in influencing the direction of the research, conducting interviews or making sense of findings.

Co-design has widely been used for intervention development and implementation for a range of health-related behaviours (see for example, Champion et al. 2020; Anselma at el., 2019; Ospina-Pinillos et al. 2019) and its principles are unquestionably becoming central to the landscape of promoting physical activity in schools. In presenting the Creating Active Schools Framework, Daly-Smith et al. (2020) assert that their approach provides a map and method to guide future co-design¹ activities 'with' schools, while abandoning traditional approaches of implementing interventions 'on' schools. There are clear parallels between the approach taken by Daly-Smith et al. (2020) and the co-design elements within the *Liikuma Kutsuv Kool* programme in Estonia (see Liikuma Kutsuv Kool 2021) as well as the *Liikkuva Koulu* programme in Finland (see Liikkuva Koulu 2021). Spotswood et al. (2021, 9) draw from similar ideas to argue that school physical activity interventionism might be usefully reimagined as a 'collaborative program of learning' aimed at managing change within a school culture in a way that is 'ready to repeatedly adapt to manage ongoing dynamic transitions'.

Specifically applying co-design principles to support girls' engagement with physical activity in schools, Mitchell, Gray, and Inchley (2015) report how their interventionist case study 'increased participation and more positive perceptions of the subject' (p. 593) for most participants. Here, involving girls was introduced as part of the implementation of the 'Fit for Girls' programme, emphasising consultation and offering choices around activities. Furthermore, described as an 'activist approach', Oliver and Kirk (2016) took the same commitment of working *with* girls but engaged with them at an earlier stage and in a more transformational way by seeking to improve their circumstances as its basis. Their approach involved a student-centred pedagogy, listening and responding meaningfully to girls' concerns and giving space for girls to think critically about the

fundamentally feminist issues related to their 'embodied' experiences; that is, experiences for which the physical, sensory body is inescapably central (see Shilling 2010). Nuñez Enriquez and Oliver (2020) extended this work through creating space for collaborative partnerships within the school system to co-design (or in their words 'co-create') change.

The purpose of this article is to share the voices of girls (and their male peers) in relation to their experience of the PE curriculum in school, to identify the potential for co-design within the development or implementation of a gendered school-based physical activity programme. Essentially, knowledge about reasons for disengagement can be first identified from the participants themselves. Creating opportunities to listen to explanations for avoidance of PE seems to be a valuable endeavour. Thus, from the inquiry, a core iteratively-derived issue raised through our work and engagement with the participants was that of physical, social, and psychological discomfort whilst engaged in physical activity in school. This finding informed our use of co-design approaches. This is especially notable, as in the context of physical activity in schools, comfort has not always been a priority, and ensuring that students are comfortable may create tensions for those delivering the curriculum and making decisions within a school, as considering comfort could be conceived unnecessary. We argue, however, that attending to comfort may avoid the natural human inclination towards it which may manifest in avoidance. Thus, the appropriation of comfort theory in response to adolescents' perspectives was deemed logical as an explanatory model.

Comfort theory is derived from the field of nursing, where Kolcaba (1991) developed an original taxonomy of four contextual (physical, social, psychospiritual, environmental) and three intersecting sensory (ease, relief, and transcendence) dimensions. As a multidimensional model (Bissell 2008) recognising comfort as a basic human need (Boudiab and Kolcaba 2015), comfort theory was noted to be transferrable to a range of other settings (Kolcaba 1991). This includes the field of outdoor leisure activity, looking at the physical, social, psychological, and visual dimensions of comfort (Dimmock 2009). Kolcaba (1991) argued that in humans there is a basic drive to maximise comfort and avoid pain; individuals engage in behaviours to assure self-comfort which may be healthy or unhealthy. Notably, an individual's comfort needs are interrelated and complex (Boudiab and Kolcaba 2015), and should be considered in a holistic way when co-designing physical activity solutions.

Building on the co-design literature and utilising comfort theory, it is important to continue developing and refining co-design approaches to supporting girls' physical activity in schools. Not only does girls' engagement remain a stubborn issue for policymakers and practitioners but the relative infancy of the use of co-design within this context creates new challenges and opportunities for development. Specifically, we consider it important to continue the development of co-design practices between researchers and practitioners to help interventionist strategies move from a commitment to co-design in principle to optimising co-design in practice. This article focuses on the views of adolescents involved in an interventionist programme that saw the girls co-design the delivery/implementation of a physical activity programme in their own schools. We offer a novel way of guiding elements of co-design practices such that known risks for girls' disengagement with physical activity can be reduced.

The study

Research context

This paper utilises data drawn from a broader sequential mixed-methods trial (Harrington et al., 2019) to evaluate the Youth Sport Trust (YST) *Girls Active* programme in schools. The Girls Active programme was developed in collaboration with educators and adolescents from 50 schools with a goal of promoting girls' physical activity. After a phased programme of development work involving schools working in partnership with each other, it was decided that the programme should

include a commitment to 'empower girls to design and deliver PE and sport' as a key principle (YST, 2020, n.p). *Girls Active* itself consisted of an initial training day for lead teachers to facilitate an assessment of need and action plan for the school, facilitated by an action plan document which was provided. Lead teachers were tasked with creating peer leader groups within their schools consisting of influential students to lead the promotion of physical activity to their peers. Like other peer-led interventions (e.g. O'Kane et al. 2020; Sebire et al. 2019) the involvement of identified peers promoted an adolescent-centred approach to implementation aligned with co-design principles. A YST coach provided periodic support to lead teachers.

The larger trial had a quantitative data collection component and qualitative data collection through, amongst other methods, focus groups with those directly involved in *Girls Active* in schools (peer leaders) and other groups from the school (female and male peers of the peer leaders) to add to an understanding of the context within which *Girls Active* was operating in (see Harrington et al., 2019 for full methods). While the main trial did not find a statistical effect on adolescents' physical activity levels (Harrington et al., 2019), the process evaluation revealed the programme was well-received and valued by teachers and pupils but barriers to implementation existed at the school level (Gorely et al., 2019). In this article, we focus on a secondary analysis of the qualitative data to examine adolescents' experiences of *Girls Active* with the purpose of revealing insights about how co-designed physical activity interventions can be optimised.

Data collection

We utilised focus groups as these are a valuable tool for data collection in health research (Wilkinson, Joffe, and Yardley 2004). This provided a platform for participants to share ideas, debate core issues relevant to the research, and comment on others' contributions (Willig 2008). The data demonstrated that in relation to this topic, participants were able to build on one another's responses to add depth and detail, and to verify one another's concerns. Focus groups were conducted and audio-recorded by Harrington (Lecturer, female) and one other researcher with three years of qualitative experience (Lecturer, female) and were supported by a project manager (female).

Overall, 22 focus groups were conducted, consisting of eight groups of peer leaders (N = 46), eight groups of girls (N = 59) and six groups of boys (N = 38). The schools reflected a range of rural, suburban, and urban locations and the pupils represented a variety of socio-economic and ethnic backgrounds. The duration ranged from 8-to-32 minutes and took place during the school day at school. Group sizes ranged from 5-to-8 participants. We assured sampling adequacy through the quality indicator of saturation; achieved within and across groups (Hancock et al. 2016). This was determined via the stopping criterion, when no new issues were arising (Francis et al. 2010).

The focus group schedule was open-ended and broadly shaped around three issues crucial for the process evaluation of the wider trial; role and impact of peer leaders, how peer leaders were perceived, and broader educational issues around physical education and sport. As is usual in focus groups, the actual topics and issues discussed went in various directions. This provided new avenues for secondary analysis which we explore in this present paper. It was recognised that during focus group it is helpful to actively engage more passive members of the group by making space for their contributions through participants developing a timeline of *Girls Active* delivery actions (using flipcharts and post-it notes) used as a prompt for discussion.

Recruitment and ethics

Ethical approval was provided by the University of Leicester College of Medicine and Biological Sciences research ethics committee representative. Using a parental opt-out consent process, three categories of adolescents were recruited in eight participating secondary schools in the East Midlands (England). Peer leader groups included girls identified by teachers who led activities designed to encourage their peers to increase participation. A sub-group of girls from the same classes as the peer

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leaders were also identified and invited by lead teachers. These girls would have received *Girls Active* but not been a peer leader. To gain a potentially different perspective on the intervention, a group of boys from the same year groups were also invited. These boys may have been peripherally aware of *Girls Active* in their school due to seeing peer leaders' activities in action.

Data analysis

Our analytic process utilised template analysis, a form of thematic analysis. The approach promotes hierarchical coding to provide a structural framework arising from a thematic organisation of data, as influenced by the evidence-base and research agenda (King 2004). Using template analysis, an initial interrogation of the data identified six meta-themes, which were formed from 33 conceptual categories. It was apparent that a connecting narrative between these meta-themes was that discomfort – of one form or another – was a contributory factor to disengagement from PE. At this point, consistent with a template approach, the literature was consulted to examine whether this notion of comfort and discomfort had been identified by previous researchers. In reviewing the literature, we identified a theory developed from nursing practice, called comfort theory, which describes the psychological righting reflex (a psychological homoeostasis) within humans to avoid pain and promote comfort (Boudiab and Kolcaba 2015). The aspects of comfort theory seemed to parallel the kinds of experiences that participants described, and therefore the principles of the theory were mapped against the data.

Thus, the data-driven coding provided a basis for the integration of comfort theory as a framework to understand the themes coming through in the analysis, and to provide a foundation for the construction of the template.

After arriving at the decision to conceptualise students' experiences in terms of comfort/discomfort, we organised our findings around the three most pertinent sources of discomfort from the participant's perspective: material, social and practical. As we highlight, these sources of discomfort are only partially distinguishable from each other because they most often act in combination to produce feelings of discomfort in individuals. The overlapping material, social and practical sources of discomfort felt by girls when taking part in physical activity in school are outlined below together with a discussion about its relevance to co-design approaches.

Findings

Material sources of discomfort

The analysis highlighted material phenomena such as clothing, the weather and facilities as important components involved with shaping girls' experiences of physical activity in school. Thinking conceptually with comfort theory, we articulate this process as feelings of comfort and discomfort for which the material environment appears to be the most significant contributor, despite never being entirely separate from social and practical sources. Our first claim arising from this analysis, therefore, it that future co-design activities may benefit from dedicated discussion about the material entities that matter to students when they are active. As we will show, resolving some of the problems with these material entities may require collaborative co-design partnerships that go further than was possible in the *Girls Active* programme.

The first way in which the material environment contributed to feelings of comfort and discomfort was through the weather, including participants' sensory awareness of temperature in indoor or outdoor spaces. As one participant explained, 'it puts us off sport when it's boiling hot in the summer and we're inside doing gymnastics and then when it's freezing cold in the winter, we're outside doing netball or hockey' (*School F, girls' FG*). Here, we see that some girls' experiences at the more extreme ends of temperature – exacerbated by the activities taking place indoors or outdoors – impact the evaluation of the activity ('it puts us off sport'). In this way, we can view mundane seasonal changes in weather conditions as a major contributor to our everyday experiences and hence something that needs to be taken seriously (Bell, Leyshon, and Phoenix 2019).

Importantly, participants appeared not only to be concerned with the immediate feelings of discomfort brought about by the weather but also how their sensory experiences endure beyond the activity and into their school day. After being too cold, one pupil expressed concern about 'becoming cold for the rest of the day' (*School F, girls' FG*) and after being too hot another pupil explained that some girls 'don't want to come in all sweaty and stuff' (*School B, peer leaders' FG*). Considering these perspectives, it seems girls' sensory experiences of comfort and discomfort may indeed derive from the material environment but are made meaningful in the context of other concerns about the remaining school day. This additional insight is meaningful for co-design approaches because the context of the remaining school day provides an altogether more malleable target for change. That is, while it is impossible to change the weather and very challenging to build temperature-controlled indoor facilities, it may be much more feasible to involve school leaders in co-design conversations about how to best timetable PE and manage the immediate time following PE lessons.

Interestingly, concerns about temperature and the uniform associated with PE were not expressed by male participants in this study, who reported being satisfied with their clothing, and comfortable in it ('Well I think our clothing's quite good at the minute'. *School F, boys, FG*). Furthermore, some boys went so far as to suggest that the lack of material comfort was exaggerated by their female peers as a mechanism to avoid or complain about PE, based on the suggestion of equality in uniform, and thus the equality ensured teachers did not allow girls to 'get off' from participating (*School B, Boys, FG*).

R2. I think they are the same as the boys but that's a bit of the same so like there's been more equality there. It just gives the girls a reason ... well, gives the PE teachers a reason for the girls not to get off ... well, for anyone not to get off sports to say, they're cold.

Such comments highlight that co-design activities can be contentious and problematic if there is disagreement among the users and stakeholders in the process (boys, girls, teachers and school decision makers) about the validity of the problem as well as possible solutions.

Additional to the weather, a significant non-human contributor to girls' experience of discomfort derived from designated school PE kits. One pupil described this as a significant issue because 'if they [pupils] are not wearing something they're comfortable in they're not going to want to take part. They're not going to achieve, like, what they're trying to get'. More specifically, girls in one focus group felt that PE would be improved if 'they got rid of the blue socks' (*School B, girls' FG*). When asked to clarify what was meant, the participants explained that:

- R1: They're not very comfortable. Like, they're slippy.
- R2: And quite itchy.

Through this building of the sensory discomfort, we see that discomfort appears to be produced from the interaction between pupils' bodies and the fabric of the socks; considerations undoubtedly central to the design of sportswear yet may be under prioritised in the context of PE and school sport kit.

Differently, the materiality of certain clothing contributed to feelings of discomfort in combination with the social context of school, highlighting the analytic inseparability of physical and social actors. Pupils expressed concern about the 'tightness' (or lack of) of school shorts not because of tightness alone but because of the social context in which they are being worn. Speaking on behalf of others, one peer leader noted, 'people say they'd rather have tight shorts because these – when we're stretching – you can, like, see our underwear' (*School E, peer leaders' FG*). Similarly, for girls in another school the transparency (presumably because of the thin quality of the fabric) surfaced as a concern, with agreement amongst members of the focus group: 254 👄 M. O'REILLY ET AL.

R1: Well, with the leggings, they were worried about them being, like ...

R2: The school ones are see-through.

(School B, girls' FG)

We view these concerns as manifestations of discomfort that are fundamentally brought about by the inability of these specific material clothes to protect the girls' privacy to the extent girls are comfortable with. Non-consensual exposure of this kind appears to undermine girls' attempts to engage with physical activity in school to the degree they would like to. As with the concerns raised about the weather, we see value in engaging with dedicated discussions around kit as part of codesign activities. Because a key benefit of co-design is that it makes use of the local and contextualised expertise of programme users themselves, co-design is likely to be a powerful tool in revealing specific concerns about kit and offering solutions in line with up-to-date and culturally sensitive priorities.

Social sources of discomfort

Continuing our conceptualisation of the data through a comfort theory lens, analysis highlighted situations in which the social environment appeared the most prominent contributor to feelings of discomfort for female participants. As such, the second suggestion arising from this analysis is that future co-design activities may benefit from being guided towards resolving the social sources of discomfort that appear to inhibit enjoyment of – and therefore engagement in – physical activity. Overlapping with our description of material sources there was a sense that the social environment also brought feelings of discomfort regarding clothing. Beyond being primarily about the materiality of clothing, participants also described clothing in terms of meaning. Put simply by one peer leader:

R4: If there are people that aren't comfortable and they're stretching in clothes that they don't really like, and stuff like that, it makes them feel more self-conscious and less likely to do the sports.

(School E, peer leaders' FG)

For some, concerns about not being comfortable in certain clothes seemed to be about avoiding the social discomfort of wearing clothing that was unattractive. The following extract is a good example of the collaborative strengthening of a case being made by different participants adding further detail:

R1: Some girls didn't like wearing the tracksuit bottoms but ...

R2: The shorts weren't particularly attractive.

R3: No, especially because sometimes the tee shirts came down to your knees and you had to have it tucked in.

(School B, girls, FG)

Another example of collaborative displays of shared understanding can be seen in the next extract. Here, the three participants can be seen to finish one another's sentences, which is a way of demonstrating a well-established shared understanding of a particular phenomenon. In this case, they expressed feelings of self-consciousness about their competitive school sports kit in comparison to the 'posh' kit worn by other schools:

R1: We'd go to fixtures or like tournaments and all the other teams will be in like posh kit with their skirts and their bibs and ...

R2: Yeah, and we just have a short top on.

R3: So, we just wouldn't really fit in.

(School E, peer leaders' FG)

While there are numerous complex reasons for these uncomfortable feelings of self-consciousness to manifest, the discomfort described is inescapably social because it involves comparisons with others as well as serving to position oneself within a social context. Here, the word 'posh' is a characterisation that alludes to hierarchical social class relations that are known to exist – and understood by pupils – in the UK context (Whigham et al. 2020; Wiltshire, Lee, and Williams 2019). Clothing, therefore, is recognised to bring about symbolic distinctions between pupils (and schools) in different socioeconomic positions and, with these distinctions, lived experiences of discomfort. What ties the above examples together is the notion that girls' evaluation of the degree of comfort/ discomfort when engaging in physical activity during school was largely shaped by the symbolic meaning of their clothes and their concerns about what those clothes mean for them socially. Of interest to future co-design activities, this finding suggests that a possible target for change might not necessarily be the clothing, but instead the social situations that encourage stigma or emphasise hierarchies between pupils and schools.

Differently, some feelings of discomfort derived from the social environment were grounded in the potential for embarrassment when taking part in physical activity. The following examples illustrate that some girls' concerns about embarrassment are significantly dependent upon the other people around them during PE, sport, or extra-curricular clubs:

R1: They feel embarrassed by the other people around them.

R2: Yes, intimidated and like, we're not as good as them so we'll look stupid.

(School D, peer leaders' FG)

R1: Some people find that PE is based around the people that are really talented at PE and that the people aren't always talented, like, feel very self-conscious about that.

(School B, peer leaders' FG)

Additional to these suggestions that girls are concerned about not being 'as good' or 'talented', a pupil from a separate focus group added that some 'might be scared of what their physical appearance would look like' (*School F, boys' FG*). Examples like this remind us that the focus of codesign activities for physical activity interventions could be to go beyond consulting girls on what sports they would prefer to do, and instead involved engaging in discussions about how to create a supportive social environment where girls do not feel uncomfortable about their ability or appearance.

It was also made clear that pupils' concerns about 'others' were not always a generalised other but were sometimes in relation to specific others. For example, one participant noted the potential for being embarrassed was heightened for people attempting an activity 'in front of their mates' (*School F, boys' FG*), presumably because some pupils are particularly sensitive about how they are seen by their close friends. A contrasting view was put forward by another participant who believed that girls would be less likely to try out new activities if 'none of their friends are doing it' (*School A, boys' FG*) suggesting close friends can help girls feel more comfortable. Notably, however, several girls reported being more uncomfortable in the company of boys. One of the peer leaders said, 'I think, like, the girls are scared of the boys judging them, so that's why they don't push themselves to go further' (*School H, peer leaders' FG*). This was echoed in another school with one girl commenting, 'when you do PE, if we're with the boys or something we get some girls who don't want to do it with the boys because they're a bit embarrassed' (*School F, peer leaders' FG*). Interestingly, when the same point was raised by a boy in a different focus group and was challenged by the interviewer, he did not seem to think that improving the boys' behaviour was realistic – once again an important consideration for collaborative discussions about how to ameliorate barriers to girls' participation: 256 🛞 M. O'REILLY ET AL.

I: Okay. Or you could not take the mick?

R3: The temptation is there, isn't it, so ...

(School E, boys' FG)

Collectively, these data underline the level of significance that the social environment holds in bringing about feelings of comfort and discomfort for girls taking part in physical activity. Even though this point may be unsurprising, it has been suggested that the literature in PE and school sport has tended towards investigating the influence of policies, teacher behaviours and wider cultural discourses at the expense of understanding the role of peers (Wiltshire, Lee, and Evans 2017). Nevertheless, studies have variously highlighted how adolescents are concerned about being 'othered' in PE (Hennig, Schaefer, and Gleddie 2020), can be exposed to bullying (Goodyear et al. 2021), and are aware of the social risks related to undesirable body shape (Powell and Fitzpatrick 2015). As such, our overarching point here is to suggest that ensuring girls are comfortable in their social environment should be incorporated into co-design activities.

Practical sources of discomfort

The third source of discomfort highlighted was discomfort around the practical activities being performed. These are instances whereby pupils would have otherwise felt comfortable in their material and social environment if it was not for the specific practical activity they were being asked to perform. With a view to help optimise future co-design activities, our analysis suggests that guiding conversions towards activity choices would be helpful. To illustrate this, consider the difference between pupils engaging in extra-curricular clubs that they have attended by choice (often because pupils believe that they will enjoy the club) and pupils engaging in PE where there is limited choice involved. In PE, it is more likely that pupils will be required at some point to take part in activities that they believe they will not enjoy. The participants in this study were aware of this. Indeed, one participant said, 'you don't want to force someone into a sport that they don't want to do because then they're just not going to enjoy it and not take part' (*School A, boys' FG*). In another group, this became a talking point:

R2: Being in clubs, you chose to do it. It can make you feel really good and positive that I chose to do this, and I did it well instead of being in PE where you are made to do it and can't do it as well as you'd like to.

(School G, peer leaders' FG)

We see these views as indicators that 'feeling good and positive' become possible when pupils engage in activities that they already feel comfortable doing. Feeling 'forced into' an activity is a powerful spatial metaphor for instances where the pupil and practice seem to be meaningfully separated which produces an uncomfortable coupling. There are several reasons why the coupling between pupil and practice become uncomfortable.

For other practical activities, participants thought personal characteristics such as confidence are important too. One pupil responded to the question of *why is peer leader encouragement important?* by saying, 'because girls, they're not always as confident. They want to do things that they are confident with' (*School H, peer leaders' FG*). Importantly, the notion of 'confidence' was first articulated as a characteristic of the individual but then as a relational concept contingent on the practical activity that the individual is doing ('the *things* that they are confident with'). In a different way, we also see discomfort being described as arising from the practical activity (a cartwheel) in conjunction with the material clothing being worn as well as, implicitly, the social environment.

R4: In gymnastics we've got to do, like, cartwheels, and stuff, and we have baggy shorts. It's like, no one wants to do that. So, it makes a lot of girls just, like, wanting to sit out and not do it because if [pause]. Like, no one wants to do something if it's in something they're not comfortable wearing.

(School E, peer leaders' FG)

It this instance, it appears that wearing baggy shorts in PE became problematic because of the additional requirement to perform cartwheels.

There was a belief that girls would engage more with physical activity if the 'right' activities were offered. One peer leader thought it was a matter of opportunity, saying 'loads of girls want to do more stuff but sometimes the opportunities just aren't there' (*School D, peer leaders' FG*). Similarly, a peer leader centralised the activity as the reason for her school peers not engaging with it by saying simply, 'if we do something they [her peers] don't want to do, then they're not going to come. It has to be something they want to do so then they come' (*School A, peer leaders' FG*). For one participant in particular, this belief was grounded in their own experience of doing PE with more effort and enjoyment after the curriculum was co-designed to meet pupils' preferences:

R2: I'm not a person who liked PE. I used to hate it. Miss M changed our entire curriculum and she asked other people how can we change it to make PE a lot more fun. So now I put in 100% effort into everything I do in PE and everyone's, sort of, enjoying it more. (*School H, peer leaders' FG*)

When discussing the idea of choice, one pupil explained that,

R3: It'll kind of solve some of the problems. If they choose themselves what they like to do obviously they'll feel comfortable with it rather than, like, people choosing stuff to do for them.

(School F, boys' FG)

Our thinking about this source of discomfort resonates with the use of practice theory approaches within recent physical activity research on active commuting (Guell et al. 2012), and mixed-martial arts (Blue 2017). Indeed, as Spotswood et al. (2019) noted, viewing physically active opportunities as social practices opens an appreciation for a range of important understandings including decentring the individual performer and revealing how practices are embedded in a complex system of broader interrelated practices. Our interest for the purposes of this paper is limited to ensuring that we acknowledge and appreciate how being physically active necessarily involves doing certain practical activities, and there can be congruence and incongruence between what the requirements of a practical activity are and whether an individual can fulfil those requirements. Instances of incongruency, we claim, are likely to bring about feelings of discomfort for girls and contribute to the list of reasons why they might not engage. As such, we again see value in ensuring that co-design processes pay attention to the types of practical activities offered within schools.

Implications for future co-design activities

Seeking to explore how co-design approaches can be optimised to improve girls' experiences of physical activity in school, our analysis has arrived at a conceptualisation grounded in comfort theory. That is, we claim girls' experiences of physical activity in school can be usefully articulated as being shaped by three sources of discomfort: material, social and practical. As described, feelings of discomfort deriving from the material environment include the weather conditions, the temperature, itchy or slippery school socks, and the tightness or transparency of PE kit. Feelings of discomfort deriving from the social environment include social risks of embarrassing oneself and taking part in sports clubs with or without friends. Feelings of discomfort deriving from practical activities as a curriculum requirement and doing certain activities that are considered by some to be inappropriate for girls. Crucially, such processes can be seen as having emergent properties by virtue of their combined powers so that a pupil may feel particularly uncomfortable (i) while performing a particular skill, (ii) if they are wearing the wrong clothing, and (iii) they are concerned about others around them. In this way, some feelings of discomfort can be understood as an effect of these three sources acting together.

A better understanding of material, social and practical sources of comfort and discomfort has implications for optimising co-design approaches. We, as authors, suggest that ameliorating feelings of discomfort brought about by material, social and practical sources could usefully be incorporated into interventionist programmes. If future programmes incorporate consultations around all three sources of discomfort – and their combined properties – into their co-design activities, a reasonable range of modifiable factors can be accounted for, and girls may be less likely to disengage with physical activity. Co-design approaches are uniquely sensitive to the particularities of the setting where the intervention is taking place which may vary significantly. Supporting our central argument, the specific material, social and practical sources of school facilities, uniforms, localised or high-profile events, and school-level expectations. As such, involving pupils in decision-making processes is likely to reveal otherwise unknown insights and offer foresight about the effectiveness of proposed new strategies.

Although some of the concepts highlighted here will not be a surprise to practitioners and researchers, it is possible that they may underestimate the individual and combined importance of sources of discomfort if they are not emphasised within the early stages of programme co-design or co-design of delivery within a school. We also recognise the potential implications of ameliorating discomfort for the wider issues of mental health and wellbeing which is an area needing urgent attention (Goodyear, Kerner, and Quennerstedt 2019). As physical activity is implicated in mental health and wellbeing (Biddle et al. 2019), it is important to seek approaches to improving girls' engagement with physical activity that do not at the same time compromise broader health concerns. Importantly, vulnerable groups such as those who are especially self-conscious about how they look, those that have vulnerability to mental health difficulties – such as anxiety or depression – and those socially marginalised by their peers, are likely to require a more thoughtful approach to promoting physical activity. While not claiming that the approach suggested here offers a 'silver bullet', we suggest that interventionist strategies centralising comfort may be on such approach.

Furthermore, to realise this more thoughtful approach to promoting physical activity, it is crucial that a broad range of views are included in the co-design process so that potential points of discomfort can be heard from, for example, the voices of disabled children, children from minority ethnic groups, LGBT+ children and children diagnosed with mental health conditions. In addition to such voices, we would also advocate for the inclusion of teachers within co-design conversations. Not only do we know that teachers can provide valuable insights into how physical activity plays out in schools (Alcántara-Porcuna et al. 2022), but their own sense of comfort and discomfort ought also to be taken into account.

While we have no intention of outlining a comprehensive interventionist strategy here, we see potential in a comfort theory-informed approach to co-design activities that prioritises the need to create comfort (and avoid discomfort) as a condition for a more gender-inclusive vision of physical activity in schools. Organised around the analyses provided in this study, we have outlined four questions that could be used to guide part of future co-design activities, possibly utilising lead teachers, peer-leaders and action plans as was done in *Girls Active* (see Table 1). The terms comfortable and uncomfortable are both theoretically credible and part of lay language, making the translation of theory to practice less challenging. Considering the need for pragmatism in outlining an interventionist strategy, we argue there is an elegance to the simplicity of asking questions as they are phrased here. Of course, posing these questions may result in responses that are challenging, which is important to recognise. For example, moving girls' football practice from lunchtime to after-school to avoid the uncomfortable gaze of the playground crowds may be structurally difficult in many schools. Indeed, changing a design or supplier of uncomfortable PE kit may be economically problematic in some schools but straightforward in others. As such, even though a comfort theory-informed approach to co-design is unlikely to simultaneously and

Sources of		Recommended questions to guide co-design
comfort	Definition and examples	intervention strategies
Material	 Feelings of discomfort for which the physical environment appears to be the most significant contributor. Weather conditions and temperature Itchy or slippery school socks Tightness or transparency of PE kit 	How could we make the physical environment where we take part in physical activity more comfortable for everybody? How could we make the clothing and equipment that we need when we take part in physical activity more comfortable for everybody?
Social	 Feelings of discomfort for which other people appear to be the most significant contributor. Comparing the quality of school kit with other schools Social risks of embarrassing oneself while doing sport and PE Taking part in sport and PE with friends 	How could we make the social environment more comfortable for everybody when we take part in physical activity?
Practical	 Feelings of discomfort for which the activity being undertaken appears to be the most significant contributor. Taking part as a curriculum requirement Activity considered inappropriate for girls 	How could we make the activities we do when we take part in physical activity more comfortable for everybody?

Table 1. Sources of comfort a	d recommendations for	intervention co-design
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comprehensively dismantle the structures that are the sources of discomfort across all domains, it is feasible that it would, firstly, bring to the fore the most pertinent and context specific issues in a given school and, secondly, offer some realistic suggestions for positive change.

Finally, it is important to transparently point out that these potential implications have not themselves been developed through a co-design process; they are strictly the suggestions of the authors having undertaken a research project and may not represent what the girls in the study would suggest. As authors, we acknowledge that our views are being privileged here and recommend that readers take this into account. Beyond being a brief declaration for the purpose of transparency, this point raises important questions about the differences between programme co-design and more radical notions of co-production within research more broadly. In future, researchers may wish to involve children and teachers in ways that can actively influence and contribute to the research process itself – what Smith et al. (2022) describe as 'equitable and experientially informed research' – in ways that extend collaborative partnerships far beyond what was achieved in this study.

Conclusions

The paper set out to contribute to the ongoing agenda that seeks to reduce gender inequalities in physical activity participation by focusing on how to enhance co-design approaches to supporting girls' physical activity in schools. Drawing on qualitative data collected as part of a wider project evaluating the *Girls Active* programme in the UK, we used a multidimensional understanding of comfort to articulate the material, social and practical sources through which girls' feelings of discomfort emerge. As such, the paper agrees with the ongoing efforts to give voice to girls through co-design interventionist approaches and makes an original contribution by suggesting that future co-design programmes may benefit from a focus on ameliorating feelings of discomfort and organising such efforts around its material, social and practical sources. Because these sources of discomfort may be context-specific, co-design approaches may be uniquely efficacious in offering insight and foresight about how to navigate a path of least resistance to make girls feel as comfortable as possible during opportunities to be physically active. 260 👄 M. O'REILLY ET AL.

Despite being optimistic about the value of the comfort theory approach to co-design that we have outlined, there are several important limitations to consider. Primarily, we are cognisant of the fact that the larger cluster randomised controlled trial (RCT) evaluating the impact of *Girls Active* did not demonstrate differences in girls' device-measured physical activity between participating and control schools (Harrington et al., 2018). The present study, therefore, cannot be taken as an examination of a demonstrably successful programme with a view to replicate our model in new contexts., Nevertheless, we have attempted to find possible insights within the programme that may still be promising if suitably understood and carefully developed.

In closing, while we value listening to girls' voices when it comes to making physical activity in schools more gender inclusive it is important to remember that schools, teachers, and pupils are operating within a complex set of structural and cultural conditions. In seeking to reduce gender inequalities through interventions like *Girls Active*, researchers and practitioners are dealing with a difficult challenge involving an array of complex processes making it important to resist the temptation to overstate the impact that co-design activities at the school level can have. That is, the context of physical activity in schools and for purposes related to education, reflect wider societal views and attitudes about girls and femininity. Gender inequalities imbued within wider society translate into the context of sport, and more specifically PE, and some of the discomfort described and felt is derived from or connected to gendered norms and how girls perceive themselves and are perceived by others. Nevertheless, it is important to also strive for transformative change even at the local level and to do that we would suggest that the guidance offered here is worthy of further empirical investigation.

Note

 For consistency in terms, we have replaced the original wording using by Daly-Smith et al. (2020). That is, the approach described by the Creating Active Schools Framework more closely aligns with the principles of codesign rather than co-production as based on our understanding of the literature. As such, we have chosen to use our preferred terminology simply for the purpose of avoiding confusion in the present article but acknowledge that the original authors may disagree.

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