

Flourishing through adventure learning: A (semi)cautionary tale

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Flourishing through adventure learning: A (semi)cautionary tale

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Abstract

Studies suggest that adventure learning can develop children's cognitive skills and promote social and emotional learning. However, evidence is needed as to whether the design of adventure learning—school-based or external/residential—plays a role in that development/promotion, and whether learning gains are maintained. This paper reports the findings of a large-scale randomised controlled trial with a synergic implementation process evaluation. Randomisation was at the school level. The trial was carried out in 97 schools in the United Kingdom with children aged 11–12. We investigated two different approaches to adventure learning delivery (5-day school-based and 5-day residential) and the longer-term impacts. The short-term impact was assessed immediately after the intervention. The long-term impact was assessed after 8 months. Data revealed that both programmes had a positive short-term impact on student engagement and self-regulation but limited longer-term impact on student engagement and behaviour. The residential experience facilitated the development of positive student–teacher relationships, while the school-based programme better promoted students' engagement in school. Interpreting our data through the dual lenses of bioecological theory and transfer, we provide new and robust evidence that while not a panacea, adventure learning can promote improved peer relationships, help repair broken student–teacher relationships and engage disengaged learners, potentially coalescing into an improved sense of school belonging. However, for sustainable long-term

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change to occur, attention should focus on establishing effective transfer mechanisms to ensure gains are maintained in school. Our findings constitute, therefore, a (semi)cautionary tale for policymakers seeking to implement adventure learning in schools.

KEYWORDS

adventure learning, bioecological theory, randomised control trial, transfer

Key insights

What is the main issue that the paper addresses?

This study critically discusses the potential benefits students can derive from adventure learning programmes (residential and school delivered) based on data from a large-scale three-arm randomised controlled trial.

What are the main insights that the paper provides?

The study identifies short- and longer-term benefits derived from both residential and school-based adventure learning programmes. These included improved self-regulation, engagement for learning and decreased problematic behaviour. The mechanisms underpinning these improvements are discussed such as improved student–teacher relationships, opportunities to succeed in a more ‘neutral’ environment and a greater sense of school belonging.

INTRODUCTION

Divergent opportunities and barriers to success are a persistent reality for many school children in England (McPherson et al., 2023; Committee of Public Accounts, 2025). COVID 19 exacerbated this inequity (Betthausen et al., 2023; Hartas, 2024). Indeed, there is mounting evidence that following the pandemic, the disadvantage gap has become entrenched across several metrics such as engagement, exclusions, mental and physical health, access to enrichment activities, and attendance (Mansfield et al., 2022; Crossfield et al., 2023). Absenteeism has risen to the extent that the press refer to ‘ghost children’ (Centre for Social Justice, 2022; Department for Education, 2023; House of Commons Education Committee, 2023). In some cases, children and young people do not access education due to the emotional distress of past school experiences (Connolly et al., 2023). If they do attend, there is no guarantee they are meaningfully engaging. A lack of meaningful engagement (Dotterer & Lowe, 2011) has been tied to lack of belonging (Boyle et al., 2023; Brown et al., 2025; Korpershoek et al., 2019; Riley, 2019) and negative teacher–student relationships (Allen et al., 2021; Ibrahim & El Zaatari, 2020; Osterman, 2000). These factors can impact longer-term adult outcomes including progression to further education and employment and even adverse mental health (Allen et al., 2024). In short, too many children are not flourishing.

As a response, schools and policymakers are turning to adventure learning. A body of evidence on the impact of adventure learning continues to accumulate. These studies usually

employ smaller-scale qualitative or mixed methods research designs in various national contexts (such as Merenda, 2021; Down et al., 2023; Gilkes et al., 2024). The studies argue the benefits of student involvement in adventure learning activities, both in terms of educational and psycho-social outcomes (e.g., Cincera et al., 2021; Fiennes et al., 2015; Povilaitis et al., 2019). Nonetheless, the extent to which these gains are maintained post-adventure learning – and for how long – is less clear. More understanding is needed of the challenges of transferring learning from adventure learning programmes back into mainstream schooling (Bolick et al., 2022; Christie et al., 2014; Mann et al., 2023; Sibthorp et al., 2011).

Furthermore, adventure learning typically involves taking students away from their usual school environments and moving them outdoors in the ‘real-world’ (e.g., Waite, 2020). The aim is to get students to engage in collaborative activities which promote learning and skills development. (We note that some recent research has also investigated how digital learning and artificial intelligence may play a part (e.g., Hills & Thomas, 2019; North et al., 2024)). But not all students can go outside of school due to socio-economic, cultural and access issues. Another key question is, therefore, can this type of learning be replicated – or simulated in - a school context to ensure access for all?

To recap, given the drive for the roll out of adventure learning and the high expectations around its impact, we need a robust evidence base to understand what happens post-adventure learning activities, and whether adventure learning can be replicated within school contexts. Our aim therefore is two-fold. First, we explore the impact of two different adventure learning interventions on English secondary school students’ self-regulation, behaviour and engagement. These constructs were selected as research suggests they underpin student learning and success (e.g. Estévez et al., 2021), which adventure learning is designed to support. Second, we explore the longer-term impact in terms of to what extent gains are maintained. Intervention A was a traditional 5-day residential adventure learning programme. Intervention B was a 5-day school-based adventure learning programme.

We ask:

RQ1. What are the affordances and constraints of the two models of intervention in terms of improving students’ social and self-regulatory skills, engagement with learning and behaviour from the perspective of the different stakeholders (school staff and students)?

RQ2. To what extent were any improvements in social and self-regulatory skills, engagement with learning and behaviour maintained post-interventions?

We draw on data from a large-scale mixed-randomised controlled trial (RCT). 97 schools took part. The study was commissioned by the Education Endowment Foundation (Willis et al., 2023) which comprised an implementation and process evaluation (IPE) and an impact evaluation (IE). In these new findings, we argue that the decontextualised nature of adventure learning—whether outside the school grounds (residential), or metaphorically outside of the curriculum (school-based)—can help build relationships and support learners to feel more engaged. However, the different contexts offer different affordances and constraints. Second, we show that while some gains made through participation in adventure learning were sustained, most dissipated over time. Our study therefore addresses two research gaps (cf. Waite, 2020): first, our mixed methods RCT has the contextual benefits of smaller-scale qualitative research but combined with effect sizes and observations pertaining to statistical significance (see, e.g., Koutsouris & Norwich, 2018); and second, we explore longer-term outcomes on students’ self-regulation, engagement, behaviour and to what extent learning was transferred.

LITERATURE REVIEW

Adventure learning is a form of experiential learning (Kolb, 1984) in which challenging experiences are transformed into learning through thinking, acting and reflecting (Leberman & Martin, 2004; Orson et al., 2020). The goal is to give children an experience beyond the top-down, narrow school curriculum, which, coupled with external accountability pressures (Ball, 2013; Buchanan et al., 2021), can minimise opportunities to acquire the social, emotional, cognitive and self-regulatory skills children need. Adventure learning, on the other hand, is designed to promote such personal development (Dickson & Gray, 2022; Stott et al., 2015).

Adventure learning interventions have gained prominence in the form of the National Youth Guarantee (Gov UK, 2022), successful legislative bill for universal entitlement to outdoor residential experiences in Scotland (Smith, 2022, 2026) and the narrowly unsuccessful equivalent in Wales (Rowlands, 2023) and an earlier stage motion in England (Farron, 2023). But adventure learning is not new (Gray, 2018; Stott et al., 2015); it has been positively reviewed in two meta-analyses in the 1990s (Cason & Gillis, 1994; Hattie et al., 1997) and more recently in relation to adventure and wilderness therapy (Mohan et al., 2022). Interest has continued. Mann et al. (2023) for example using self-report found that boosted motivation attributed to adventure learning endured for 8 to 10 months but some improvements in engagement decreased once students returned to school. Prince (2021) conducted a systematic review of literature and data sets in the United Kingdom to investigate lasting impacts, but this was limited to residential experiences. Brown (2010) questioned an overly simplified notion that knowledge derived through adventure learning can be transferred across contexts, arguing instead it should be principally valued for its contribution to enabling students to understand the dynamics of social interaction. Adventure learning activities has been associated with raised educational attainment (Hattie et al., 1997), enhanced levels of resilience and reduced anxiety (Ewert & Yoshino, 2011), improved growth mindset (O'Brien & Lomas, 2017), heightened responsibility, leadership development, self-reliance and self-awareness (Bobilya et al., 2011), improved teacher/student relationships (Cincera et al., 2021) and had some influence on students' prosocial behaviours (Gillard, 2020).

THEORETICAL AND CONCEPTUAL FRAMEWORK

We view our data through the lens of Bronfenbrenner's (1994) bioecological theory. The theory emphasises the importance of the interconnection between environmental, social and individual characteristics influencing the development of an individual over time. An individual exists within five systems: the microsystem, mesosystem, exosystem, macrosystem and chronosystem, which highlights the importance of the dynamic and reciprocal processes that take place between a developing individual and their microsystem. Developmental outcomes may differ dependent on the person, process and context longitudinally (Hayes et al., 2017; Rosa & Tudge, 2013).

We also employ four psychological constructs: First, self-regulation of learning relates to how students learn to manage their emotions, behaviours and attitudes to maximise their success in learning (Zimmerman, 1989; Etkin, 2018; Stefansson et al., 2018). For our purposes, self-regulation was measured using the self-regulation of learning self-report scale (SRL-SRS) (Toering et al., 2012).

Prosocial behaviour is behaviour which benefits others and supports social bonds. Behavioural difficulties can be viewed as behaviour which may lead to issues with other students or teachers, either through active behaviours such as bullying or aggressive outbursts or withdrawing through anxiety or fear. It is therefore important to note that we are not using

the term behavioural difficulties to suggest that students were 'naughty' or to place moral value on these behaviours. Rather, we recognise that individuals communicate difficulties in different ways. We measure the positive and negative attributes of behaviour using the strengths and difficulties questionnaire (SDQ) (Goodman, 2001), which assesses both pro-social behaviour and behavioural difficulties.

Somewhat tied to behaviour is student engagement. Engagement is conceptualised as having three or four components: academic, behavioural, emotional and cognitive (Appleton et al., 2008; Obrovská et al., 2025). Cognitive engagement encapsulates the value students place on work, while psychological engagement refers to students' relationships with teachers and sense of belonging (Appleton et al., 2006; Appleton et al., 2008; Brown et al., 2025). Some indicators of these components are more challenging to assess than others. For example, time spent on task for academic engagement is easily observed versus self-regulation or belonging for cognitive and psychological engagement. We therefore focused on assessing the more challenging components: psychological engagement and cognitive engagement using the student engagement instrument (SEI) (Appleton et al., 2006) and behavioural and academic engagement through qualitative data analysis and the SDQ.

Finally, transfer pertains to the act of applying learning from one context to another. Crucially, students are unlikely to be able to transfer learning gains to a new context without scaffolding to enable that transfer to occur (Bolick et al., 2022). Barnett and Ceci's (2002) taxonomy of near/far transfer sets out what makes transfer easier or harder to achieve (near/far). Specifically, knowledge base, physical context (place), length of time passed, the functional context (i.e., is it an academic task or outside world) and social context all influence transfer and denote whether transfer is a near or far task (Barnett & Ceci, 2002). Far transfer pertains to where learning is to be transferred either to a different knowledge domain, within a different physical context or needs to happen after a length of time. Near transfer pertains to contexts where learning is applied to a very similar context.

METHODOLOGY

The study was approved by Sheffield Hallam University Ethics Review Board (AA80370219) and draws on an EEF trial report. The quantitative data has been re-analysed and interpreted to provide context and answer the new research questions posed in this paper. Nonetheless, some aspects of this numerical data appear in the EEF report, albeit in answer to different research questions. The qualitative data has also been re-analysed for the purposes of this paper considering the new research questions. A small number of quotations featured in the original EEF report are used in this paper but, again, to illustrate a different argument.

Schools signed a memorandum of understanding and nominated a school-based lead (SBL) to handle trial-related data collection and activity organisation. Information sheets were disseminated to all potential participants and their guardians and signed prior to data collection. Ongoing age-appropriate informed consent was continued prior to each data collection point.

The study is a large-scale mixed methods three-armed RCT involving schools in England. RCTs are considered the gold standard (Oakley, 2006; Simpson, 2019; Styles & Torgerson, 2018) in that they enable the use of validated measures, generalisable results alongside a qualitative data set that allows contextualisation of statistical results. 'Disadvantaged' schools were eligible to take part. 'Disadvantaged' was defined as schools that have a 20% pupil premium rate (see Department for Education, 2025) or above. A total of 97 schools took part. The SBL nominated up to 24, 11 or 12-year-old students for inclusion. The trial targeted students who were 'achieving less than expected' because of behavioural,

social and/or emotional difficulties. The number of schools recruited was guided by the calculation of a minimal detectable effect size (MDES) (see Willis et al., 2023).

The SBL accompanied students during the intervention and led post-intervention work, supported collection of student and parent consent, and provided baseline demographic details for the students. Students completed two baseline measures: the SRL-SRS (Toering et al., 2012) and the SEI (Appleton et al., 2006). The nominated students' tutors completed the SDQ (Goodman, 2001) for each of the students. These measures are outlined below. Baseline data was collected online using Qualtrics and schools were randomised into one of three trial-arm groups. Randomisation was conducted by Sarah Reaney-Wood and checked by a statistical lead at three time points using the=RAND() function in Microsoft Excel. Schools were informed of their randomisation allocation. To compensate for data collection burden, control schools were given a £1500 incentive. Figure 1 outlines the timeline for key evaluation activity and COVID outbreaks/lockdowns.

The study comprised two interventions and one control group (see Table 1). A sample of the interventions was observed by both authors. Table 1: Intervention characteristics.

Intervention A involved travelling to a UK-based purpose-built adventure learning centre located in a rural setting with access to specialist outdoor equipment and instructors. Activities included rock-climbing, kayaking, gorge walking, hiking and sailing which were new to most of the students. Students reflected at the end of the day in huts. Two to three staff from each school, often including an SBL, accompanied the students. Intervention B was delivered in school in the normal school day over 5 days. Run by qualified ex-service personnel, the intervention focused on mission-based scenarios that utilised adventure learning principles such as map reading/building a tent. Students carried out reflection exercises after each activity/mini mission. 'Group 3' was the control group. Attendance data were collected to assess compliance and fidelity. Students were considered to have 'complied' if they attended 3/5 days of activities.

Quantitative methods

Table 2 provides sample size and both school and student level demographics for each of the trial arms. 97 schools were randomised to take part in the trial. Percentage of free school meals (FSM) was similar for intervention groups A and B, but slightly lower for control schools. Intervention A schools had higher levels of student with Special Educational Needs (SEN) and English as an additional language (EAL). For all trial arms, most schools were Ofsted rated good (Gov UK, 2025). Over the course of the trial, schools and individual students were lost to attrition. This was relatively comparable across groups (Table 2 & 3).

Quantitative data was collected at three time points: baseline (T1); endpoint (T2) and longitudinal follow-up (T3). At T1 and T3 data was collected for all the outcome measures and at T2 only the SRL-SRS and SEI. Between T2 and T3 COVID restrictions were implemented

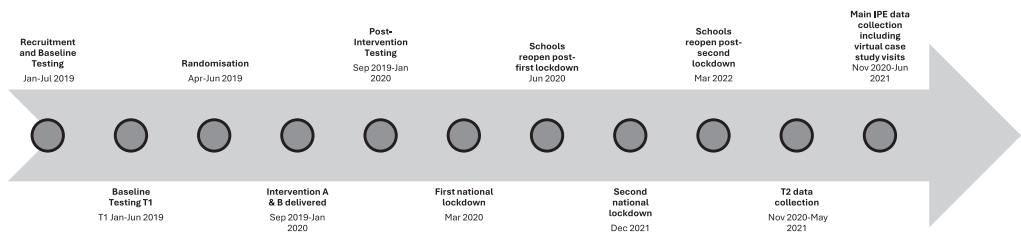


FIGURE 1 Timeline of key evaluation activity and Covid-19-related school closures.

TABLE 1 Key features of both interventions.

Key features of the intervention	Intervention A (OBT)	Intervention B (CJ)
Delivery organisation	Long established and well regarded outdoor/adventure learning specialist delivery organisation Residential delivery	Established company with a burgeoning reputation and links to ex-service personnel Delivery of character education within school settings
Extent of school staff involvement within the intervention	Activities delivered by trained instructors Up to three staff from visiting schools (typically teachers, pastoral staff or teaching assistants) co-experiencing activities with students and co-supervising outside core activities	Activities delivered by trained instructors Member of school staff (usually pastoral or teaching assistants) present for supervisory/behaviour management School staff often rotated through week Little engagement in the activities themselves by school staff School site-based enabled increased visibility/awareness among staff
Duration and setting of intervention delivery	5Day/4-night intervention delivered as a residential at a purpose-built outdoor learning centre Catering and a range of accessible sector leading facilities/specialist equipment Each centre located in an area of outstanding natural beauty often some distance from students' home	Week-long intervention delivered within the school setting and across the standard school day Students off timetable and allowed to focus exclusively with intervention School site size, access to outdoor green spaces and room availability meant some customisation to the environment available
Intervention activity	Adventure learning weeklong programme planned with school Setting Based Lead Activities included gorge walking, hiking, rock-climbing, orienteering, overnight camping, yachting, canoeing, coasteering and wild swimming Following each core activity, instructors led a full review, with learning explicitly discussed in relation to transference to students' day to day lives School specific terminology e.g. mantras and/or student/school goals woven into activities and reflection sessions Reflection journal used throughout week Opportunities for 'downtime' and informal interactions between school staff/students e.g. walking to activities, evening campfires and inter-sessional breaks	Focused on 12 missions set in the aftermath of a hypothetical 'cyber-attack' leading to national power failure Set of resources accompanied each mission examples included tarpaulins, walkie-talkies, compasses, maps, blind folds, remote control cars and vaults Each mission had clear guidance and aims/objectives focused on personal and team development Students encouraged to discuss, negotiate, assign and rotate team roles for each mission e.g. Team leaders through to Logistics specialists Debrief session at the end of the day where students encouraged to reflect upon the activities undertaken

TABLE 2 School and pupil demographics.

	Intervention A	Intervention B	Control
Number of schools at randomisation (<i>n</i> =pupils)	33 (<i>n</i> =792)	32 (<i>n</i> =768)	32 (<i>n</i> =768)
Number of schools analysed at longitudinal follow-up (<i>n</i> =pupils)	22 (<i>n</i> =263)	18 (<i>n</i> =275)	18 (<i>n</i> =228)
OFSTED rating			
Outstanding	6.4	7.3	9.5
Good	62.7	63.6	59.2
Requires improvement	21.9	25.4	21.8
Inadequate	5.8	0.0	3.2
Missing	3.1	3.7	
	Mean (SD)	Mean (SD)	Mean (SD)
School level (continuous)			
%FSM	34.9 (11.02)	34.9 (14.77)	32.4 (10.31)
%SEN	14.3 (8.62)	12.3 (6.62)	13.7 (6.89)
%EAL	18.9 (20.44)	16.2 (22.00)	15.8 (19.01)
Student level (continuous)			
Baseline SRL-SRS	17.7 (3.65)	17.6 (3.67)	17.2 (3.70)
Baseline SEI	2.1 (0.58)	2.2 (0.58)	2.2 (0.61)
Baseline SDQ	10.0 (6.78)	9.8 (6.82)	10.2 (7.34)

TABLE 3 Attrition across the course of the trial.

SRL-SRS	Randomisation to T3	Intervention A	Intervention B	Control
Number of students	Randomised	762	657	757
	Analysed at T2	531	481	560
	Analysed at T3	263	275	228
% attrition	Analysed at T2	30.3	26.8	26.0
	Analysed at T3	65.5	58.1	69.9

which meant that students were working from home. As such, COVID restrictions only had an impact on T3 data collection and likely contributed greatly to attrition (Table 3). Other factors specific to the sample such as the 'hard-to-reach' nature may also have contributed. It is worth noting that previous research has found higher levels of socioeconomic deprivation to be associated with trial attrition (Hindmarch et al., 2015). Our study sought to recruit schools with a higher percentage of student's eligible for free school meals, which is a proxy measure for socioeconomic disadvantage.

Self-regulation of learning self-report scale (SRL-SRS)

The SRL-SRS is a 46-item measure that assesses student behaviours and attitudes to maximise their success in learning with a good level of psychometric acceptability (Toering et al., 2012). During validation of the SRL measure, confirmatory factor analysis (CFA) was conducted, and several changes were made to improve model fit. A six-factor model was

considered to have the best fit and factor loadings were between 0.44 and 0.80. For this trial, a composite measure using all six subscales was used as the primary outcome. As a measure of acceptable internal consistency, all Cronbach alphas were higher than 0.70 and all inter-item correlations were positive. Reliability of the SRL-SRS is good with test–retest reliability over a four- to six-week period of between 0.69 and 0.84 for the six subscales, with relative temporal stability observed, and longitudinal measurement invariance analysis that demonstrated the factor structure was equal over time (please see Toering et al., 2012 for further discussion).

Student Engagement Instrument (SEI)

The SEI is a 33-item measure of student engagement that assesses how students engage in school and with their own learning. The scale can be calculated as a total score or broken down into six subscales that measure individual aspects of student engagement: teacher–student relationships, peer support at school, family support for learning, control and relevance of schoolwork, future aspirations and goals, and intrinsic motivation. The overall score and the six subscales were used. The SEI has good reliability and validity, and the internal reliability of the six subscales is between 0.72.

Strengths and difficulties questionnaire (SDQ)

The teacher SDQ is a 25-item scale that assess behaviour in 4- to 16-year-olds. The SDQ is available in three formats. One for parents to complete about their child, one for teachers to complete about a student and students' self-report. For this trial we used the version completed by teachers about their students. The score for the SDQ can be calculated as a total score for behavioural difficulties and a separate score for prosocial behaviour. In addition, the total score can also be separated into 4 subscales relating to emotional problems, conduct problems, peer problems and hyperactivity. The SDQ has been used extensively in both clinical practice and research and has good psychometric properties, with an internal consistency of 0.62–0.85 (Cronbach's alpha) and a test–retest reliability of $r=0.62$.

Quantitative analysis

Descriptive statistics were conducted on each of the outcome measures. To determine differences in outcomes between the groups (Intervention A, Intervention B and control) a series of multilevel linear regressions were conducted in STATA. From the model output, the coef, standard error, z score, *p*-value, and lower and upper 95% confidence intervals were converted into effect sizes (Hedges G). Exploratory analysis included paired *t*-tests that were conducted to look at changes in the sub-scales for each of the trial arms, Intervention A, B and the control group.

Qualitative methods and analysis

A comprehensive IPE was conducted to aid understanding of the extent to which both interventions were delivered with fidelity and how and why the results were as they were and to make sense of any variations. The following data collection tools were used to gather the qualitative data set: post-intervention online interviews with SBLs; online post-intervention

focus groups with a sample of Year 10 students that attended the intervention (when in Year 9); focus groups or interviews with pastoral leads, heads of year, SEN coordinators, class teachers and form tutors who were involved in supporting the SBL. All interviews and focus groups were semi-structured, audio-recorded and fully transcribed. Interviews and focus groups lasted between 30 and 60 min. Data collection was undertaken face to face up to and including delivery of the residential weeks. This included three observational visits to see Intervention A and B being delivered. Post-intervention interviews were conducted online due to COVID restrictions.

All interview transcripts were analysed using Nvivo and analysed thematically (Braun & Clarke, 2006). Coding was initially deductive using a preliminary coding framework. However, inductively emergent codes from the data were integrated into the coding framework. Codes were then grouped, and the content summarised to identify the developing themes.

RESULTS

First, we present the results of the thematic analysis. We show the perceived impact of the different models of the interventions, teasing out any similarities and differences. We then report the results of the quantitative analysis to show to what extent the impact of the two interventions was sustained over time.

Qualitative results

This section reports on the findings of the qualitative data analysis and is organised into themes derived from the analysis. The results are divided into three sections: the psychological facets of engagement – relationships and peer support for learning, cognitive facets (effort, relevance, self-regulation and self-efficacy); and finally, transfer, the extent to which the gains were implemented in the typical school context and sustained. The themes traverse the constructs (self-regulation, behaviour, engagement and transfer) that are investigated in the quantitative data. As will be shown, school staff and students' perception of the interventions was positive in terms of relationship building, behaviour, engagement and self-regulation. However, data also revealed little legacy planning to maintain gains.

Recalibrating relationships to improve school belonging

In this section, we show how both interventions A and B provided opportunities for teaching staff and students to change their perceptions of each other. However, in Intervention A, there was more opportunity to translate these perceptions into altered relationships because the residential design provided more time, space and collaboration. Relationships between staff and students seemed to develop positively during both interventions. Indeed, according to teachers, the adventure learning experience enabled a neutral environment and activities to facilitate re-imagined relationships. Teachers across both interventions frequently expressed a shift from a fixed and negative view of certain students to a more flexible and positive perception. For example:

I got to know some lads that maybe I had a bit of a preconception about [...]. Seeing them in a completely different environment and [...] excelling and doing really well and I can now support from a distance.'

(AStaff2)

'For some of them who I'd only ever dealt with in maybe a negative way because of their behaviour previously and my role as assistant head it was quite nice to see them doing something positive and change that a little bit.

(BStaff1)

The two worst behaved [students] probably turned out to be the two best.

(BStaff2).

In terms of moving from perception to actual shifts, Intervention A seemed to afford more opportunity for meaningful dialogue between students and staff than Intervention B. This was likely because in Intervention B, staff's role was largely limited to that of observer and behaviour monitor:

I think that my sort of role at the time was probably just more making sure that they were doing what the instructor had asked.

(BStaff3)

I was just kind of there for behaviour management really more than anything.

(BStaff4)

In contrast, Intervention A frequently presented opportunities for school staff to actively engage in activities alongside students. The residential component allowed students to see staff in a different context through informal conversations and shared experiences. This was particularly powerful when staff openly acknowledged being out of their own comfort zone, be that contending with a fear of heights or the demands of gorge walking. Outside of participation in the organised activities, the unassigned time a residential afforded was regularly cited as a vehicle to facilitate (enduring) bonds, as these anecdotes reveal:

It was the small things. Getting ready, having a laugh. Teaching them 90s songs that they'd never heard before! The thing is they have to have a key [to access their lockers], so every time someone said I've got the key I used to say, 'I've got the secret.' It's the small things like that that they picked up on. I can go round any of those 20 kids now, if I shout out, 'I've got the key', they'll just turn round and say, 'I've got the secret!'

(AStaff3)

We had conversations on the bus going to activities with one particular student, talking about her life ambitions and how they weren't that high but during the course of the week she was like I really want to be a paramedic, I really want to go for it and do all this sort of stuff and be really involved in activities where you can help. [...] So, yeah, those are [...] really positive relationships and stuff to work on.

(AStaff4)

There were also some instances where students reported changes in how they viewed each other, in some cases prompted by the team-working activities that characterise adventure learning.

Me and [student]- weren't really that close when we were at school, so the team-work thing kind of helped with us. And I remember at one point when we were walking up the mountain I would like hold your hand. When we would walk together and I think that's what really brought us together, because otherwise I don't think that we'd be that close as friends.

(AStudent1)

And closer relationships with school staff:

Yeah, I'd say we probably have a better relationship with them because we're definitely closer [...] We spent a lot of time with them, and it helped us develop the relationship with them and the encouragement and stuff we got from them. It still stands now.

(AStudent2)

To conclude this section, our data suggests that the collaborative and time rich quality of the residential (Intervention A) provided more scope for changing relationships.

Using engagement to improve resilience

In this section, we report the data pertaining to extrinsic motivation, aspirations and peer support. Many previously perceived disengaged students engaged well with the interventions, in part due to the shift in relationships described previously but also in terms of the different roles students were allocated through the various intervention activities. This was evident in Interventions A and B. For instance, the distribution of roles did not reference students' prior school-based status; in the interventions, the bullied could be the leader and the bully could follow instructions as outlined in the following examples:

One girl in particular, ... wouldn't speak, wouldn't do anything and then all of a sudden this fiery competitive character by Wednesday came out [...] and she was just taking control.

(BStaff5)

There was clear leadership roles. There was ones in each group who were clearly the leader. It was really nice actually just to watch them come out of their shell and develop those things they wouldn't normally have chance to do.

(AStaff6)

This increased engagement seemed to be closely connected to what several school staff interpreted to be better behaviour:

They certainly settled a lot more [...] to the point that a student that I wouldn't necessarily have thought would get it so right was getting praise and rewards.... this is a student that still has significant behaviour issues, but I think that he became a different kind of person whilst the trial was ongoing.

(BStaff6)

The engagement levels and all of it throughout the week [...] it's like a different student that you're watching and it's like a different group of kids that you're watching. It's as though they instantly become embraced in everything.

(AStaff7)

This included students' capacity to communicate cooperatively with staff. For example, one teacher observed:

You'd always prepare yourself for the backlash or [...] saying why are we doing this? Towards the end they were a lot more receptive, they let you speak, they

listened, they rationalised and then if they still didn't agree they asked but it was a very different way than instead of just kneejerk reaction.

(AStaff8)

Certain staff also noticed improvements in students' capacity for self-regulation across both interventions, but particularly in Intervention A, and significant numbers of students and staff remarked on an increased capacity for resilience and ability to sustain engagement with a learning task, which seemed to be connected to an increase in confidence:

I think that I kind of realised I could push myself a little bit more. And because doing that mountain was hard but I realised I could do it and I made it, and I wasn't dead. And I was like 'Oh I can do that!', and before that I was like 'There's no way I can do this, no way I can climb up a mountain and then climb back down.'

(AStudent1)

[...] it's probably just everything, all the stuff that I found hard and everything that was out of my comfort zone that I wouldn't normally do, just the fact that it built up resilience and confidence and stuff that I could do it.

(AStudent2)

Some of them are so quiet [...] and they were coming back from activities, and it was 'I've just abseiled down this great big wall/I've been walking across this thing/I've jumped in this lake' and the confidence that they got from it was astonishing because they were doing things that they didn't think they'd have been able to accomplish.

(AStaff9)

I found it quite useful, because it was fun, but disciplined us a bit, and taught us to like – if it's hard, the task that you're doing, if you push through, then it will be better in the end.

(AStudent3)

In this sense, students were often cognisant themselves of learning and development taking place, encapsulated by this anecdote from a teacher:

One boy got to the top of one of the mountains and just said, 'Well, I would rather be standing here on top of a mountain than sat in my bedroom on my phone. I've learnt more here than I have in the rest of my life.'

(AStaff10)

To summarise, Intervention A appeared to be more conducive to the development of cognitive engagement than B.

Transferring learning and embedding in the school contexts

Here we discuss the staff expectations of how the learning from the interventions might transfer into everyday school experience and how some gains made from the interventions set out in the previous section endured once 'normal' school resumed. In terms of long-term effects, data suggest that some of the experiences of the participants were carried over into schools in the following weeks. For example, an SBL observed:

I know conversations after that week continued with the kids and some of the staff as well which was nice.

(BStaff7)

In terms of continuing to build on recalibrated relationships, in Intervention A we frequently found that improvements were less distributed but ran deeper. For instance, this student remarked:

We're definitely closer to them [staff]...We spent a lot of time with them, and it helped us develop the relationship with them and the encouragement and stuff we got from them. It still stands now.

(AStudent2)

Several teachers in Intervention A and B reported the perception that staff that had taken part in the intervention gained a different status with the students:

It has sort of helped me maintain that relationship now, now that they're in year 10, they still talk to me about it and everything.

(BStaff8)

I can be somebody whose door they can knock on [...] if they're having a bit of a rough time with a member of staff in a particular faculty area I can maybe go and have a little chat and say, look, they were great on this so it's more about what we're doing in school and how do we get them hooked on what you're trying to get across to them because in the right environment these kids are able to absolutely flourish and do really, really well.

(AStaff11)

These teachers often seemed to become brokers/intermediaries, enabling them to intervene to support students:

I don't have dealings with them in lessons now and they may not necessarily make the right behaviour choices in the corridor for example but if I do walk past, I will get a slight recognition glance. I do think there's a little connection there now.

(AStaff12)

When I see them and they're standing outside the classroom and it's not often that happens, but I say what would you have done differently if you were working in that team in Wales?

(AStaff10)

It's good not just in my subject area but around the school and because they recognise you and they know you on that more personal level I think they take more notice. It does help in terms of the overall relationship with the students and the teachers.

(AStaff13)

However, as in the examples below, this only seemed to make a difference for the specific teacher–student relationship:

...sometimes they're like 'Oh I can't do this' and I say yes you can, because just look at what you've achieved last year, climbing that hill' as I said, some of them were on their hands and knees, 'you didn't think you were going to do it and you got up there, so look at what you can achieve if you put your mind to it, so don't

tell me you can't do something' so I still use that with them on a personal level for the ones that I teach, but obviously there is only four of them in my class now.
(AStaff14)

In Intervention B many more staff were able to interact with the students during the intervention. The data hints at a more distributed impact because the school context enabled more staff to be involved:

Throughout the week when they were off timetable we were continually sending out stuff to staff [...] whenever you're free [...] please come up and spend ten, 15 minutes, whatever, just to pop in and see what they're doing [...] because the kids will see it, the kids will notice it, they'll appreciate it, that kind of thing... staffing wise I'd say probably a good third of the staff that we have at some point came in to spend a little bit of time with them, just to have a bit of a nosey.
(BStaff7)

As the following quote exemplifies, there were also several examples of enduring gains in students' attitude towards learning. However, note that the teacher here again refers only to their own lessons; the impact on lessons with teachers who were not part of the interventions are not known:

I think certainly initially it was really clear to me that the students I had taken, you know, their attitude towards learning, certainly in my lessons, had just went through the roof in terms of they were hands up for every question, they were giving really well thought out answers and that kind of thing. Certainly, as I say, in the lessons that I had with them.
(AStaff15)

When it comes to capitalising on the learning in the wider school context, there were limitations among the schools' approach from both interventions. Some schools explored ongoing mentoring opportunities, retaining the groups in some way to engage in follow-up activities and signposting and encouraging students to take up new opportunities (for example Cadets or team sports). However, overall, there was frequently a paucity of concrete planning to build upon intervention gains.

There was kind of like a mentoring thing that went on throughout the year where we just for two or three times had them back as kind of like a select group just to try and do a little bit of follow-up work with them....We did some kind of like sporty/teambuilding things but it was done like a special club, so it was kind of like a members only type of thing. It was just for them so that they got a bit more quality time together.
(BStaff7)

I just did like a review with them, and the booklets, and then PE lessons, PE staff did – like we do OAA [Outdoor Adventurous Activities] in PE, and team building and ...the leaders, but really that was it then because then we went a bit pear-shaped [Due to Covid].
(AStaff10)

Some schools felt constrained by being part of the study, and COVID 19 restrictions were identified as a barrier to implementing follow-up activities. Nevertheless, there was only limited evidence of concrete preparations for follow-up activities.

I don't think it was really clear to us whether we could or was supposed to carry on with it. I think when you're part of a research trial if people don't explicitly tell

you to do something you might not do it because you don't want to affect the integrity of the results so we haven't done anything else.

(BStaff10)

Probably for a couple of months afterwards. I taught two of the girls and I was very much able to use what I knew about what had gone on where and what they had been like in there in the classroom and I was able to share that with members of staff as well, so we were able, I think, for a couple of months to keep them very focused, and then unfortunately, I think if I look at them now, you know, did they engage during lockdown? No, they didn't. and they've come back, and I think that we're back to square one with them. Which is sad, and I suppose that's the hard thing isn't it.

(BStaff1)

Finally, certain schools across both interventions had no strategies for sustaining the gains, with some suggesting follow-up input from the delivery teams.

We didn't have any follow-up sessions or anything like that with the students.

(BStaff6)

I would have liked a little bit more sort of continued intervention afterwards. I know that ...they sort of encourage you as a school leader to continue on with some intervention post-intervention. I think that there maybe could be more, even whether it is organising now, like I suppose we have completely changed how we think about long distance stuff now, but potentially now a zoom chat with their team leaders, a couple of months after or something, I think that would be really powerful for the students that were involved, to sort of have a little bit of an input from [...] after the intervention, rather than it just being left to school staff to do the after activities.

(AStaff15)

To summarise, our qualitative findings suggest that adventure learning can improve relationships and engagement. Intervention A provided more opportunity for bonding and collaborative challenge which seemed to promote self-regulation and establish meaningful relationships, but these were restricted to staff who had taken part. In Intervention B, staff still had opportunities to shift their mindset about certain students; however, there were fewer opportunities to concretise these new perceptions. Nonetheless, both interventions lacked post-intervention strategies for embedding the gains made or transfer.

Quantitative findings

Quantitative measures were employed to assess the longer-term impact of adventure learning on students. The trial was designed to capture outcomes at three time points: pre-randomisation (T1), immediately post-intervention (T2) and 8 months post-intervention (T3). We operationalised impact as increases in self-regulation of learning scores, an increase in student engagement and a reduction in 'difficult' behaviour.

Firstly, the overall impact of adventure learning on each of the constructs assessed is reported by looking at the differences in impact between the programmes and a control group. Secondly, exploratory analysis is reported that focuses on breaking down the overall scores to investigate the findings on the individual subscales of the self-regulation of learning self-report scale and the student engagement instrument.

Overall impact-multilevel regression

Self-regulation of learning

Short term. At T2 evidence suggests that adventure learning impacts on self-regulation in the short term. In intervention A the impact was small OBT ($ES = +0.16$, 95% CIs: $+0.01$; $+0.31$) and for intervention B it was medium ($ES = +0.33$, 95% CIs: $+0.17$; $+0.48$).

Long term. At T3 we found little evidence to suggest that the adventure learning intervention impacted long-term self-regulation of learning. When compared to a control group, no significant effect was found for Intervention A ($ES = +0.03$, 97.5% CI: -0.20 ; $+0.25$) or Intervention B ($ES = +0.08$, 97.5% CI: -0.15 ; $+0.31$) (Table 4).

Engagement in school—student engagement instrument (SEI)

Evidence points to a positive impact in the short-term on student engagement. However, the impact may be intervention dependent. When compared to a control, Intervention A showed a small but non-significant impact ($ES = +0.13$, 95% CIs: -0.03 ; $+0.28$) (with a p-value of 0.11). Intervention B showed a small but statistically significant impact ($ES = +0.19$, 95% CIs: $+0.03$; $+0.36$).

Longitudinal follow-up. Data suggests the impact of adventure learning on student engagement may grow over time. When compared to a control, Intervention A showed a statistically significant small improvement in students' engagement ($ES = +0.22$, 95% CIs: $+0.00$; $+0.43$) and Intervention B ($ES = +0.21$, 95% CIs: $+0.002$; $+0.43$) (Table 5).

Behaviour strengths and difficulties questionnaire (SDQ)

Longitudinal follow-up. At longitudinal follow-up, we found evidence to suggest that adventure learning had a positive impact on behavioural difficulties (reduction in behavioural difficulties), when compared to a control, and a moderate impact was observed for Intervention A ($ES = -0.38$, 95% CIs: -0.68 ; -0.08) and for Intervention B ($ES = -0.48$, 95% CIs: -0.80 ; -0.17). These effects were driven by intervention gains (reduction in behavioural difficulties) rather than control decline (an increase in behavioural difficulties within the control group) (Table 6).

Analysis in the presence of non-compliance

Complier Average Causal Effect (CACE) analyses were conducted to estimate the impact of compliance on outcomes. Here we provide a contextual summary. The complete analysis is provided in (Willis et al., 2023). Findings from the CACE analysis did not contradict the ITT findings of no impact on the primary outcome. Even when students were identified as compliant, there was still no impact.

Attrition

Logistic regression analysis was conducted to explore any patterns in missing data at both the student and school level between T1 and T3. Here, we provide a contextual summary; the complete analysis can be found in the full report published (Willis et al., 2023). A loss of 34 schools at T3 meant a clustering of missing data at the school level. At the individual level, being female was associated with a lower likelihood of being missing; lower SRL-SRS

TABLE 4 Analysis of the short-term and long-term impact on self-regulation of learning.

Outcome	Unadjusted means				Effect size		
	Intervention group		Control group		Total <i>n</i> (intervention; control)	Hedges <i>g</i> (95% CI)	<i>p</i> -value
	<i>N</i> (missing)	Mean (95% CI)	<i>n</i> (missing)	Mean (95% CI)			
Intervention A vs. Control short-term	531 (231)	17.59 (17.27; 17.90)	560 (197)	16.84 (16.52; 17.14)	1091 (531, 560)	+0.16 (+0.01; +0.30)	0.04
Intervention B vs. Control short-term	481 (176)	18.22 (17.91; 18.52)	560 (197)	16.84 (16.52; 17.15)	1041 (481, 560)	+0.33 (+0.17; +0.48)	<0.01
Intervention A vs. Control long-term	263 (489)	17.24 (97.5% CI16.82; 17.67)	228 (524)	17.03 (97.5% CI 16.58; 17.49)	491 (263, 228)	+0.03 (97.5% CI, -0.20; +0.25)	0.78
Intervention B vs. Control long-term	275 (368)	17.41 (97.5% CI 17.01; 17.80)	228 (524)	17.03 (97.5% CI 16.58; 17.49)	503 (275, 228)	+0.08 (97.5% CI, -0.15; +0.31)	0.42

TABLE 5 Analysis of the short- and long-term impact of both interventions on student engagement when compared to a control.

Outcome-student engagement instrument	Unadjusted means				Effect size		
	Intervention group		Control group		Total <i>n</i> (intervention; control)	Hedges <i>g</i> (95% CI)	<i>p</i> -value
	<i>N</i> (missing)	Mean (95% CI)	<i>N</i> (missing)	Mean (95% CI)			
Intervention A vs. Control short-term	531 (231)	3.75 (3.70; 3.80)	552 (205)	3.64 (3.59; 3.69)	1083 (531, 552)	+0.13 (−0.03; +0.28)	0.11
Intervention B vs. Control short-term	473 (184)	3.78 (3.73; 3.84)	552 (205)	3.64 (3.59; 3.69)	1025 (473, 552)	+0.19 (+0.03; +0.36)	0.02
Intervention A vs. Control long-term	258 (504)	3.69 (3.63;3.76)	227 (530)	3.53 (3.46; 3.61)	485 (258, 227)	+0.22 (0.00; +0.43)	0.04
Intervention B vs. Control long-term	272 (385)	3.69 (3.63; 3.76)	227 (531)	3.53 (3.46; 3.61)	499 (272, 227)	+0.21 (0.00; +0.43)	0.04

TABLE 6 Analysis of the long-term impact of both interventions on behavioural difficulties when compared to a control.

Outcome-behavioural difficulties	Unadjusted means				Effect size		
	Intervention group		Control group		Total <i>n</i> (intervention; control)	Hedges <i>g</i> (95% CI)	<i>p</i> -value
	<i>n</i> (missing)	Mean (95% CI)	<i>N</i> (missing)	Mean (95% CI)			
Intervention A vs. Control	180 (582)	7.78 (6.97; 8.59)	157 (600)	10.75 (9.64; 11.86)	337 (180, 157)	-0.38 (-0.68; -0.08)	0.012
Intervention B vs. Control	110 (547)	6.95 (5.77; 8.12)	157 (600)	10.75 (9.64; 11.86)	267 (110, 157)	-0.48 (-0.80; -0.17)	0.003

scores at baseline were associated with a higher likelihood of being missing. At the school level, a higher OFSTED rating and higher attainment (school level KS2 average points score) were both associated with a lower likelihood of being missing. Multiple Imputation estimates led to an increased estimate of impact at both interim (T2) and longitudinal (T3) follow-up.

Exploratory analysis subscales

We explored the subscales of each of the measures to explore any difference in outcomes between the two time points for each of the interventions independently. The aim of this was to explore whether the interventions had a universal effect on all the subscales making up a total score, or whether each programme had differential effects. The aim was to understand which dimensions of the scales were impacted most by each programme.

Self-regulation of learning

Self-regulation of learning Intervention A showed improvements (increase in scores) for the effort sub-scale only, whereas Intervention B showed increases in planning, self-monitoring, reflection and self-efficacy (Table 7).

Student engagement

Intervention A showed a significant difference in all the engagement subscales, suggesting that students in Intervention A showed an increase in all sub-facets of student engagement. However, for Intervention B, improvements were seen in specific sub-facets: extrinsic motivation, aspirations, family support and peer support only (Table 8).

When interpreting these findings, it is important to acknowledge that they are complex, with longer-term impacts differing dependent on the intervention and the outcomes being accessed. Furthermore, the effect sizes are moderate, and in some cases, the CIs are wide.

TABLE 7 Analysis of differences in self-regulation sub-scale scores for Intervention A and B.

Self-regulation of learning subscales			
	df	t	p-value
Intervention A			
Planning	530	−0.79	0.43
Self-monitoring	530	0.237	0.81
Evaluation	530	1.281	0.20
Reflection	530	0.531	0.57
Effort	530	3.196	0.00
Self-efficacy	530	0.885	0.06
Intervention B			
Planning	480	−5.243	0.00
Self-monitoring	480	−2.08	0.03
Evaluation	475	0.448	0.65
Reflection	475	−1.975	0.04
Effort	475	−0.93	0.35
Self-efficacy	475	−2.858	0.00

TABLE 8 Analysis of differences in student engagement sub-scale scores for Intervention A and B.

Student engagement sub-scale scores			
	<i>df</i>	<i>t</i>	<i>p-value</i>
Intervention A			
Extrinsic motivation	529	−3.919	0.00
Control relevance	529	−3.887	0.00
Teacher–student relationships	529	−4.086	0.00
Aspirations	529	−5.203	0.00
Family support	529	−4.248	0.00
Peer support	529	−3.627	0.00
Intervention B			
Extrinsic motivation	472	−4.103	0.00
Control relevance	472	−1.429	0.15
Teacher–student relationships	472	−1.569	0.12
Aspirations	472	−4.276	0.00
Family support	472	−3.494	0.00
Peer support	472	−3.575	0.00

DISCUSSION AND CONCLUSION

Our analysis showed that *both* interventions facilitated gains in terms of social and self-regulatory skills (primary outcome), engagement with learning (secondary outcome) and behaviour (secondary outcome) from the perspective of students and staff, much in line with the literature (e.g., Fiennes et al., 2015; Hattie et al., 1997; Prince, 2021). Bronfenbrenner's (1994) bioecological theory has explanatory potential here. Applying Bronfenbrenner's approach to an educational context (El Zaatari & Maalouf, 2022), schools and teachers sit within a student's microsystem, and the interactions between those within the school (teacher, staff, other students and the individual) impact individual level outcomes. In other words, what seems to matter most is the interactions between the actors in *any* environment. However, when that environment is outside school, the neutral space seems to allow teacher–student relationships to improve. This was not seen to the same extent in the school setting. Nonetheless, given the positive outcomes of both interventions (albeit differential impact and in the short-term), an important finding is that for changes in self-regulation, engagement and behaviour to occur, adventure learning can take place within or outside of the school context.

Given the overwhelming focus on out-of-school programmes in previous research, our findings make an important contribution to knowledge. Gillard (2020) noted that in-school programmes are limited by issues with self-regulation and student behaviour; however, our analysis counters this argument by suggesting these 'limitations' can in fact be improved by in-school programmes. Outside of the school context, our data show that greater gains in improving relationships between staff and students are more apparent. But within the school context, greater gains are seen in the transfer of learning skills into the classroom.

The fact that both interventions show evidence of improvements in students' regulation, engagement and behaviour is important given the current UK policy context. Despite favourable signs of intention (Farron, 2023; Rowlands, 2023; Smith, 2022, 2026), adventure learning residencies remain expensive and at the time of writing there is limited concrete funding to enable universal entitlement. As such, students in need of experiences such as

an adventure learning residential to improve their engagement in school and to benefit their wellbeing through access and connection to nature (Holland et al., 2025) are less likely to be able to take up these opportunities. In-school interventions may be an answer. Our data suggest that what seems to matter most for relationships and engagement levels is having the neutral space and time for students and teachers to interact, and in which participants have opportunities for vulnerability and new learning. While our findings align with previous research attesting to improved teacher–student relationships through interactions outside the confines of the classroom (Kendall & Rodger, 2015; Povilaitis et al., 2019), our work is one of the first to compare in-school and out-of-school adventure learning programmes, and to propose ‘neutral space’ as a key mechanism.

The role of teachers also differed across interventions. In Intervention A, teachers held a participatory role. Conversely, in Intervention B, teachers were utilised predominantly for behaviour management and were less likely to be involved in tasks. This influenced outcomes, evident in both data sets. Again, applying Bronfenbrenner's theory, in Intervention A, the novel tasks and extended periods of time enabled the development of bi-directional relationships in which both teacher and student could help each other. The teacher–student relationship has been identified as the most important influencer of school belonging for students (Uslu & Gizir, 2017; Allen et al., 2018, 2021;), so this is an important finding. Viewed through a bioecological theory lens, this interaction needs to occur over a longer period and have the opportunity to further develop in complexity. As such, the findings that teacher–student relationships can be improved through adventure learning should prompt investigations into how this development could be better capitalised upon post-intervention and how they might occur more frequently within the school curriculum.

Intervention B was particularly successful in improving the cognitive elements of student engagement, including facets of self-regulation, and promoting transfer. This contrast with Intervention A can be understood by considering the differences in activities and post-activity tasks. Intervention B comprised a series of planned tasks (missions), as opposed to the more generic outdoor ‘experiences’ in Intervention A. Although both interventions involved students undertaking post-activity scaffolded evaluation and reflection tasks, Intervention B was more structured (mission plans) and being undertaken onsite were more contextually relatable to school (near transfer, Barnett & Ceci, 2002). This may explain why transfer was more visible in Intervention B in the quantitative results. In residential adventure learning programmes, transfer becomes more challenging because of the difference in the physical context, generality of the skills learnt (rather than specific to a subject or task) and the need for students to remember and use the skills they have acquired (see Gass, 1999). We therefore suggest tasks to promote transfer should be built into adventure learning programmes.

In terms of research question two, both interventions saw short-term improvements in self-regulation (in line with, e.g., Fiennes et al., 2015; Povilaitis et al., 2019; Cincera et al., 2021), but these improvements had dissipated by longitudinal follow-up. For student engagement short-term improvements were observed for Intervention B only, but at longitudinal follow-up both Intervention A and B showed improvements in engagement. These findings suggest that improvements in student engagement following adventure learning interventions may grow over time. These findings raise questions pertaining to the relationship between the type of intervention and the immediate impact (rather than the longer term or sustained impact) and warrant further research.

Thus, we have provided new insights into two models of adventure learning and the duration of their impact based on a very large data set. Importantly, we found that both bring benefits in the short term. While, intuitively, a school-based intervention may seem less attractive, we found that this model was in fact more conducive to transfer. This is welcome news for students unable to access out-of-school activities. Intervention A was nonetheless more successful at recalibrating student and teacher relationships,

potentially leading to increased belonging (Allen et al., 2018; Allen et al., 2024; Brown et al., 2025; Korpershoek et al., 2019; Riley, 2019). However, while the qualitative data painted a picture of a potentially transformative experience for students, gains made in all areas were not sustained in the longer term. Therefore, adventure learning should not be viewed as a panacea, but rather a starting point for recalibration that requires legacy planning.

Despite the large-scale nature of the study, there are limitations. Success or otherwise of the interventions was operationalised using specific quantitative scales. There are other potential gains that these scales did not capture. Future research should investigate the range of skills or qualities that are developed in this kind of learning and what conditions are conducive to transfer. Covid-19 impacted longitudinal data collection (T3), which may have contributed to the findings. Additional insights could be gained by exploratory qualitative research with school staff and students focused upon the realities of attempting transfer of learning from a one-off adventure learning context into the day-to-day school environment. Follow-up analysis and unpicking divergent experiences could then inform further collaborative work involving delivery leads to refine the intervention design to facilitate improved transfer mechanisms and greater enactment/embedding of learning. Finally, we call for an exploration of how the standard school curriculum could be modified to enable the positive conditions that enabled these students to flourish – challenge, down time, staff and student collaboration – to be recreated in students' everyday school experience.

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CONFLICT OF INTEREST STATEMENT

We have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

Anonymised data available on request to authors.

ETHICS STATEMENT

This study was reviewed and approved by an independent Research Ethics Committee (AA80370219) at Sheffield Hallam University. Informed consent was obtained from a parent/carer/guardian and the students themselves before randomisation. Thereafter, online student consent was obtained at the start of each questionnaire and verbal assent was confirmed with each student prior to any qualitative data collection activity. Students, school staff and delivery leads were informed about the overall RCT and prior to any data collection activities in age-appropriate ways, with an emphasis that participation was always voluntary and that they were free to not answer questions, stop taking part at any point without reason or consequence. Only experienced researchers with Enhanced Disclosure and Barring Service (DBS) checks undertook face to face data collection with students. All data collected was treated confidentially. Pseudonyms are used in the findings, but no personal identifiers are included. The original adventure learning trial was registered with the ISRCTN (ISRCTN68006446) prior to the interventions and data collection commencing.

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