Environmental *Change* Institute

Nature for student's life: The impact of outdoor greenness on mental wellbeing and chronic absenteeism

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Flourishing & Wellbeing

Investigating how non-clinical environments might be utilised to enhance public health and mental health

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Green space and children's mental health

- Improve cognitive development: attention restoration, memory, competence
- Stress reduction: lower symptoms of anxiety and depression
- Emotional resilience: enhance mood
- Self-discipline
- Increase physical activity
- Limited evidence compared to adult populations

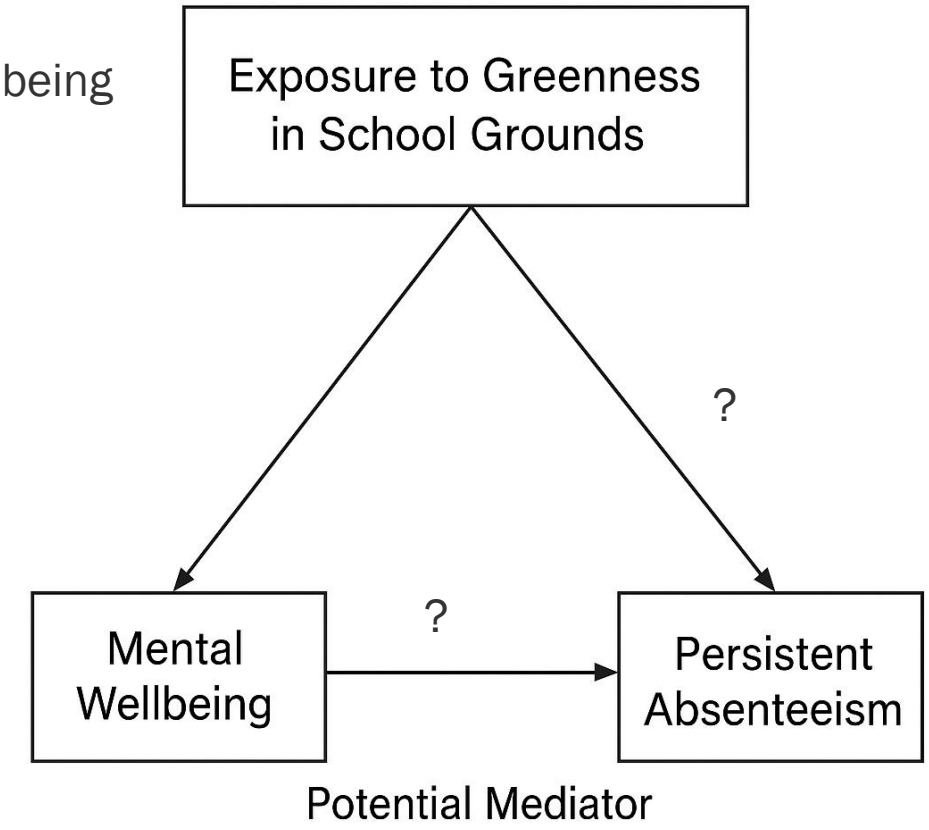
School greenness and chronic absenteeism

- School-based intervention: Schools are “Natural”

Schools play a crucial role in shaping children's development and addressing their needs, serving as a key context for promoting wellbeing and learning across diverse global settings(Fazel at al,2014).

- Student attendance in state-funded primary, secondary and special schools in England: the growing concern

Persistent absence rate	Oxfordshire
18.6%	26.9%
academic year 2024/25 to date	academic year 2022/23



A pupil enrolment is identified as persistently absent if 10% or more of possible sessions are missed

Research gaps

- Socio-spatial disparities in exposure to school greenness
- Lack of focus on school-based greenness
- Attendance and greenness post-covid
- Specific features of school green space and their associations with mental health
- Methodological gaps and inconsistent results

Research question

1

How does the relationship between school outdoor greenness and mental wellbeing vary across socio-economic neighbourhoods?

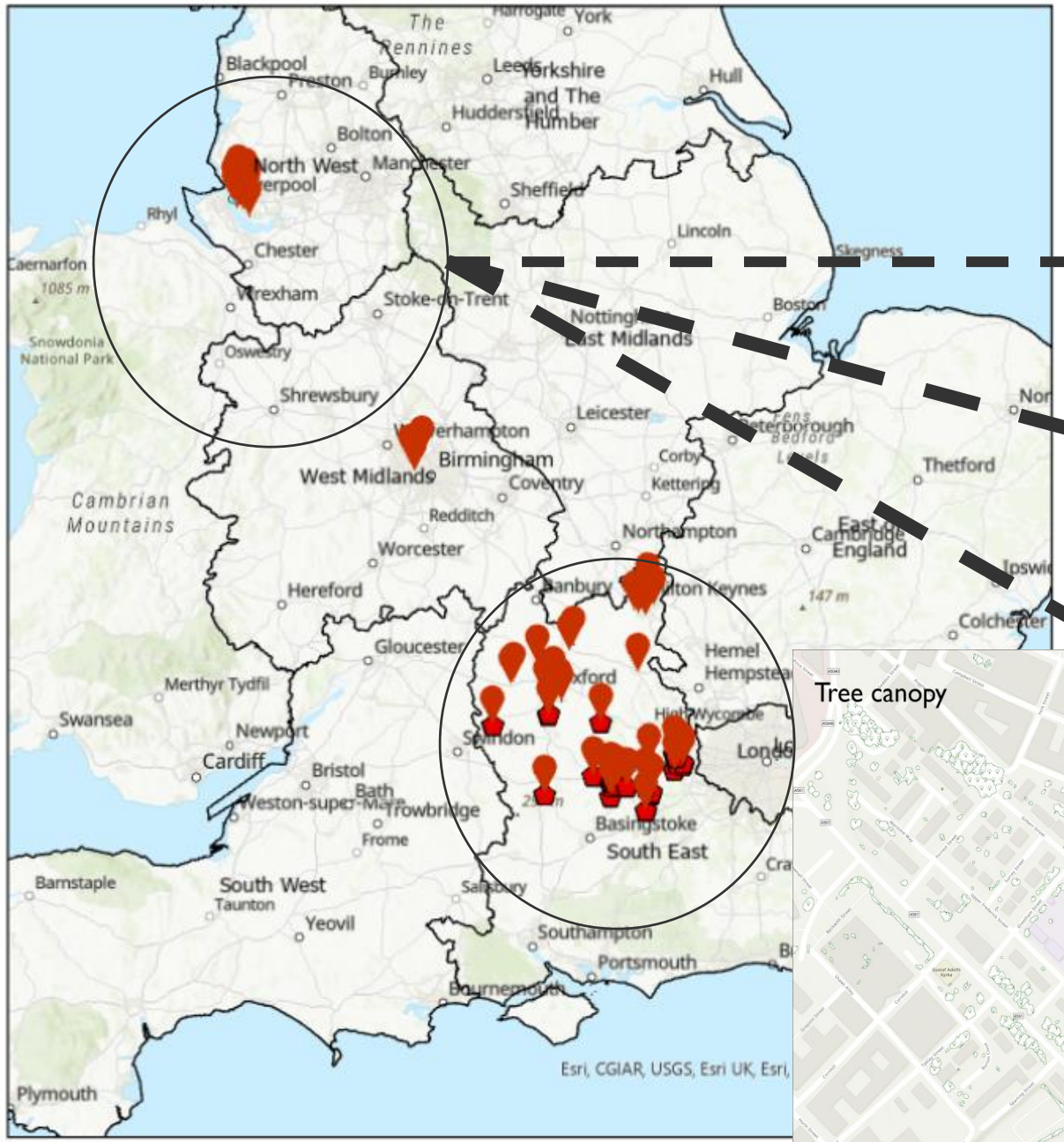
2

How specific features of green spaces in school grounds (e.g., tree cover, woodlands, grassland, playgrounds, gardens) influence children's mental well-being?

3

What is the relationship between school outdoor greenness and student chronic absenteeism?

What outdoor greenness in schools



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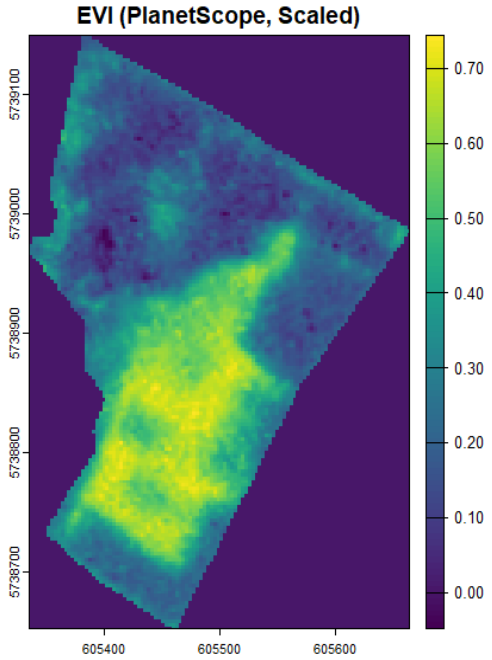
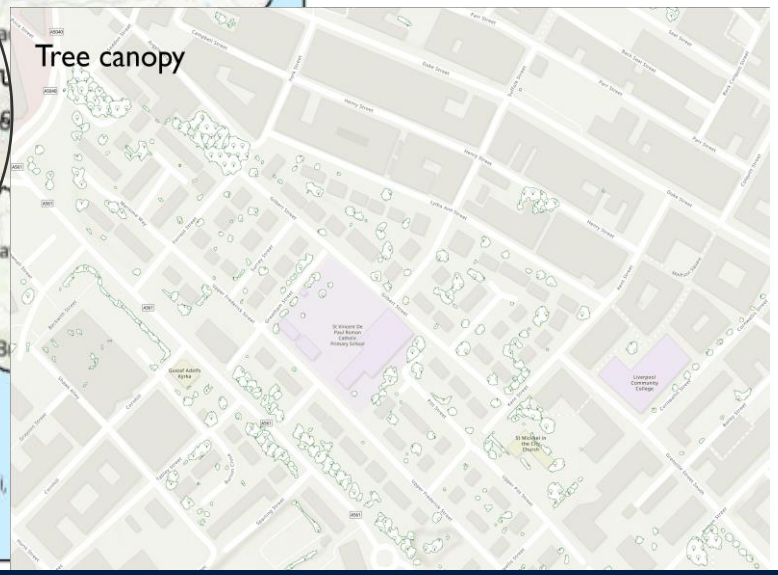
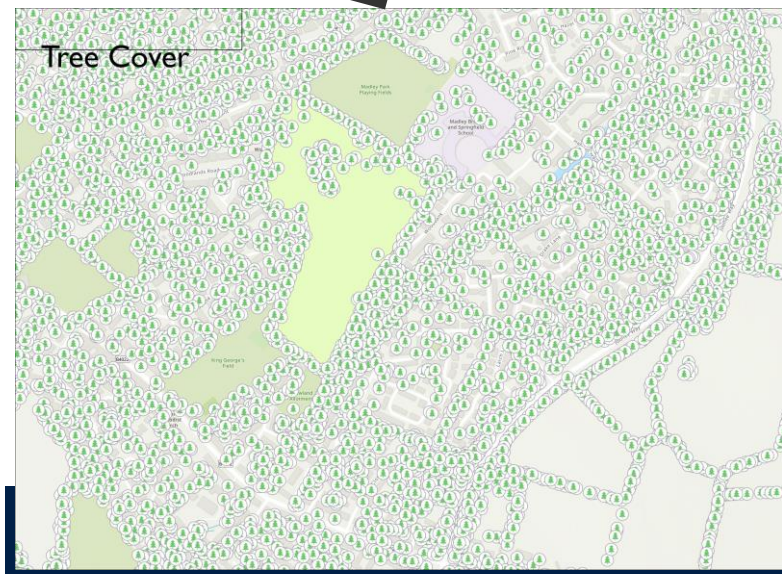
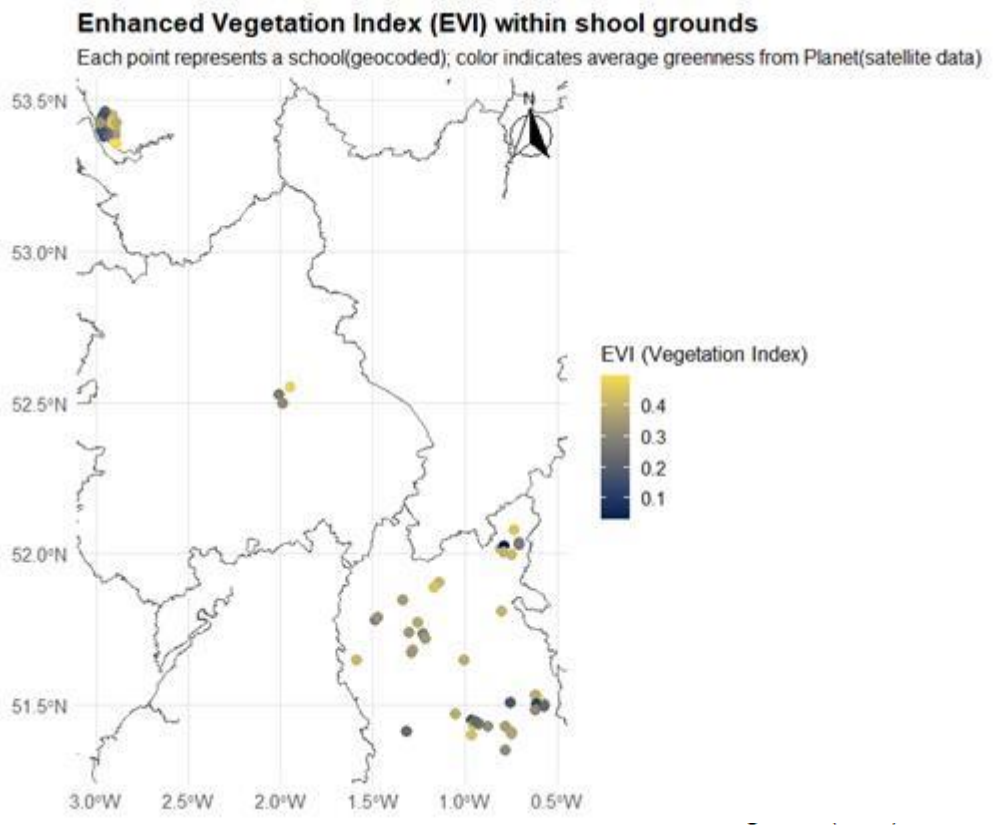
Legend

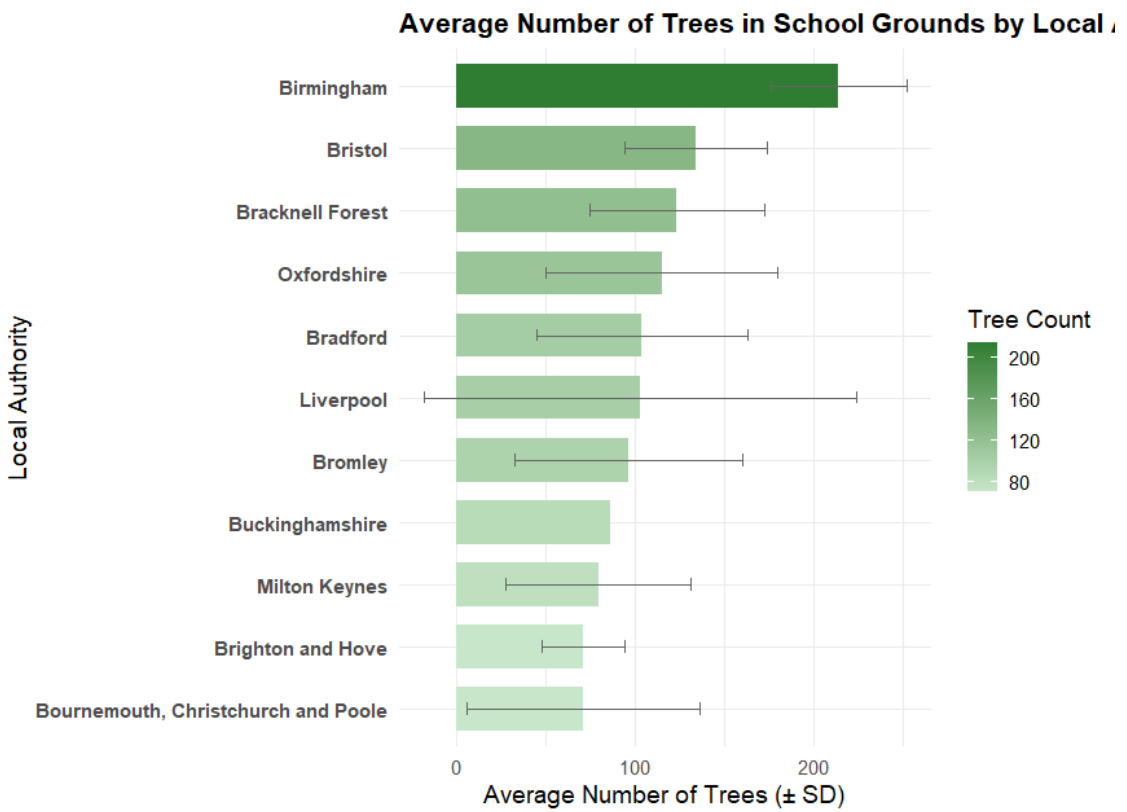
- Schools
- england region boundary
- School grounds





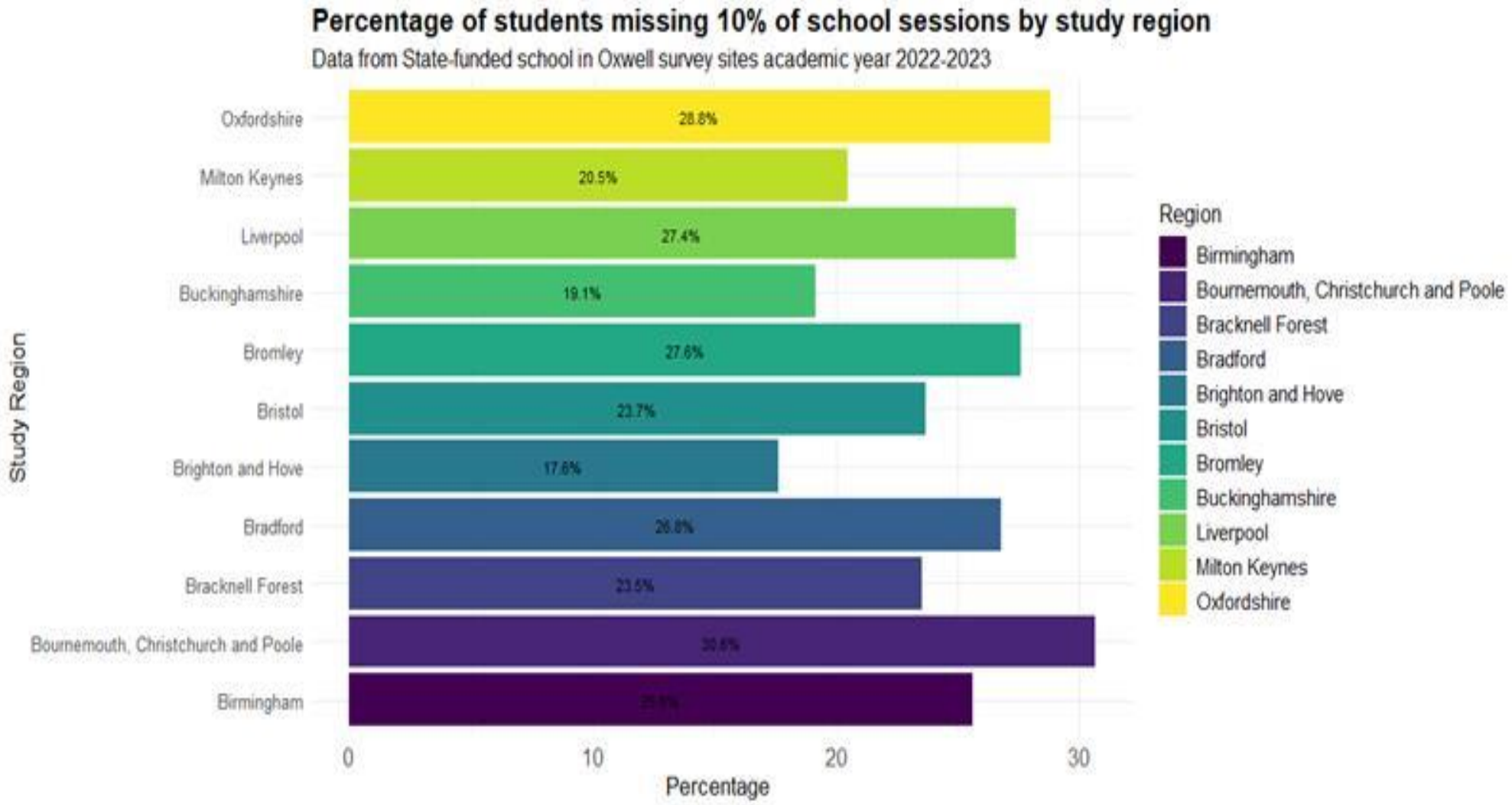






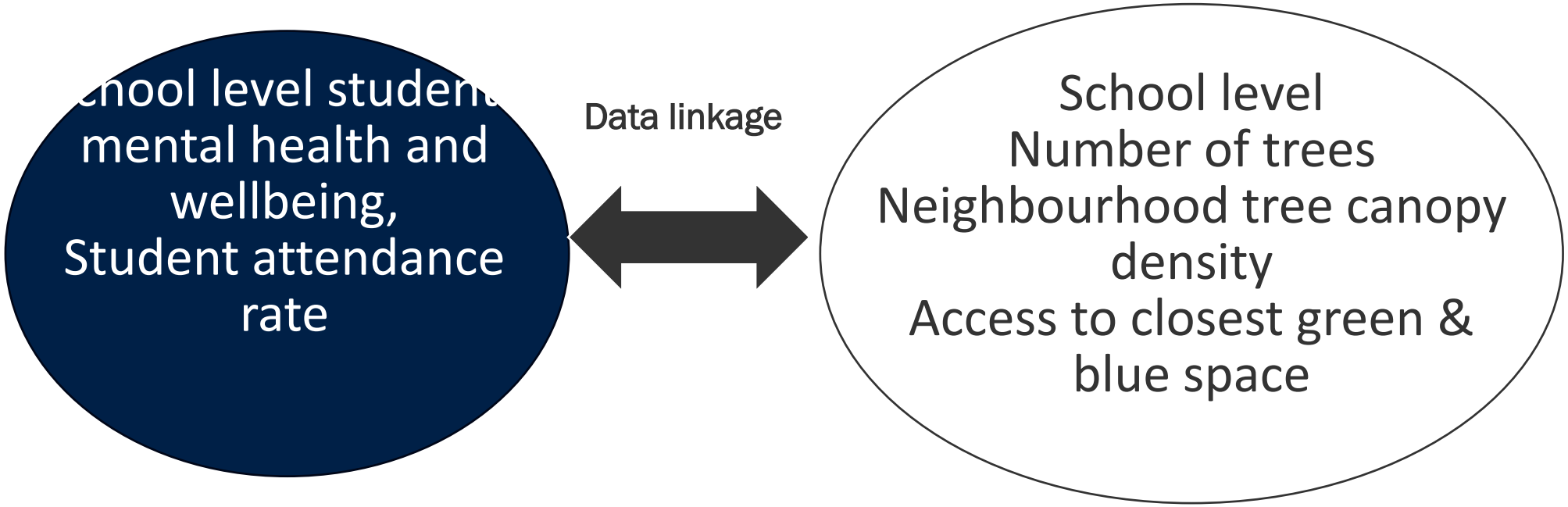
Metric	Oxfordshire	Liverpool
Number of trees	↑ moderate higher (~115 trees)	↓ lower (~103 trees)
EVI (Greenness)	↑ (≥ 0.36)	↓ lower (~0.31)
% of tree canopy cover	↑ moderate–high (~9.5%)	↓ lower (~8.5%)
Variation (SD across schools)	~	↑ higher variation

Chronic absenteeism

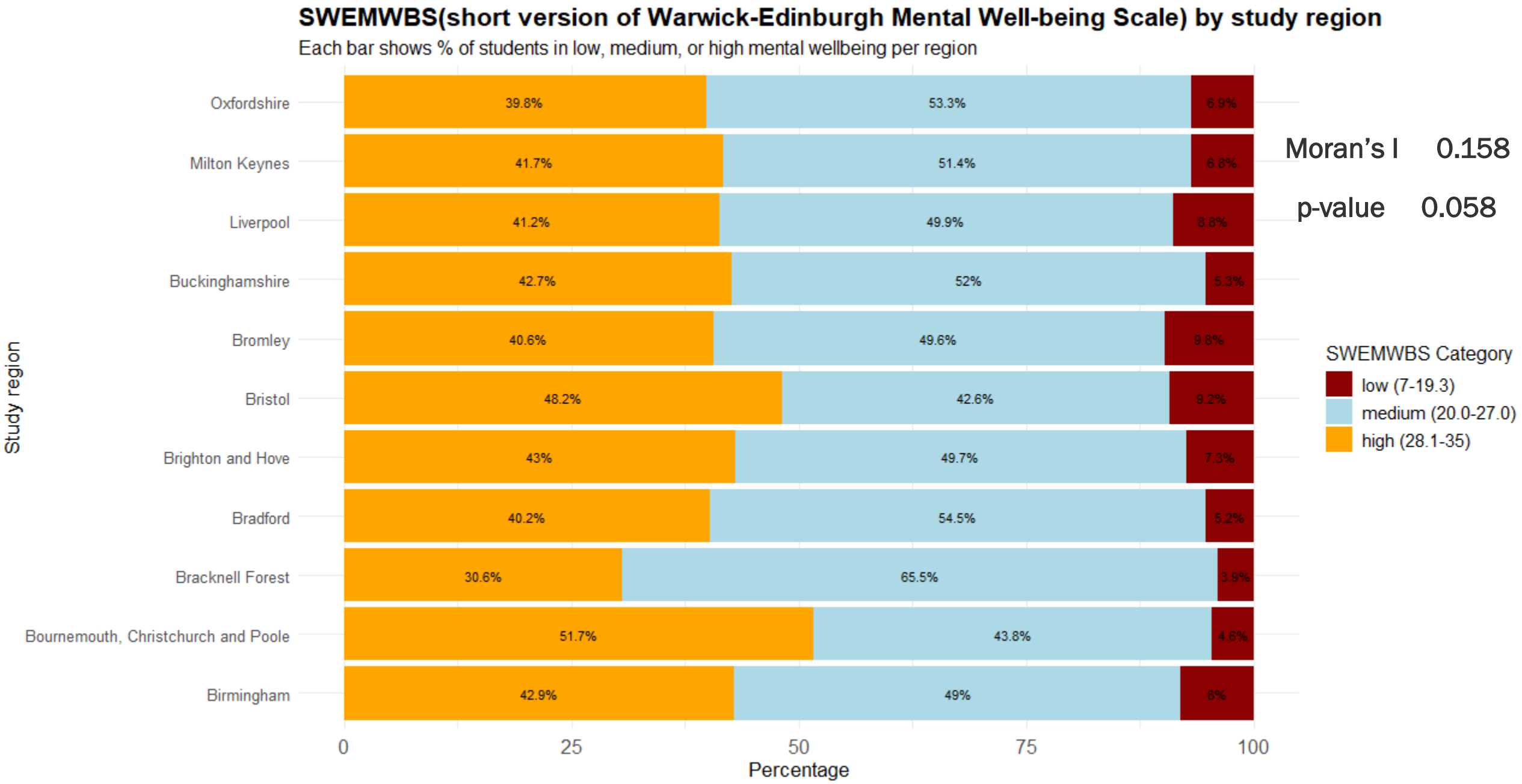


How to investigate this relationship?

- Linking to environmental exposure at school level



Student mental wellbeing in Schools



Preliminary: Does greenness matter to chronic absenteeism?

Model	Model Level	Greenness Variable	Main Effect	Interaction with SWEMWS
Model 1	School-level	School-level PERCENTAGE (tree canopy %)	**Positive** (β = 9.68, *p* = 0.0178) ✔	**Negative** (β = -0.48, *p* = 0.0166)
Model 2	School-level	School level number of trees (tree count)	**Positive** (β = 0.98, *p* = 0.0039) ✔	**Negative** (β = -0.048, *p* = 0.0033)
Model 3	School-level (aggregated)	EVI	**Not significant** (β = 69.14, *p* = 0.809) ✘	**Not significant** (β = -4.14, *p* = 0.767) ✘
Model 4	Multilevel (student-level)	EVI	**Negative** (β = -0.34, *t* = -5.04) ✔	**Not significant** (β ≈ 0, *t* ≈ 0) ✔

More to come…

Preliminary: Does greenness matters to mental health?

Greenness is more beneficial for students in more deprived neighbourhoods(controlled for school level social-demographics, more to add).

Model	Model Level	EVI Effect	IMD10 Effect	EVI × IMD10 Interaction
OLS	Individual	−2.01 (p = .003) ✓	−0.16 (p < .001) ✓	+0.45 (p < .001) ✓
OLS	School-level	−0.76 (ns) ✗	+0.002 (ns) ✗	+0.04 (ns) ✗
SAR	Individual	−1.98 (p = .003) ✓	−0.16 (p < .001) ✓	+0.45 (p < .001) ✓
Multilevel (LMM)	Individual (nested in schools)	−1.93 (p ≈ .09)	−0.15 (p = .04) ✓	+0.39 (p ≈ .07)
SAR	School-level	−1.12 (p = .43) ✗	−0.05 (p = .58) ✗	+0.21 (p = .42) ✗
More to come, on trees. ...SDM,spatial weight in LMM..trees*IMD..				

Preliminary take away

- More trees and tree canopy in schools are linked to higher absenteeism, but students with better mental wellbeing are less affected
- Greener school grounds (measured by EVI) slightly reduce absenteeism, and this isn't influenced by students' mental wellbeing.
- Relationship between outdoor school greenness and mental wellbeing is highly localized, not driven by broader spatial spillovers
- In deprived areas, greenness in school grounds matters more for student's mental wellbeing

Next steps

- Enrich the greenness side: Different type of land use within the school grounds: playground, grassland, woodland, gardens and etc.
- Regional difference: North and South dividends
- Sensitivity analysis
- Deep dive case studies

What we wish to provide?

Environment improvement plan (EIP)

Green infrastructure intervention

DFE: Working together to improve school attendance

NPPF(National Planning Policy Framework)

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Questions?

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