

Living near woodlands is good for children and young people's mental health

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Analysis of children and young people's proximity to woodlands has shown links with better cognitive development and a lower risk of emotional and behavioral problems, in research led by UCL and Imperial College London scientists that could influence planning decisions in urban areas.

In what is believed to be one of the largest studies of its kind, researchers used longitudinal data relating to 3,568 children and teenagers, aged nine to 15 years, from 31 schools across London. This period is a key time in the [development](#) of adolescents' thinking, reasoning and understanding of the world.

The study, published in *Nature Sustainability*, looked at the links between different types of natural urban environments and the pupils' [cognitive development](#), mental [health](#) and overall well-being.

The environments were divided into what planners call [green space](#) (woods, meadows and parks) and blue space (rivers, lakes and the sea), with green space separated further into grassland and woodland. Researchers used satellite data to help calculate each adolescent's daily exposure rate to each of these environments within 50m, 100m, 250m and 500m of their home and school.

After adjusting for other variables, the results showed that higher daily exposure to woodland (but not grassland) was associated with higher scores for cognitive development, and a 16% lower risk of emotional and behavioral problems two years later.

A similar but smaller effect was seen for green space, with higher scores for cognitive development, but this was not seen for blue space. The researchers note though that access to blue space in the cohort studied was generally low.

Examples of other explanatory variables considered included the young person's age, ethnic background, gender, parental occupation and type of school, e.g., state or independent. The level of air pollution might have influenced adolescents' cognitive development, but researchers did not feel these observations were reliable or conclusive, and these require further investigations.

It is already estimated that one in 10 of London's children and adolescents between the ages of five and 16 suffer from a clinical mental health illness and excess costs are estimated between £11,030 and £59,130 annually for each person. As with adults, there is also evidence that natural environments play an important role in children and adolescents' cognitive development and mental health into adulthood, but less is known about why this is.

The results of this study suggest that urban planning decisions to optimize ecosystem benefits linked to cognitive development and mental health should carefully consider the type of natural [environment](#) included. Natural environments further away from an adolescent's residence and school may play an important role too, not just their immediate environment.

Lead author, Ph.D. student Mikaël Maes (UCL Geography, UCL Biosciences and Imperial College London School of Public Health) said: "Previous studies have revealed positive associations between exposure to nature in urban environments, cognitive development and mental health. Why these health benefits are received remains unclear, especially in adolescents.

"These findings contribute to our understanding of natural environment types as an important protective factor for an adolescent's cognitive development and mental health and suggest that not every environment type may contribute equally to these health benefits.

"Forest bathing, for example (being immersed in the sights, sounds and smells of a forest), is a relaxation therapy that has been associated with physiological benefits, supporting the human immune function, reducing heart rate variability and salivary cortisol, and various psychological benefits. However, the reasons why we experience these psychological benefits from woodland remain unknown."

Joint senior author Professor Mireille Toledano (Director, Mohn Centre for Children's Health and Wellbeing and Investigator, MRC Centre for Environment and Health and Principal Investigator of the SCAMP study, Imperial College London) said: "It's been suggested previously that the benefits of natural environments to mental health are comparable in magnitude to family history, parental age and even more significant than factors like the degree of urbanization around you, but lower than your parents' socio-economic status. Sensory and non-[sensory pathways](#) have been suggested as potentially important for delivering cognition and mental health benefits received from exposure to nature.

"It's critical for us to tease out why natural environments are so important to our mental health throughout the life course—does the benefit derive from the physical exercise we do in these environments, from the social interactions we often have in them, or from the fauna and flora we get to enjoy in these environments or a combination of all of these?"

Joint senior author Professor Kate Jones (UCL Centre for Biodiversity & Environment Research, UCL Biosciences) said: "One possible explanation for our findings may be that audio-visual exposure through vegetation and animal abundance provides psychological benefits, of which both features are expected in higher abundance in woodland. Even though our results show that urban woodland is associated with adolescent's cognitive development and mental health, the cause of this association remains unknown. Further research is fundamental to our understanding of the links between nature and health."

To arrive at the findings, researchers analyzed a longitudinal dataset of 3,568 adolescents between 2014 and 2018, whose residence was known, from the Study of Cognition, Adolescents and Mobile Phones (SCAMP) across the London metropolitan area. They assessed adolescents' [mental health](#) and overall well-being from a self-reported Strengths and

Difficulties Questionnaire (SDQ) - covering areas such as emotional problems, conduct, hyperactivity and peer problems—and the KIDSCREEN-10 Questionnaire taken by each adolescent for SCAMP.

Limitations of the study include an assumption that living or going to school near [natural environments](#) means more exposure to them, which may not always be the case due to how easily they can be accessed by a child or young person or how usable they are.

Also, a considerable proportion of the participants (52.21%) were in the group whose parents had a managerial/professional occupation, so adolescents in less favorable socio-economic groups may be underrepresented and pupils requiring special needs may be differently affected compared with their peers. Crime rates, which may have influenced the results too, were not taken into account.

More information: Maes, M.J.A., et al, Benefit of woodland and other natural environments for adolescents' cognition and mental health, *Nat Sustain* (2021). [DOI: 10.1038/s41893-021-00751-1](https://doi.org/10.1038/s41893-021-00751-1)

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