



To: Transport Planners

From: Adrian Davis

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Subject: School Travel Toolbox: No 10 Green spaces and cognitive development in primary school children

Top line: New research shows improving green spaces in and around schools is linked to improved cognitive function in children, providing a stronger evidence base for policymakers to support achievable targeted interventions.

Green spaces have a range of health benefits, but little is known in relation to cognitive development in children. Exposure to green space has been associated with better physical and mental health. Although this exposure could also influence cognitive development in children, available evidence on such an impact has been scarce. Children spend a considerable part of their active daily time at schools and “green exercise” has been related to better mental health.¹ A study, based on comprehensive characterisation of outdoor surrounding greenness (at home, school, and during commuting) and repeated computerized cognitive tests in school children in Barcelona, Spain (2012–2013) has provided new scientific evidence of the impact of exposure to green space on cognitive development in children.²

The study aimed to assess the association between exposure to green space and measures of cognitive development in primary school children was based on 2,593 school children in the second to fourth grades (7–10 y) of 36 primary schools. Cognitive development was assessed as 12-month change in developmental trajectory of working memory, superior working memory, and any changes in inattentiveness by using four repeated (every 3 months) computerized cognitive tests for each outcome. The researchers assessed exposure to green space by characterizing outdoor surrounding greenness at home and school and during commuting by using high-resolution satellite data on greenness.

The study found an improvement in cognitive development associated with surrounding greenness, particularly with greenness at schools. This association was only partly influenced by reductions in traffic-related air pollution (and its impact on cognitive function). A school and total surrounding greenness index was associated with enhanced 12-month progress in indicators of working memory (5%), superior working memory (6%) and a slight greater 12-month reduction in inattentiveness (1%) and were more evident for greenness at school. Commuting greenness was also associated with better 12-month progress in working memory. The findings from the study are consistent with some previous observations. This includes that residential surroundings greenness has been related to better mental health including lower risk of depression and anxiety in children.³

¹ Thompson, C., et al 2011 Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental wellbeing than physical activity indoors? A Systematic Review. *Environment, Science & Technology*, 45(5): 1761-1772.

² Davvand, P., Nieuwenhuijsen, M., Esnaola, M., et al 2015 Green spaces and cognitive development in primary school children, *Proceedings of the National Academy of Science of the USA*, www.pnas.org/cgi/doi/10.1073/pnas.1503402112

³ Maas, J., et al 2009 Morbidity is related to a green living environment. *Journal of Epidemiology and Community Health*, 63(12) 967-973.