

Institution: University of East London (UEL)		
Unit of Assessment: 4 Psychology, Psychiatry and Neuroscience		
Title of case study: City kids: demonstrating how noisy, cramped environments affect early cognitive and emotional development		
Period when the underpinning research was undertaken: 2014 – 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Sam Wass	Senior Lecturer	2016 – present
Period when the claimed impact occurred: 2014 - 2020		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact (indicative maximum 100 words)

Childhood is changing: 300 years ago, 5% of children grew up in cities, compared to 50% today. UEL's BabyDev Group has pioneered new methods to uncover how changing modern living environments affect early cognitive and emotional development. The research has had wide-ranging impact across the public and commercial sectors – including: i) direct impact on local councils' Early Years provision within the UK, ii) contribution to governmental campaigns from Public Health England and the Department of Education, iii) involvement in high-impact television and other media work and iv) projects with commercial organisations, including shopping centre and hotel design.

2. Underpinning research (indicative maximum 500 words)

The BabyDev group at UEL is located in the London Borough of Newham, in one of the most demographically mixed and socioeconomically challenged areas of the UK. Children growing up in the catchment area experience an exceptionally wide range of different types of early life environment. The research investigates how these diverse home environments affect early development.

The BabyDev group, led by Wass, has been awarded a number of large-scale grants over the past 6 years, including from the Nuffield Foundation, the Economic and Social Research Council, the Leverhulme Trust, a Marie Curie Fellowship and a €1.5 million European Research Council Starter Grant. These projects have been developed in consultation with local council authorities and Children's Centres in Newham. The group also has funded collaborations with other researchers in the UK (London (Institute of Psychiatry, Birkbeck), Cambridge, Belfast) and internationally (Belgium, Germany, Austria, Finland, Israel, US, Canada, Chile). Through these, they have pioneered new methodologies for understanding how the early home environment affects children's development. These include, for example, wireless miniaturised wearable microphones, cameras and physiological stress monitors that can be worn by babies and parents at home, and dual neuroimaging to observe early parent-child interactions. Using these, they can examine for the first time how changing levels of noise and chaos in the home environment can immediately impact on children's physiological stress, concentration, and social engagement.

In two recent papers (**R1**, **R2**) they showed that, even by 12 months of age, children growing up in physically noisier home environments have higher physiological stress, affecting both their cognitive performance and their emotional responsiveness. Importantly, these differences were not all indicative of poor development: While they were more highly stressed, urban children

Impact case study (REF3)

showed lower sustained attention and greater emotional instability, they showed faster learning speeds in some contexts. This research offers the first mechanistic evidence for how the early living environment can affect multiple different types of problem – e.g. impaired academic performance and adverse mental health outcomes. But it also offers new insights for clinicians, educationalists and parents into maximising learning potential for more highly stressed ‘city kids’. The research examines differential susceptibility: how, and why, some children may be particularly vulnerable to the effect of noisy, cramped environments, and what can be done to protect these children.

Other papers (R3, R4, R5) have pioneered new techniques such as dual parent-child neuroimaging to examine ‘stress contagion’: how stress and anxiety is shared between adults and children both at home and at school. As well as typical development, atypical parent-child dyads, where the adult has clinical anxiety or depression, were investigated. This research has widespread relevance both for identifying high-risk parent-child dyads, and developing new intervention techniques to minimise long-term harm.

3. References to the research (indicative maximum of six references)

R1. Wass, S. V., Smith, C. G., Daubney, K. R., Suata, Z. M., Clackson, K., Begum, A. and Mirza, F. U. 2019. Influences of environmental stressors on autonomic function in 12-month-old infants: understanding early common pathways to atypical emotion regulation and cognitive performance. *Journal of Child Psychology and Psychiatry*, 60(12), 1323-1333. <https://doi.org/10.1111/jcpp.13084>

R2. Wass, S.V., Smith, C.G., Stubbs, L., Clackson, K. and Mirza, F.U. (in press) Physiological stress, sustained attention and cognitive engagement in 12-month-old infants growing up in urban environments. *Developmental Psychology*. <https://doi.org/10.31234/osf.io/7nv34>

R3. Wass, S. V., Smith, C. G., Clackson, K., Gibb, C., Eitzenberger, J. and Mirza, F. U. 2019. Parents mimic and influence their infant’s autonomic state through dynamic affective state matching. *Current Biology*, 29 (14), 2415-2422. <https://doi.org/10.1016/j.cub.2019.06.016>

R4. Wass, S.V., Daubney, K., Golan, J., Logan, F. and Kushnerenko, E. 2018. Elevated physiological arousal is associated with larger but more variable neural responses to small acoustic change in children during a passive auditory attention task. *Developmental Cognitive Neuroscience* 37 (Art. 100612). <https://doi.org/10.1016/j.dcn.2018.12.010>

R5. Leong, V., Byrne, E., Clackson, K., Lam, S. and Wass, S.V. 2017. Speaker gaze increases information coupling between infant and adult brains. *Proceedings of the National Academy of the Sciences* 114 (50), 13290–13295. <https://doi.org/10.1073/pnas.1702493114>.

G1. Sam Wass, ‘What is the difference between ‘good’ and ‘bad’ stress? Understanding possible effects of socio-economic status on learning’, Economic and Social Research Council, October 2016-September 2018, GBP152,526.

G2. Sam Wass, ‘New insights into how the infant brain subserves dynamic social interactions’, Leverhulme Trust, January 2019-January 2022, GBP356,020.

4. Details of the impact (indicative maximum 750 words)

Informing government policy

Wass has been involved in multiple recent government public initiatives targeting early development – such as two recent Department of Education campaigns to raise parent awareness about the importance of getting children back to school post COVID-19, for which he acted as official spokesperson. He also contributed to a recent Start4Life campaign on behalf of Public Health England (S1).

Changing practice in the early years educational sector

Wass has presented his research findings to over 50,000 Early Years practitioners, including the head teachers of over 2,000 primary schools and nurseries, through interactive keynote presentations and workshops that Wass has given at early years conferences such as: The National Day Nurseries Association; National Childminder Conference; Barnardo's children's charity; Together for Children; International Association of Prep Schools; and Early Excellence Annual National Meeting (**S2**). He has also presented at over 40 local Councils or Academy Trusts around the UK. His research was published in articles in the Times Educational Supplement (**S3**), Early Years Educator, Nursery World, the Chartered College of Teaching and many others.

These presentations have led to fundamental change in practitioners' understanding of how noisy and chaotic environments influence children's learning (**S4**). In particular, practitioners are learning to reduce auditory and visual noise in teaching environments wherever possible – so that the types of 'stress reduction' techniques that have been introduced into Special Needs schools over the past 10-20 years are, increasingly being introduced in mainstream settings, too. As a result of this research, a number of councils have also introduced steps to identify children who are particularly vulnerable to the detrimental effects of noisy environments, and to alter their teaching practice to reflect this.

Raising awareness and creating debate among public audiences

Regularly, including during the recent Covid-19 pandemic, Wass has appeared as expert commentator on national TV networks (e.g., BBC Breakfast, ITV This Morning, Sky Sunrise, the Victoria Derbyshire show), radio stations (BBC Radio 2/3/4/5 Live, Heart, Capital Radio, Kiss FM) and newspapers (**S5**). These appearances have raised awareness for parents about how their children are affected by stress and anxiety. The research also featured in a recent 2019 TEDx talk which amassed 62,000 views (**S6**).

From 2013 to 2018 Wass was involved in the Channel 4 series The Secret Life of 4 and 5-Years Olds (**S7**). Wass contributed heavily to the development of the show, which involved him and other scientists observing and commenting live on children's interactions. The UK show reached over 5 million people and the format has been remade in over 10 countries, including the United States and China. The show received backing from the Wellcome Trust and widespread praise for its innovative approach to making scientific findings about child development accessible to parents at home. It received a Broadcast award and was twice nominated for a BAFTA.

Providing information resources for commercial campaigns

The child directed commercial sector has engaged extensively with Wass' research. For example, he was heavily involved in a project with Thomas Cook, contributing to the design of the leisure facilities at their holiday resorts. He also worked with New River, who own 35 shopping centres around the UK, to raise awareness of how shopping centres can be stressful and over-stimulating environments for children, and to introduce steps to make the shopping centres more accommodating to children and adults vulnerable to over-stimulation (**S8**).

He contributed to work with Center Parcs based on his research into the importance of shared parent-child engagement during leisure time and acted as a child development expert in consultancy work with other organisations including: Lego, Fisher Price, Tesco, Dulux, Ikea, Argos, Nickelodeon, the Cartoon Network and Aardman Animations.

NGOs and other organisation influenced by the research

Wass further raised public awareness and engagement with the findings of his research through their informing campaigns for charities such as the 2016 National Trust campaign '50 things to

Impact case study (REF3)

do before you're 11 ¾', a Save the Children campaign on childhood literacy, and work for Barnados charity (**S9**). Dr Wass is also official scientific consultant for the new Early Years gallery in development at The Science Museum (**S10**).

5. Sources to corroborate the impact (indicative maximum of 10 references)

Department of Education spokesperson role:

S1a. *Daily Mirror* interview: <https://www.mirror.co.uk/news/psychologist-children-school-missing-coronavirus-22232040>

S1b. *Telegraph* interview: <https://www.telegraph.co.uk/lifestyle/spark/in-this-together/back-to-school-preparation/>

S1c. *Female First* interview: <https://www.femalefirst.co.uk/parenting/why-babies-arent-developmentally-ready-to-eat-before-six-months-old-1231164.html>

Early Years Keynotes:

S2a. http://earlyexcellence.com/wp-content/uploads/2017/10/EX_Conference_2017.pdf

S2b. <https://www.daynurseries.co.uk/news/event.cfm/id/1253160>

S2c. <https://www.togetherforchildren.org.uk/news/2018/channel-4-psychologist-sam-wass-speak-early-years-conference>

Outreach to Early Years:

S3a. <https://www.tes.com/news/four-year-olds-need-their-own-model-behaviour-management-says-child-psychology-expert>

S3b. <https://www.nurseryworld.co.uk/other/article/dr-sam-wass-don-t-ban-children-s-screen-use>

S4. Letter of Support from Kim Salisbury, Quality Improvement Officer at School Improvement Liverpool.

Example of national media coverage:

S5a. BBC Radio 5 Live interview: <https://www.bbc.co.uk/programmes/m000m5vr>

S5b. *inews*: <https://inews.co.uk/news/children-now-want-to-be-influencers-not-heroes-says-tv-psychologist-285212>

S5c. *Daily Mail*: <https://www.dailymail.co.uk/news/article-4111444/Lazy-children-putting-46-hour-week-School-homework-helping-house-mean-youngsters-doing-hours-parents.html>

S6. https://www.ted.com/talks/sam_wass_smarter_but_more_stressed_how_the_modern_world_is_changing_children

S7. *Secret Life of 4-Year-Olds*:

<https://www.channel4.com/press/news/dr-sam-wass-talks-about-filming-secret-life-4-year-olds>

Coverage of children tantrums in shopping centres:

S8a. <https://www.thenorthernecho.co.uk/news/local/darlington/15420118.darlingtons-cornmill-shopping-centre-security-guards-get-tantrum-training-school-holidays-approach/>

S8b. <https://www.express.co.uk/featured/news/uk/1299783/Psychologist-on-devastating-unseen-impact-of-children-missing-school>

S8c. <https://en-gb.facebook.com/C5News/videos/avoiding-toddler-tantrums-5-tips/1553144838043322/>

S9a. <https://www.nwemail.co.uk/news/barrow/16453996.the-national-trusts-urges-kids-to-get-outside-and-enjoy-life-by-releasing-a-bucket-list-for-11-year-olds/>

S9b. <https://www.irishexaminer.com/opinion/arid-20462758.html>

S10. Hana Dethlefsen, Lead interactive gallery curator, Early Years Gallery, Science Museum, London.