

Emotional response to city design could guide urban planning

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Neurologists, architects, artists, and epidemiologists are collaborating to design cities that could be used to improve well-being among older people. Credit: Senior Guidance, licensed under CCby2.0

Virtual reality and scenario-testing models are being built to help urban planners and architects get real-time feedback about the impact of their

designs on mental health, particularly for older people.

Europe's cities are getting greyer. The EU's 2018 ageing report claims that by 2070, more than half of Europeans will be over the age of 65. Poor health and a limited income mean [older people](#) can be more susceptible to isolation, depression and mental decline.

But what if [city](#) design could instead be used to boost wellbeing? A combination of neurologists, architects, artists, and epidemiologists are now seeing how to do just that, by testing people's [emotional response](#) to spaces such as redeveloped buildings and plazas before a single brick is laid.

As part of the MINDSPACES project, artists and architects first come up with a blueprint for a city square, for example, which can then be turned into a digital simulation. Locals can then 'see' what the simulated blueprint looks like by donning a pair of [virtual reality](#) (VR) goggles.

"During the VR experience, the (physical) space in which the person will react will interact with the (digital) space," says Dr. Stefanos Vrochidis, senior researcher at the Centre for Research and Technology Hellas, Greece.

Users also wear lightweight devices that measure their brain activity, skin response, and [heart rate](#) while they explore the virtual space. Using these devices, neurologists then use machine-learning programs to figure out the most pleasant, inspiring or emotionally appealing aspects about the proposed design.

"Based on the emotions, the space will be adapted in real time," said Dr. Vrochidis. "This means you might walk in the square and you see a bench that you don't like. And then when you revisit it in the next two seconds the bench is not there, and there is something else."

Emotionally friendly

One of the project's test cases involves redesigning and refurbishing seniors' homes in Paris, France, to make them more 'emotionally friendly' for the residents. Working with the healthcare initiative eSeniors, architects and artists will redesign this space so that it offers different artworks and furniture to address emotions such as isolation and loss.

Artists will be first given the 3-D plan of someone's living space and information from interviews about their habits at home. The resident will then use VR goggles to explore the virtual space, interact with the artwork and furniture and have their emotional reactions to their proposed living space recorded.

Dr. Vrochidis is convinced this real-time feedback can also democratise urban planning for both older people and the wider community.

"This gives you the ability to implicitly have an important say in how the [space](#) is designed, and you see it in real time. That, I think, is a very important interaction capability which is very different to simply having an image," said Dr. Vrochidis.

But it's not just the physical design of cities that can impact mental health, according to Frank van Lenthe, professor of social epidemiology at Erasmus Medical Centre Rotterdam, the Netherlands.



Dr Vrochidis believes this VR approach further involves older people in the decision-making process. Credit: MINDSPACES

"A city has a physical shape and a social shape that may be beneficial for the elderly," he said.

He leads a project called [MINDMAP](#) which is looking at what policies and designs in cities across Europe and North America could boost mental health among older city dwellers.

Bus passes

The project has already suggested [a link between a UK initiative of](#)

[giving the elderly free bus passes and an increase in mental wellbeing.](#)

This, says Prof van Lenthe, may be due to bus journeys helping people go and meet others, and thus reducing loneliness.

The researchers have also found more nuanced features of urban design. Building high-density apartments helps to encourage walking and cycling, boosting [mental health](#). But building apartments too densely has the opposite effect.

"If you make them even denser, the stress related to that would be worse than the benefits of more walking and cycling' said Prof. van Lenthe.

The team is also comparing the policies and design of European and US cities to see how different factors affect wellbeing.

"American cities are built on completely different policies and different starting points," said Prof. van Lenthe. "The huge car dependency for example is completely incomparable (to Europe), but also the very market driven economies."

The differences extend to low-income areas and nutrition. "In the small and dense cities that we have in Europe, for example, the availability of shops for healthy food is relatively easily accessible for everyone—whereas in the US, this differs much more by level of deprivation," Prof. van Lenthe explained.

In March, the project published a [paper on the link between depression and alcoholism](#), and possible policy solutions, among the older adults in Los Angeles. Using data from a previous LA healthcare study, they used computer models to see what affected the alcoholism rate among the elderly.

These models include personal factors (e.g. a history of depression)

alongside city life (e.g. living close to shops selling alcohol and alcohol taxes).

Their results suggest that although depression and alcohol abuse are linked, it is not as strong as some may believe. A combination of social-based therapy to fight depression and alcohol taxes could help lower the rate of alcoholism among the elderly.

The project, which ends later this year, aims to pull all their results together in a digital model so that policymakers can test different scenarios for their cities. "Currently we're in a bit of a situation where, given the challenges we face with urbanisation, policies need to be made—and I understand fully that policymakers can't wait," said Prof. van Lenthe.

"But I do hope that our project will provide lots of evidence to further underly policies in different cities."

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