

## **NEWS RELEASE**

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### **Want to eat less candy? Watching immersive videos of someone else consuming it could help, NTU Singapore study finds**

People who have watched repeated immersive videos of others consuming candy, subsequently have a significantly decreased craving for it, a team of scientists from **Nanyang Technological University, Singapore (NTU Singapore)** has found.

Immersive video viewing involves using innovative technologies, such as virtual reality (VR) or augmented reality (AR) headsets, 360-degree videos, and motion tracking, to transport the viewer into the video itself, allowing them to feel like an active participant rather than a passive observer.

Previous studies have found links between watching an immersive video once and then reporting a decreased appetite but have not investigated the impact of repeated exposure to the videos.

They found that viewers who watched the immersive candy-eating video 30 times subsequently consumed an average of a third less candy (32 per cent to 38 per cent less candy), equating to around three pieces less. This is compared to those who ate an average of ten pieces of candy after watching the control video, which showed a single coin being inserted into a laundry machine 30 times.

The NTU researchers suggest that repeatedly watching the videos makes the participants imagine themselves ingesting and tasting the candy, leading them to think or believe that they had already consumed the candy, reducing their desire for it.

The researchers explained that the reduced desire for candy was caused by an effect called habituation, which is a decrease in one's physiological and behavioural response resulting from repeated stimulation. Individuals who are habituated therefore become less motivated to respond to food cues, showing less desire to obtain or consume the food item.

To measure the effect of repeated exposure to immersive videos on a person's desire to consume candy, the researchers offered M&Ms candy to participants who had watched an immersive video of people consuming M&Ms that was repeated 30 times, totalling eight minutes of viewing.

The study involved 317 Singapore residents, of 21 to 28 years of age, with the demographics of the participants reflecting the make-up of Singapore's multi-racial society.

**Assistant Professor Benjamin Li Junting, from NTU's Wee Kim Wee School of Communication (WKWSCI)**, who led the study, said: "Our findings suggest that viewing food-related immersive videos may be a way to induce satiation and reduce the amount of food consumed after watching. This could be helpful for individuals looking to curb their appetites or manage compulsive eating behaviours. For example, clinicians might tap into habituation as a psychological mechanism in therapy interventions for patients. This can possibly appear in the form of repeated viewings of other people eating food, leading to reduced desire to eat or induce feelings of satiation or fullness."

The researchers said the study was inspired by *mukbang* videos, which originated in South Korea and are known for showcasing excessive food consumption. They added that their findings could contribute to a deeper understanding of how immersive videos impact binge eating habits and inform strategies for designing interventions or guidelines to promote healthier eating behaviours in media consumption contexts.

The immersive nature of these videos, combined with their visual and auditory stimuli, sparked interest in understanding how watching such content could potentially impact binge-eating habits.

The researchers were curious to investigate whether immersive videos, such as *mukbang*, could evoke strong cravings or trigger unhealthy eating behaviours in viewers. However, the results suggest that the opposite behavioural effect is taking place.

**Co-author of the study, Ms Lee Hui Min, a master's student from NTU's WKWSCI**, said: "We were intrigued by the *mukbang* phenomenon where people seem to enjoy watching others eat large amounts of food, with some reporting feeling full afterwards. We were motivated to find out if there was a way that we can explore this through a series of studies and determine if watching food consumption videos can have effects on their actual eating behaviour."

**Asst Prof Li** added: "Mukbang videos might be satisfying cravings and potentially causing people to consume less food. It appears that seeing so much food being

consumed has the possibility of inducing habituation among viewers leading to some kind of satiation.”

The findings were recently published in the journal *Scientific Reports*.

### **Want to crave it less? Smell it more**

Adding on to their study, the researchers wanted to test if another stimulus – smell – while watching immersive videos of candy eating, could impact participants’ desire for candy, as scent plays a significant role in our perception of food and our eating behaviours.

Studying the impact of smell in immersive videos allows researchers to understand how the combination of visual, auditory, and olfactory stimuli can influence individuals’ eating behaviours and cravings. It helps to explore whether the inclusion of smell in immersive videos intensifies the desire to eat or affects food-related responses, such as appetite regulation or satiety cues.

To test the effect of scent on consumption combined with visual stimuli, the researchers repeated the experiment and diffused the scent of chocolate while participants watched the same immersive videos 30 times, as in the previous tests.

They found that smelling chocolate while watching the videos resulted in the participants consuming fewer M&Ms (11 per cent less candy), or one less piece of candy, than if they watched the same repeated videos without the scent.

The researchers found that by adding an olfactory cue, the chocolate scent, to the previous experiment, participants cumulatively ate an average of four pieces less of candy.

**Asst Prof Li** added: “Smelling chocolate had a similar, habituating, effect as watching people consuming chocolate and decreased the participants’ desire for the candy. Our study found that exposure to food scent cues alongside visual food cues can lead to a sensory stimulation of tasting the food. Some researchers have termed this embodied cognition. This makes sense as the experience of food consumption typically involves more than one sense, and the addition of a food scent appears to enhance the effect of one feeling satiated, or full.”

The NTU team will be conducting further research to explore the long-term effects of visual immersive exposure to a certain food product on a person’s craving for it.

**Ms Lee** added: “As we only tested a chocolate scent in our study, we are keen to explore if the results might be different for other types of smells, for example, savoury

scents like garlic, or scents of greasy foods like French fries. There is also the question of whether the length of scent exposure will have a stronger influence, and whether the results of habituation through watching 360-degree videos persist over time.”

They expect that watching videos repeatedly over a period, such as a week, would help reinforce the participants’ decreased appetite for chocolate.

**Asst Prof Li** added: “In future studies, we hope to test the long-term effects of repeatedly watching such immersive videos. We hypothesise that it would have a long-lasting effect on eating behaviours, as the visual and olfactory stimuli could be learned by participants, such as in the well-known physiology experiment Pavlov’s Bell, conducted by Russian physiologist Ivan Pavlov, where subjects learned a behaviour or bodily reaction after being repeatedly conditioned to stimuli, such as an audible or visual cue.”

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**Notes to Editor:**

The research paper titled “[Exploring the effects of habituation and scent in first-person 360-degree videos on consumption behavior](#)” was published in *Scientific Reports* in May 2023. DOI 10.1038/s41598-023-35669-5

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***About Nanyang Technological University, Singapore***

A research-intensive public university, Nanyang Technological University, Singapore (NTU Singapore) has 33,000 undergraduate and postgraduate students in the Engineering, Business, Science, Medicine, Humanities, Arts, & Social Sciences, and Graduate colleges.

NTU is also home to world-renowned autonomous institutes – the National Institute of Education, S Rajaratnam School of International Studies, Earth Observatory of Singapore, and Singapore Centre for Environmental Life Sciences Engineering – and various leading research centres such as the Nanyang Environment & Water Research Institute (NEWRI) and Energy Research Institute @ NTU (ERI@N).

Under the NTU Smart Campus vision, the University harnesses the power of digital technology and tech-enabled solutions to support better learning and living experiences, the discovery of new knowledge, and the sustainability of resources.

Ranked amongst the world's top universities, the University's main campus is also frequently listed among the world's most beautiful. Known for its sustainability, NTU has achieved 100% Green Mark Platinum certification for all its eligible building projects. Apart from its main campus, NTU also has a medical campus in Novena, Singapore's healthcare district.

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