

Improving children's attention with focus training and meditation

The widespread use of increasingly sophisticated electronic devices and the vast amount of information accessible through these devices has been linked to a decline in people's ability to pay attention to a single task or stimulus for prolonged periods of time. This might be particularly true for children who grew up in the digital era, as a growing number of these children struggle to concentrate in the classroom. With this in mind, Kang-Ming Chang, Yi-Jung Lai and colleagues at Asia University, Taiwan, have recently investigated the potential of focus training strategies and meditation for improving the attention of elementary school students.

Today, people have access to an unprecedented amount of information through their smartphones, tablets, portable computers, and other electronic devices. While digital technologies allow people to instantly learn about different topics and communicate with others around the world, their widespread use has considerably reduced the appeal of experiential and in-person learning.

Over the past decade or so, many educators have observed a decline in the performance and concentration of children in both elementary and secondary school. This decline has often been linked to a reduction in attention, which could in turn be associated with the widespread use of digital technology. Many researchers have thus been conducting studies aimed at better understanding the notion of attention and its impact on children's

academic performance, while also trying to identify strategies that could improve attention over time.

Drs Kang-Ming Chang and Yi-Jung Lai, in collaboration with colleagues at Asia University and at other institutes in Taiwan, have been trying to identify practices that could improve the attention of elementary school students. In one of their most recent studies, they specifically examined the effects of focus training and meditation on children's ability to concentrate for long periods of time.

UNDERSTANDING AND MEASURING ATTENTION

The Clinical Model of Attention, introduced by Sohlberg and Mateer back in 1987, divides attention into five distinct dimensions: focused attention, sustained attention, selective attention, alternating attention, and divided attention. The term focused attention refers to a person's ability to promptly respond to specific sensory stimuli in their surroundings.

Sustained attention is what allows people to consistently respond to stimuli during a prolonged or repetitive activity. The term selective attention, on the other hand, refers to a person's ability to direct his/her behaviour or cognitive efforts towards a specific task or stimulus, even in the presence of distractions, whether external (e.g., sounds, movements, environmental changes) or internal (e.g., worries, thoughts, etc.). Alternating attention is the ability to change the focus of one's attention, rapidly shifting between tasks



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that require different cognitive abilities. Finally, divided attention is what allows people to simultaneously focus on multiple tasks.

Over the years, researchers have devised different instruments and questionnaires that can be used to assess these different types of attention. In their past research, Chang, Lai and colleagues measured the attention of participants using a variety of tools, ranging from attention scale questionnaires to wearable devices and eye-tracking tools.

FOCUS TRAINING TO IMPROVE THE ATTENTION OF ELEMENTARY SCHOOL CHILDREN

In their recent study, Chang and Lai evaluated the effectiveness of a strategy for increasing people's attention that they refer to as fixation focus training, by specifically using it to improve the attention of elementary school students. To do this, they asked groups of 11- and 12-year-old children to focus their attention on a specific point on the wall in front of them for approximately 20 minutes, as they followed specific instructions.

Essentially, the children were asked to perform certain physical movements while paying particular attention to different parts of their body and simultaneously concentrating on the same point on the wall. For instance, they were asked to throw both of their hands backwards while standing on their toes and slightly tilting their head backwards, all this as they focused their attention on their heart space. The researchers asked the children to perform a series of these movements,

while focusing their attention on different areas of the body.

Once this dynamic part of the training was complete, the children sat down in a cross-legged position for 10-15 minutes, with their hands gently placed on the knees, their back straight and their eyes gently closed and took part in what is known as 'static focus training'. In other words, they were asked to focus their attention on specific parts of their body (e.g., the heart, stomach, throat, etc.) while sitting still. Towards the end of this meditative practice, the researchers offered children the choice to focus on any body parts of their choice. Finally, all participants took part in a discussion session where they shared their experiences with one another.

The children attended one session per week for 12 weeks. The researchers

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assessed their attention before and after the training, using the Attention Scales for Elementary School Children, a questionnaire-based approach to measure the five dimensions of attention outlined by Sohlberg and Mateer. They also compared the attention of students who had attended the focus training sessions with that of students who did not take part in the sessions.

THE BENEFITS OF FIXATION FOCUS TRAINING FOR CHILDREN'S ATTENTION AND WELLBEING

Interestingly, Chang and Lai found that the attention of children who attended fixation focus training on a regular basis appeared

to improve over time, particularly their focused and selective attention. While the scores of children in the experimental and control groups on the attention scale were similar before the training, the attention scores of children in the experimental group improved significantly after the focus training.

More specifically, the researchers found that the total attention mean DIFF value (defined as the post-test results minus the pretest results) of children in the experimental group was 27.20, which is significantly ($p < 0.05$) higher than the 18.92 mean DIFF value observed in the control group. The mean DIFF value for focused attention was also significantly ($p < 0.05$) higher in the experimental group than in the control group (18.07 and 5.24, respectively), and so was the selective attention mean DIFF value ($p < 0.01$ with values of 20.38 and 8.32, respectively).

In other words, after the training children were more able to promptly respond to specific stimuli in their surroundings and they were better at focusing their attention on a specific stimulus even in the presence of external distractions (e.g., noises) or internal (i.e., thoughts, worries, etc.).

Moreover, 54.1% of the children reported improvements in their concentration during school lessons, 29.1% an enhanced ability to fall asleep at night, 8.4% said they felt more relaxed, 4.2% said their stress had reduced and 4.2% said their chest pain was alleviated. The

focus training protocol used by Chang and Lai partly resembles mindfulness meditation techniques, which were found to have numerous beneficial effects and are employed in numerous therapeutic settings.

The results gathered by Chang and Lai highlights the potential of the focus training they developed. However, as they evaluated the attention of students using a questionnaire primarily used in Taiwan, they hope to ultimately repeat their study utilising different instruments and questionnaires to assess changes in attention, as this would help them to confirm their findings and improve their validity.



Their findings show positive effects from Chan meditation on concentration, heart rate variability, sleep quality, relaxation, and general wellbeing.

ADDITIONAL RESEARCH INVESTIGATING THE EFFECTS OF MEDITATION ON ADULTS

In addition to exploring the effects of focus training and meditation on children's attention, Drs Chang and Lai carried out other studies assessing the effects of meditation practice on adults.

For instance, they organised two face-to-face and video-based Heart Chan meditation courses for both experienced and inexperienced adult meditators, led by a Chan master. Chan is a Chinese school of Mahāyāna Buddhism and the Heart practice specifically asks meditators to focus their attention on Chakra points in the body. Interestingly, they found that both the heart rate and biological heart rate variability age of participants decreased significantly after they completed the meditation courses, regardless of whether they attended sessions in person or via video and even if they had no prior experience with meditation.

In another study, Chang and Lai used eye tracking technology to assess the ability of 306 adult participants to focus their gaze on a specific point in space

(at the centre of three concentric circles) for one minute. Interestingly, they found that those who could focus their gaze better had lower systolic blood pressure and reported sleeping better at night. As gaze concentration is a crucial aspect of Heart Chan meditation, these findings hint at additional health benefits of fixation focus training.

The researchers also conducted a study aimed at evaluating the physical stillness of adults as they practiced Chan Ding meditation, which asks people to focus on the ten energy points or

centres outlined by the Chen school of Buddhism, known as 'mailuns'. Physical stillness was evaluated using accelerometers that participants wore on their arms and chest. Interestingly, the researchers observed that more

experienced meditators were able to remain still for longer periods of time.

THE POTENTIAL OF FOCUS TRAINING AND MEDITATION PRACTICES TO IMPROVE ATTENTION IN THE DIGITAL ERA

Overall, the results gathered by Chang, Lai and their colleagues over the past few years highlight the possible effects of consistent Chan meditation on concentration, heart rate variability, sleep quality, relaxation, and general wellbeing.

Their most recent study specifically explored the impact of weekly meditation on the concentration of elementary school children. Their findings suggest that a combination of meditation and dynamic attention training could greatly benefit children, as it could help them to train their brain to focus their attention on tasks, lessons and other stimuli for longer periods of time.

In the future, these results could pave the way for further studies aimed at investigating the effects of meditation practices on children's concentration and academic performance. In addition,

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the work of Chang and Lai could inspire more schools and educators worldwide to introduce daily or weekly focus training and meditation sessions, as a means to improve the attention of students and enhance their learning over time.

A combination of meditation and dynamic attention training can help children to focus their attention on tasks, lessons and other stimuli for longer periods of time.



Behind the Research



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Research Objectives

Dr Kang-Ming Chang's research is devoted to biomedical signal processing and AI. His recent interests include attention, meditation and AI in medicine.

Dr Yi-Jung Lai's research is concerned with children's health and learning through focus and meditation training.

Detail

Bio

Dr Kang-Ming Chang is Associate Professor at the Department of Computer Science and Information Engineering, Asia University. <https://scholar.google.com/citations?user=oo-0iugAAA&hl=en>

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Collaborators

Special thanks to the help of Shakyamuni Buddhist Foundation, Chiayi section, Taiwan. Also valuable suggestions from Wu Chueh Miao-Tien, the 85th Patriarch of the Order of Chan since Shakyamuni Buddha.

References

- Chang, K., Chueh, M., Lai, Y. (2020). Meditation Practice Improves Short-Term Changes in Heart Rate Variability. *International Journal of Environmental Research and Public Health*, 17, 2128. doi:10.3390/ijerph17062128
- Lai, Y., Chang, K. (2020). Improvement of Attention in Elementary School Students through Fixation Focus Training Activity. *International Journal of Environmental Research and Public Health*, 17, 4780. doi:10.3390/ijerph17134780
- Chang, K., Chueh, M. (2019). Using Eye Tracking to Assess Gaze Concentration in Meditation. *Sensors*, 19, 1612. doi:10.3390/s19071612
- Chang, K., Chun, Y., Chen, S., Lu, L., Su, H., Liang, H., Santhosh, J., Ching, C., Liu, S. (2016). The Evaluation of Physical Stillness with Wearable Chest and Arm Accelerometer during Chan Ding Practice. *Sensors*, 16, 1126. doi:10.3390/s16071126

Personal Response

Based on the findings gathered so far, what training strategies and meditation practices can help to improve children's attention the most, and how does this improved attention affect their learning and behaviour?

Original attention training is based on Shakyamuni Buddhist Foundation in Taiwan: <https://www.buddhachan.org/>

People in United States can visit Heart Chan, a spiritual organisation based in the United States that shares the teachings and practices of Chan meditation: <https://www.facebook.com/heartchannational/>

If anyone is interested about the practical teaching of focus attention training for elementary school children, please contact Dr Yi-Jung Lai, yrlai@wfu.edu.tw

