

# Predictive, Preventive and personalized Medicine & Molecular Diagnostics

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## Effects of school-based mindfulness training on learning skills of secondary school students

**Background/Objectives:** Converging lines of evidence indicate that stress influences learning and memory processes. Hormones and neurotransmitters released during and after stressful events may hamper memory, executive functions and memory retrieval and it depends on the specific memory process or stage that is affected by stress and the activity profile of major physiological stress response systems. Unfortunately stressful events are very common in school daily life. School children often encounter stressful events inside, for example: exams, evaluations and deadlines, and outside of their school environment and nearly 70% of primary school children report symptoms of stress such as worries, anxiety or sadness. Situations like these could have a critical impact on students performance and on their cognitive ability. Indeed further evidences show that stress may induce a shift from a flexible, 'cognitive' form of learning towards rather rigid, 'habit' like behaviour. All these stress-induced changes may explain some of the difficulties of learning and remembering under stress in the classroom. Taking these insights from research into account could bear the introduction of supporting strategies to facilitate processes of education for students and teachers as well. Brief mindfulness meditation and lovingkindness meditation are two aspects of mindfulness practice that have the potential to decrease students' feelings of anxiety and stress, and increase their sense of wellbeing and capacity for compassion for self and for others. School appears to be an appropriate setting for such interventions, since children spend a lot of time there and interventions can be brought directly to groups of children in areas of need as part of a preventive approach at little cost. Mindfulness means maintaining a moment-by-moment awareness of our thoughts, feelings, bodily sensations, and surrounding environment. Mindfulness practice may teach students "from the inside out" to cultivate self-management of attention and increase self-awareness by focusing on intrapsychic experiences, such as thoughts, emotional states, the breath, and other bodily sensations.

**Methods/Statistical Analysis:** The definition of Mindfulness frequently used in literature is awareness that arises through paying attention, on purpose, in the present moment, non-judgementally. The benefits of mindfulness could be attributed to two distinct and strongly interrelated components: 1) Regulating of attention focused on own immediate experience; 2) Approaching own experiences with an orientation of curiosity, openness, and acceptance, regardless of their valence and desirability. Mindfulness has already been tested and applied in students. There are a variety of mindfulness-based interventions that are effective with children and youth. Our approaches include body scan, meditation, breathing exercises, all of which may increase an individual's capacity for attention and awareness. The goal of using these interventions is to improve the children's resiliency, their capacity for sustained attention as well as increase their awareness. This study will measure changes using self-reported scores on questionnaires, computer-based attention tests, and neurological tests, and will compare the results to "control groups" who complete the tests at the same times but do not taken part in the mindfulness courses. At least 120 students, from "G. Carducci" secondary school of Bari, free from active crises or severe mental illness will be randomised to joining an 8-week Mindfulness course. A Data Monitoring and Ethics Committee from "Aldo Moro" University of Bari will be set up. An advisory reference group will comprise parents representatives, members of the School Counselling Service and other student welfare staff. Psychological distress will be measured using the Clinical Outcomes in Routine Evaluation Outcome Measure at baseline, postintervention, examination term and 1-year follow-up. Outcome assessment

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and intention-to-treat primary analysis using linear mixed models adjusted for baseline scores will be blind to intervention allocation. We will also conduct per-protocol, subgroup and secondary outcome analyses. We will systematically monitor for, and react to, possible adverse events. The 8-week mindfulness course is called 'Mindfulness Skills for Students' and consists of a secular, group-based skills training programme based on the course book 'Mindfulness: A Practical Guide to Finding Peace in a Frantic World', and adapted for secondary school students. This intervention aims to optimise experiences across a range of students and is not specifically developed for those students in the clinical range. The sessions will last for 90 min for the first session, and 75 min for the remaining sessions. There will be eight weekly sessions, all run by Dr. Luigi Maselli, an experienced and certified mindfulness teacher. Each session will include two mindfulness meditations, the first embedding the meditation that the students have practised at home throughout the week; the second, introducing them to the new meditation that they will practice at home in the coming week. There will also be periods of reflection and inquiry, helping the students to understand the nature of mindfulness, to deepen their learning and embed it into their everyday lives. A few simple models will be used and developed throughout the course, to give the students some theoretical understanding of the concepts developed experientially. As is usual and appropriate in mindfulness programmes, each session will include interactive exercises as well, so that the students can share their experience and can get to know each other throughout the course, building a sense of safety and community.

**Eligibility criteria:** Participant eligibility criteria for this study are unchanged from those used routinely for mindfulness school-based courses. They are all self-reported. The inclusion criteria are as follows:

From 5<sup>th</sup> to 7<sup>th</sup> grade "Giosuè Carducci" students;

Who consider they can realistically attend at least seven sessions of the course.

The exclusion criteria are as follows:

1. Currently suffering from severe periods of anxiety or depression;
  2. Experiencing severe mental illness such as hypomania or psychotic episodes;
  3. Following recent bereavement or major loss;
  4. Experiencing any other serious mental or physical health issue that would impact on their ability to engage with the course.
- Students will be advised to contact the study team if they are unsure about their eligibility.

**Ethics and dissemination:** Approval has been requested to Research Ethics Committee of "Aldo Moro" University of Bari. Results will be published in peer-reviewed journals. A lay summary will be disseminated to a wider audience including other universities.

## Biography

Luigi Maselli received the Distinguished Doctor Award at San Raffaele University of Rome in honor of his significant contribution to Lifestyle Medicine in Italy. He is a neuroimmunologist with a PhD in Neurosciences and works as a Research Fellow at Sapienza University of Rome – School of Medicine and Dentistry and as a Visiting Fellow at Gabriele d'Annunzio University of Chieti-Pescara – School of Health Sciences. He is the founding President of the Italian Lifestyle Medicine Association (ILMA). He is active in patient care, research, speaking, teaching and writing, and wrote the first Italian book on Lifestyle Medicine. After establishing his connection with the Institute of Lifestyle Medicine at Harvard Medical School, where he fell in love with Lifestyle Medicine, he established Lifestyle Medicine programs in several Italian universities. His overwhelming enthusiasm for life and propensity for helping others reflect the values that make Lifestyle Medicine unique- for the treatment and prevention of lifestyle-related chronic diseases.

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