Investigating teachers’ psychological and physiological stress

Teaching is a demanding profession. Teachers are constantly managing complex social situations within the classroom as they lead their courses and provide learning opportunities for their students. Work-related stress among teachers has significantly increased during the last decade resulting in one of the highest rates of burnout. This includes how aggressive student behaviour and challenging classroom settings can activate physiological stress in teachers. Teachers’ emotional exhaustion has a detrimental effect on the quality of teaching as well as reducing their students’ achievement and motivation. Staff turnover is high, particularly among new teachers, with 40% - 50% leaving the profession within the first five years of their teaching career. These factors highlight the necessity to understand and prevent teacher stress.

STRESS FACTORS
Healthy teachers are crucial to successful teaching. Prof Dr Wettstein describes how teachers have to be healthy if they are to continuously produce inspiring lessons and create a positive and respectful classroom climate. When compared to other professionals, however, teachers suffer more from exhaustion, fatigue, headaches and tension. Mental and psychosomatic diseases are also overrepresented in teachers. Teachers’ emotional exhaustion has a detrimental effect on the quality of teaching. This includes how aggressive student behaviour and challenging classroom settings can activate psychophysiological stress reactions in teachers.

EXPLORATIVE STUDY
Teachers were recruited from primary schools in the canton of Bern, Switzerland. The researchers selected eight healthy primary school teachers, six female and two male with a mean age of 43, to take part in the preliminary study. Ambulatory assessment was employed, allowing data collection while the participants underwent normal day-to-day activities. To assess the teachers’ physiological stress responses, continuous biopsychological data was collected from when the teachers woke up until 8:00 pm over the course of two workdays and a free day. The teachers also kept diaries to assess their activities on each measurement day. Classrooms were equipped with GoPro cameras and a dictaphone to enable external observation of lessons, enabling the researchers to categorise the classroom settings and levels of student aggression.

ELECTROPHYSIOLOGICAL MEASURES
The teachers’ heart rates and heart rate variabilities were measured using ambulatory ECGs. Cardiac activity is largely controlled by the autonomic nervous system and an increase in heart rate usually signifies an increase in psychophysical stress. Heart rate variability demonstrates how the heart activity is adapting to demands. High heart rate variability signifies increased parasympathetic nervous system activity which is healthy, whereas low heart rate variability indicates low vagus nerve activity which is linked to mental and physical health problems.

BIOCHEMICAL MEASURES
Eight saliva samples were collected from each teacher throughout each day to determine the levels of cortisol and alpha-amyrase. Assessments of perceived stress and anger ratings were also recorded at these times. Cortisol is a stress hormone released by the adrenal glands that helps the body deal with stressful situations. Salivary alpha-amyrase is a marker of autonomic nervous system activity during stress.

FINDINGS
Analysis of cortisol and alpha-amyrase demonstrated the typical daily cycle of decreasing cortisol and increasing alpha-amyrase levels. The results disclosed significantly higher morning cortisol and perceived stress and anger levels for the teachers on workdays compared with their free day. The teachers’ cortisol awakening response, i.e. the change in cortisol levels occurring in the first hour after waking, was also notably higher on workdays which could be explained by the anticipation hypothesis and due to a reflection of their cognitive engagement in preparation for coping with the demands of the day ahead.
The central, overarching goal of the research is to create pedagogical settings that are characterised by mutual trust, respect, and recognition.

The teachers’ overall heart rate variability was significantly lower on weekdays than the free day. This is in agreement with previous studies and indicates a relationship between work stress and reduced heart rate variability. There were no significant differences in either salivary alpha-amylase levels or heart rates between work days and free days. Considering the significant difference in heart rate variability but not in heart rate suggests that only moderate levels of stress were experienced by these teachers during the course of this study.

The time-based analysis revealed that aggressive student acts triggered both an increase in teachers’ heart rates and in heart rate variability but not in heart rate variability during the morning. It then decreased, showing good recovery through the afternoon and evening. In contrast, there was no significant difference in levels of perceived stress and anger throughout the free day.

The physiological stress parameters observed in this study revealed that teachers experience significantly higher stress levels on weekdays in comparison with free days. This was in line with their perceived stress and anger levels.

Prof Dr Wettstein suggests that the ambulatory assessment strategy employed in this research can be used to examine teachers’ coping patterns in stress situations in class. Adverse coping patterns that escalate negative teacher-pupil interactions can be identified and this knowledge can be applied to prevention of such dynamics on a class or school level. It can also identify the strains on an individual teacher’s work situation and inform changes in their lesson design.

This research into teachers’ psychological and physiological reactions to stress in class has the potential to alert teachers to negative stress experiences and offer valuable information for health-promoting school development. Moreover, these physiological measures can be employed in stress-reducing interventions and teacher counselling.