



## CASE STUDY

The Effects of Neuroguided Performance Training on Teacher  
Well-Being Utilizing the Vital Neuro Method

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# SUMMARY

Teaching wields immense influence, shaping the future through the education of the next generation, yet this profession is accompanied by formidable challenges that can make the profession feel overwhelming for many educators. Well-being is crucial for teachers to sustain their physical and mental health and continue to provide high-quality educational experiences for their students. **Vital Neuro utilizes innovative neurofeedback technology to offer a time-efficient solution to effectively address the high rates of burnout currently being seen in education. This case study involved 27 educators who integrated the Vital Neuro method into their daily lives over a 6-week period.** Although these findings are preliminary, the teachers experienced significant reductions in anxiety, depression, stress, and burnout, along with meaningful improvements in general well-being and sleep quality.



## THE POPULATION OF INTEREST

Teachers wield a profound impact on the lives and futures of their students. However, to meet the demands of the profession, teachers are responsible for delivering quality education while managing behavior, meeting administrative expectations, and navigating budget constraints. Approximately 46% of teachers report “high daily stress”, which is more pronounced in urban school districts<sup>1</sup>. Teachers’ stress and burnout levels are associated with mental health problems and intent to leave the profession with as much as 50% of teachers leaving the profession in the first five years<sup>1,2</sup>.

When schools are underfunded, teachers are forced to supply their own classrooms and often take on larger class sizes, increasing their workload and subsequent stress levels. In addition, test-based accountability practices, such as reaching thresholds for standardized testing scores, can lead to teacher stress and burnout linked to student outcomes, absenteeism, and student behavioral management<sup>3</sup>. Research suggests that the state-level educational policies and requirements are associated with inadequate sleep among teachers, another important factor in well-being<sup>4</sup>. Poor sleep quality is not only common for teachers, but it has negative classroom impacts—when sleep is poor, teachers are more nervous and irritable in the class, reducing student motivation<sup>5</sup>. Previous research has found that teacher burnout was related to self-efficacy, perceived fairness at work, and the school environment<sup>6</sup>. One study found only 38.7% of teachers reported high levels of mental health which was correlated to levels of depression, burnout, job satisfaction, and self-efficacy<sup>7,8</sup>. This relationship can undermine the teacher’s performance in the classroom and potentially result in negative student outcomes.

The COVID-19 pandemic amplified feelings of burnout for teachers—increasing stress, anxiety, and depression<sup>9,10</sup>. The rapid deployment of remote teaching during the COVID-19 pandemic highlighted stark technological inequities and unpredictable challenges in delivering high-quality educational experiences, parent communication, and administrative support. During this time, teachers saw high levels of COVID-related anxiety citing anxiety for the safety of themselves and their families and the students’ home situations<sup>11</sup>. Both teachers and students suffer when burnout levels are high—the mental health toll on teachers associated with burnout is linked to worse

academic achievement and lower student motivation<sup>12</sup>, indicating a necessity for interventions to improve mental and physical well-being of teachers.

Teachers face daily challenges that require a high emotional involvement in their work<sup>13</sup>. For this reason, teachers with higher emotional intelligence and resilience tend to have lower levels of anxiety and depression<sup>13</sup>. Interventions that included mindfulness and meditation were beneficial for teachers in improving their ability to cope with stress, manage conflict, awareness, relaxation, resilience, and classroom organization<sup>14,15</sup>. Personalized mindfulness, behavioral, and cognitive-behavioral interventions are the most effective in improving feelings of burnout<sup>3</sup>. Vital Neuro’s Neuroguided Performance Training provides an effective and time efficient solution to reduce burnout and improve well-being in teachers, enhancing student outcomes in the process.

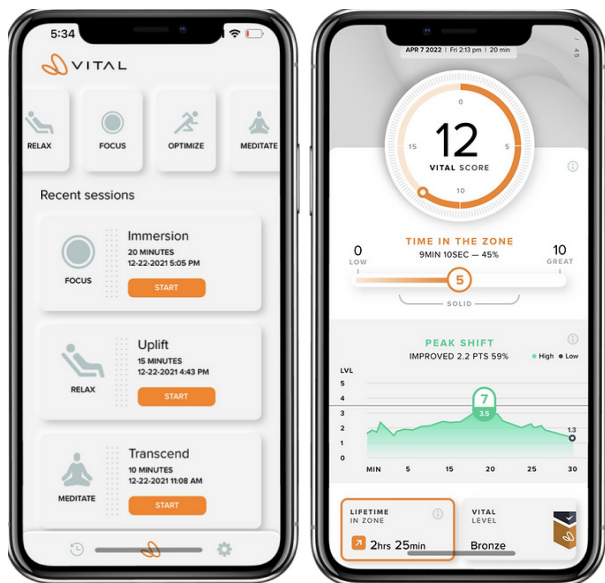
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## VITAL NEURO TECHNOLOGY

Developed by best-in-class technology and based on decades of neuroscience research, Vital Neuro hardware and software together provide scalable solutions that can rewire the brain for optimal performance. The brain fluidly adapts based on subtle environmental cues. The ability of neural networks of the brain to change through growth and reorganization is called neuroplasticity—and it can be harnessed by the individual through neurofeedback, deep meditation, focus, and music.

Whether the goal is to manage stress and anxiety or increase focus and productivity, Vital Neuro’s Neuroguided Performance Training leverages real-time electroencephalography (EEG) neurofeedback and personalized music therapy, to seamlessly shift the brain state. The technology monitors the electrical activity of the brain and provides auditory & visual cues to improve self-regulation<sup>16</sup>. Research suggests that by controlling brain waves through neurofeedback, participants can improve attention, working memory, and executive function<sup>17</sup>—improving productivity and potentially staving off age-related cognitive decline. In other words, neurofeedback is a way to train your brain for optimal performance. In a clinical or laboratory setting EEG and other neural measures can be costly and invasive, but the Vital Neuro method brings this technology into the

real-world using comfortable bluetooth headphones. Aimed to improve mental, emotional, and physical well-being, Vital Neuro helps people live their best life.



<b>After Shift</b>	10-20 min Relax If overly stressed or sleep deprived.
<b>Before Bed</b>	10-20 min Meditate

Keeping the recommendations in mind, participants ultimately self-selected the timing, type, and length of Vital sessions based on their schedule and preferences. No other instructions were provided to change lifestyle habits including physical activity, sleep, or nutrition and there was no attempt to control for those factors in the study design.

A total of 27 participants participated in the 6-week intervention and completed all pre-testing, mid-point, and post-testing. The participants engaged in 9,080 minutes of Vital Neuro sessions over the 6-week period with an average session length of 12 minutes at a time. The most popular session category that the participants chose was “Relax”, followed by “Meditate.” The pie chart below shows the breakdown by session category participation.

## THE STUDY PROTOCOL

The sample included elementary, middle, high school, special education, and English as a second language teachers as well as school administrators (Mean age = 46 years ± 10 years, 18 female and 9 male). Close to half of the participants held their position for more than 15 years (14 participants), 4 held their position for 10-15 years, 4 held their position for 6-10 years, and 5 were early career educators with 0-1 year (2 participants) and 2-5 years (3 participants). Participants completed survey questionnaires prior to starting Vital Neuro sessions, at the 3-week mark, and following the 6-week intervention. Participants were provided the following protocol recommendation:

<b>Upon Waking</b>	10-20 min Relax
<b>Before Shift</b>	10-20 min Focus
<b>On Breaks</b>	10-20 min Relax



### Session type chosen by Teachers

- Focus - 13%
- Meditate - 25%
- Optimize - 20%
- Relax - 42%

## THE OUTCOME MEASURES

**Anxiety:** Anxiety is a normal human emotion, but in excess, it can become pervasive and even take on pathological significance as a disorder. At this stage, anxiety can interrupt activities of daily living, compromising personal and professional life. Research suggests the prevalence of anxiety in teachers is as high as 49.4%, making it a priority to measure intervention effectiveness<sup>10</sup>. The Generalized Anxiety Disorder scale-7 (GAD-7)\* is a seven-item diagnostic tool validated in the general population<sup>18,19</sup>.

*The following cut-offs correlate with level of anxiety severity on the GAD-7:*  
Score 0-4: Minimal Anxiety



Score 5-9: Mild Anxiety  
Score 10-14: Moderate Anxiety  
Score greater than 15: Severe Anxiety

**Depression:** Characterized by a depressed mood or loss of interest in activities for long periods of time, depression is a common mental disorder that can impact all aspects of daily life. Not only is quality of life affected, but physical health may be affected. Factors associated with depression, like physical inactivity or alcohol dependence, may result in an increased risk of cardiovascular disease, diabetes, cancer, and other chronic conditions. Understanding the current mental health challenges and the efficacy of interventions to reduce depression is crucial because approximately 28.9% of teachers currently report feelings of depression<sup>10</sup>. The Patient Health Questionnaire-8\* is a scale that is valid and reliable within the general population<sup>20</sup>.

*The following PHQ-8 Score is associated with Depression Severity:*

Score 0-4: None-minimal  
Score 5-9: Mild  
Score 10-14: Moderate  
Score 15-19: Moderately Severe  
Score 20-27: Severe

**Stress:** Your body and mind adapt to daily stressors, but chronic stress can negatively impact physical and mental health. Perceived stress is a common and effective measure to assess effectiveness of an intervention. In fact, one in two teachers report high levels of stress<sup>10</sup>. To measure their perception of stress, the Perceived Stress Scale (PSS-10)\* was used to understand how unpredictable, uncontrollable, and overloaded participants found their lives and how Vital Neuro impacted these perceptions<sup>21</sup>.

*Scores on the PSS are totaled with the following criteria:*

0-13: low stress  
14-26: moderate stress  
27-40: high perceived stress

**General Well-Being:** Well-being is a state of thriving influenced by an individual's wellness and the communities to which they belong. Well-being is an all-encompassing term including emotional, environmental, financial, intellectual, occupational, physical, social, and spiritual wellness. The World Health Organization

Well-Being Index (WHO-5)\* is a simple and widely used questionnaire measuring subjective psychological well-being, providing insights into the quality of life of educators and how Vital Neuro plays a role in improving well-being<sup>22,23</sup>.

*Scoring: The 5 questions on the WHO-5 result in a total raw score ranging from 0 to 25. The raw total is multiplied by 4 to give the final score, with 0 representing the worst imaginable well-being and 100 representing the best imaginable well-being.*

**Sleep:** Adequate rest profoundly impacts your cognition, exercise performance, and emotional well-being<sup>24-26</sup>. Sleep loss is also associated with impaired hormone regulation, glucose homeostasis, and higher rates of obesity—increasing the risk of developing cardiovascular disease<sup>27-29</sup>. Any changes brought on by using Vital Neuro to aid in sleep was assessed using the Sleep Condition Indicator (SCI-8)\* scale<sup>30</sup>.

*All responses are totaled on the SCI-8 and higher scores indicate better sleep, lower scores indicate poorer sleep and/or insomnia.*

**Self-Efficacy:** Self-efficacy is the belief that one can perform novel or difficult tasks, or cope with adversity. When someone perceives they have high self-efficacy, they are more successful in goal setting, persistence in face of barriers, and recovery from setbacks<sup>31</sup>. The Generalized Self Efficacy (GSE)\* scale assesses a general sense of perceived self-efficacy to predict coping with daily stressors<sup>32</sup>. Improved scores in a teacher population would indicate more resilience to daily life stressors and improved self-confidence.

*The sum of the responses yields a composite score between 10 and 40, higher scores indicate better self-efficacy.*

**Burnout:** Burnout is a complex phenomenon of occupational stress described as energy depletion due to chronic stress, manifesting with feelings of emotional and physical exhaustion and cognitive weariness<sup>33</sup>. Burnout involves individual, organizational, and institutional aspects and can contribute to a sense of personal and professional inefficiency<sup>6</sup>. Similar to traditional stress maladaptation, burnout is associated with increased cardiovascular risk factors and other physical and mental chronic health issues<sup>34</sup>. The Copenhagen Burnout

Inventory (CBI)\* was used to measure burnout and how Vital Neuro may improve this aspect of psychological health<sup>35</sup>.

*Scores on the CBI are ranked as how often one experiences personal, work-related, and client-related burnout:*

100: always

75: often

50: sometimes

25: seldom

0: never

Instruments used in this study were strategically and carefully chosen based on rigorous reliability and validity testing (including testing for internal consistency, test-retest reliability, inter-rater reliability, face validity, content validity, and construct validity). Tens of thousands of participants are surveyed across multiple studies to ensure the questionnaire is consistently measuring what it is purports to measure within a specific population<sup>46</sup>.

## STUDY RESULTS

**Anxiety:** The teachers in this intervention significantly reduced their anxiety levels based on the GAD-7 scale from baseline to follow-up ( $p < .001$ ,  $\eta_p^2 = 0.37$ ). At baseline, they reported an average of 8.73, which reduced to 6.23 at midpoint and further reduced to 5.05 following the intervention. At the start, teachers reported scores that fell into mild anxiety disorder, however, the Neuroguided Performance Training intervention appeared to reduce their anxiety by up to 42%, bordering on the threshold of minimal anxiety.

**Depression:** Teachers reported a score of 8.27 at baseline on the PHQ-8, which rates as a mild level of depression. This number lowered to 5.73 by the midpoint of the intervention, then again to 5.18 after using Vital Neuro for six weeks ( $p < .001$ ,  $\eta_p^2 = 0.28$ ). Neuroguided Performance Training appeared to reduce feelings of depression by 36% in only three weeks and maintained those changes through the entire intervention.

**Stress:** Teachers reported improved perceived stress over the 6-week intervention. The results indicate a 30% reduction in stress level on the PSS-10 from 19.73 to 13.77 to 13.95 across baseline, midpoint, and follow-up ( $p < .001$ ,  $\eta_p^2 = 0.45$ ). Teachers experience high stress levels with heavy workloads, pressure of state educational policy, and funding issues. The Vital Neuro method helped

teachers reduce their stress from “moderate” stress to “low” stress levels.

**General Well-Being:** Participants reported a 28% improvement in well-being with ratings of 10.80 at baseline, 13.70, at midpoint, and 15.00 at follow-up on the WHO-5 ( $p = .001$ ,  $\eta_p^2 = 0.29$ ). When teachers put their students’ needs ahead of their own well-being, utilizing the Vital Neuro method provides much needed improvements in quality of life.

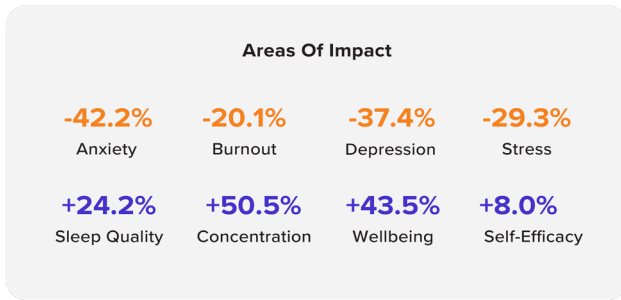
**Sleep:** The Vital Neuro method appeared to help teachers sleep more and sleep better by close to 20%. Starting at 16.55 at baseline then increasing to 18.50 at midpoint and again to 20.55 at follow-up indicated a significant change from baseline to follow-up ( $p = .001$ ,  $\eta_p^2 = 0.28$ ). The higher SCI-8 score indicates improvements in the following: concerns about getting to sleep, remaining asleep, sleep quality, daytime personal functioning, daytime performance, duration of sleep problem, nights per week experiencing a sleep problem, and extent of which they are troubled by poor sleep.

**Self-Efficacy:** General self-efficacy, or the belief that one can accomplish hard things, improved slightly over the intervention. The teachers reported a 30.75 at baseline and increased to 33.25 at midpoint and follow-up ( $p = .002$ ,  $\eta_p^2 = 0.28$ ). The post-hoc tests showed a significant change from baseline to midpoint ( $p < .001$ ). Self-efficacy is an overall sense of self and ability, so while these changes were significant, perhaps larger changes would be observed over a longer intervention.

**Burnout:** Teachers experience high levels of occupational burnout, with many teachers leaving the profession within years of starting. On the CBI, participants reported personal, work-related, and client-related burnout at 62 on the CBI prior to the intervention, rating close to “often” in frequency. At midpoint, this rating reduced to 35, and then further to 34 ( $p < .001$ ,  $\eta_p^2 = 0.54$ ). The Neuroguided Performance Training with Vital Neuro appeared to improve experiences of burnout by 45%, particularly within the first three weeks of the intervention. The pairwise comparisons for rank-sums of the CBI showed similar significant changes.

Note: A repeated-measure analysis of variance (ANOVA) with one within-subjects factor was performed to measure changes for each outcome across three timepoints. There were no confounding variables in the analysis and non-

parametric testing was reported where necessary. A paired t-test and Wilcoxon Signed Rank Test was conducted for pre- and post-intervention data analysis. Outside of General Self-Efficacy, all results discussed in this whitepaper showed statistically significant changes ( $p < .05$ ) with moderate to large effect sizes between



baseline and follow-up.

## FACTORS TO CONSIDER

While the study provided preliminary evidence of efficacy in using novel Neuroguided Performance Training in mental health outcomes and well-being, there were some limitations to this study. The study lacked a control group nor were other lifestyle factors controlled to understand whether the Vital Neuro method was the specific variable that caused the change. This study was also conducted during the group's summer break. A future study will include the same participants during the school year. There are challenges inherent to meditation-like interventions such as individual differences, placebo effects, and limitations in self-report measures. However, this case study lays important groundwork in the exploration of Neuroguided Performance Training for a variety of mental and physical health outcomes.



# CONCLUSIONS & IMPLICATIONS

Teachers face a range of challenges and carry a heavy workload that can jeopardize their mental well-being. The constant demand to balance instructional responsibilities, student behavior management, parent concerns, administrative pressure to innovate learning methods, and meet standardized testing scores, often leads to burnout, leaving them emotionally drained, sleep deprived, and unmotivated. Additionally, inadequate resources and large class sizes hinder their ability to provide individualized attention, exacerbating stress and impacting the quality of education they can deliver. Results of this preliminary case study indicate that a 12-minute daily session of Vital Neuro Neuroguided Performance Training produced statistically and clinically meaningful improvements in psychological outcomes including reduced feelings of anxiety, depression, burnout, and stress and increased self-efficacy, sleep, and well-being.

**Teachers often prioritize students' needs before their own, compromising their personal mental and physical health to cultivate a nurturing and supportive classroom environment. Vital Neuro is an economical and time-efficient solution to improve overall well-being and prevent burnout in one of the most influential professions shaping the future. Neuroguided Performance Training can help teachers show up as their best selves in the classroom—with renewed energy, motivation, and resilience.**

The improvements following the intervention may suggest that the Neuroguided Performance Training can serve as a catalyst for adopting other health-promoting behaviors such as regular physical activity, balanced nutrition, or better sleep hygiene throughout the day. Furthermore, the mindfulness, emotional regulation, and focus gained from using the Vital Neuro Method may enhance the relaxation effect of health-promoting behaviors, such as improved sleep quality. This makes it a practical solution for individuals in the general population seeking to enhance their daily functioning, as well as for specific occupational groups facing excessive stress in their work environments.



## REFERENCES

1. Bottiani JH, Duran CAK, Pas ET, Bradshaw CP. Teacher stress and burnout in urban middle schools: Associations with job demands, resources, and effective classroom practices. *Journal of School Psychology*. 2019/12/01/2019;77:36-51. doi:<https://doi.org/10.1016/j.jsp.2019.10.002>
2. Ryan SV, von der Embse NP, Pendergast LL, Saeki E, Segool N, Schwing S. Leaving the teaching profession: The role of teacher stress and educational accountability policies on turnover intent. *Teaching and Teacher Education*. 2017;66:1-11.
3. von der Embse N, Ryan SV, Gibbs T, Mankin A. Teacher stress interventions: A systematic review. *Psychology in the Schools*. 2019/09/01/2019;56(8):1328-1343. doi:<https://doi.org/10.1002/pits.22279>
4. Farley AN, Chamberlain LM. The Teachers are Not Alright: A Call for Research and Policy on Teacher Stress and Well-Being. *The New Educator*. 2021/07/03/2021;17(3):305-323. doi:[10.1080/1547688X.2021.1939918](https://doi.org/10.1080/1547688X.2021.1939918)
5. Poon CY-S, Hui VK-Y, Yuen GW-C, Kwong VW-Y, Chan CS. A well-slept teacher is a better teacher: A multi-respondent experience-sampling study on sleep, stress, and emotional transmission in the classroom. *PsyCh Journal*. 2019/09/01/2019;8(3):280-292. doi:<https://doi.org/10.1002/pchj.282>
6. Capone V, Joshanloo M, Park MS-A. Burnout, depression, efficacy beliefs, and work-related variables among school teachers. *International Journal of Educational Research*. 2019/01/01/2019;95:97-108. doi:<https://doi.org/10.1016/j.ijer.2019.02.001>
7. Capone V, Petrillo G. Mental health in teachers: Relationships with job satisfaction, efficacy beliefs, burnout and depression. *Current Psychology*. 2020/10/01/2020;39(5):1757-1766. doi:[10.1007/s12144-018-9878-7](https://doi.org/10.1007/s12144-018-9878-7)
8. Skaalvik EM, Skaalvik S. Teacher burnout: relations between dimensions of burnout, perceived school context, job satisfaction and motivation for teaching. A longitudinal study. *Teachers and Teaching*. 2020/11/16/2020;26(7-8):602-616. doi:[10.1080/13540602.2021.1913404](https://doi.org/10.1080/13540602.2021.1913404)
9. Pressley T. Factors Contributing to Teacher Burnout During COVID-19. *Educational Researcher*. 2021/06/01/2021;50(5):325-327. doi:[10.3102/0013189X211004138](https://doi.org/10.3102/0013189X211004138)
10. Silva DFO, Cobucci RN, Lima S, de Andrade FB. Prevalence of anxiety, depression, and stress among teachers during the COVID-19 pandemic: A PRISMA-compliant systematic review. *Medicine (Baltimore)*. Nov 5 2021;100(44):e27684. doi:[10.1097/md.00000000000027684](https://doi.org/10.1097/md.00000000000027684)
11. Wakui N, Abe S, Shirozu S, et al. Causes of anxiety among teachers giving face-to-face lessons after the reopening of schools during the COVID-19 pandemic: a cross-sectional study. *BMC Public Health*. 2021/06/02/2021;21(1):1050. doi:[10.1186/s12889-021-11130-y](https://doi.org/10.1186/s12889-021-11130-y)
12. Madigan DJ, Kim LE. Does teacher burnout affect students? A systematic review of its association with academic achievement and student-reported outcomes. *International Journal of Educational Research*. 2021/01/01/2021;105:101714. doi:<https://doi.org/10.1016/j.ijer.2020.101714>
13. Martínez-Monteagudo MC, Inglés CJ, Granados L, Aparisi D, García-Fernández JM. Trait emotional intelligence profiles, burnout, anxiety, depression, and stress in secondary education teachers. *Personality and Individual Differences*. 2019/05/01/2019;142:53-61. doi:<https://doi.org/10.1016/j.paid.2019.01.036>
14. DiCarlo CF, Meaux AB, LaBiche EH. Exploring Mindfulness for Perceived Teacher Stress and Classroom Climate. *Early Childhood Education Journal*. 2020/07/01/2020;48(4):485-496. doi:[10.1007/s10643-019-01015-6](https://doi.org/10.1007/s10643-019-01015-6)
15. Hwang Y-S, Bartlett B, Greben M, Hand K. A systematic review of mindfulness interventions for in-service teachers: A tool to enhance teacher well-being and performance. *Teaching and Teacher Education*. 2017;64:26-42.
16. Sitaram R, Ros T, Stoeckel L, et al. Closed-loop brain training: the science of neurofeedback. *Nature Reviews Neuroscience*. 2017/02/01/2017;18(2):86-100. doi:[10.1038/nrn.2016.164](https://doi.org/10.1038/nrn.2016.164)
17. Wang J-R, Hsieh S. Neurofeedback training improves attention and working memory performance. *Clinical Neurophysiology*. 2013/12/01/2013;124(12):2406-2420. doi:<https://doi.org/10.1016/j.clinph.2013.05.020>
18. Sapra A, Bhandari P, Sharma S, Chanpura T, Lopp L. Using Generalized Anxiety Disorder-2 (GAD-2) and GAD-7 in a Primary Care Setting. *Cureus*. May 21 2020;12(5):e8224. doi:[10.7759/cureus.8224](https://doi.org/10.7759/cureus.8224)
19. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med*. May 22 2006;166(10):1092-7. doi:[10.1001/archinte.166.10.1092](https://doi.org/10.1001/archinte.166.10.1092)
20. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. Sep 2001;16(9):606-13. doi:[10.1046/j.1525-1497.2001.016009606.x](https://doi.org/10.1046/j.1525-1497.2001.016009606.x)
21. Cohen S, Kamarck T, Mermelstein R. A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*. 1983;24(4):385-396. doi:[10.2307/2136404](https://doi.org/10.2307/2136404)
22. World Health Organization. Regional Office for E. Wellbeing measures in primary health care/the DepCare Project: report on a WHO meeting: Stockholm, Sweden, 12–13 February 1998. 1998. 1998. <https://apps.who.int/iris/handle/10665/349766>
23. Topp CW, Østergaard SD, Søndergaard S, Bech P. The WHO-5 Well-Being Index: a systematic review of the literature. *Psychother Psychosom*. 2015;84(3):167-76. doi:[10.1159/000376585](https://doi.org/10.1159/000376585)
24. Belenky G, Wesensten NJ, Thorne DR, et al. Patterns of performance degradation and restoration during sleep restriction and subsequent recovery: a sleep dose-response study. *J Sleep Res*. Mar 2003;12(1):1-12. doi:[10.1046/j.1365-2869.2003.00337.x](https://doi.org/10.1046/j.1365-2869.2003.00337.x)
25. Neil PW, Shona LH, Charli S, et al. Sleep and the athlete: narrative review and 2021 expert consensus recommendations. *British Journal of Sports Medicine*. 2021;55(7):356. doi:[10.1136/bjsports-2020-102025](https://doi.org/10.1136/bjsports-2020-102025)

26. Haack M, Mullington JM. Sustained sleep restriction reduces emotional and physical well-being. *Pain*. Dec 15 2005;119(1-3):56-64. doi:10.1016/j.pain.2005.09.011
27. Van Cauter E, Holmback U, Knutson K, et al. Impact of sleep and sleep loss on neuroendocrine and metabolic function. *Horm Res*. 2007;67 Suppl 1:2-9. doi:10.1159/000097543
28. Morselli L, Leproult R, Balbo M, Spiegel K. Role of sleep duration in the regulation of glucose metabolism and appetite. *Best Pract Res Clin Endocrinol Metab*. Oct 2010;24(5):687-702. doi:10.1016/j.beem.2010.07.005
29. Beccuti G, Pannain S. Sleep and obesity. *Curr Opin Clin Nutr Metab Care*. Jul 2011;14(4):402-12. doi:10.1097/MCO.0b013e3283479109
30. Colin AE, Simon DK, Peter H, Maria G, Leanne F, John C. The Sleep Condition Indicator: a clinical screening tool to evaluate insomnia disorder. *BMJ Open*. 2014;4(3):e004183. doi:10.1136/bmjopen-2013-004183
31. Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*. 1977;84:191-215. doi:10.1037/0033-295X.84.2.191
32. Schwarzer R, Jerusalem M. Generalized self-efficacy scale. *J Weinman, S Wright, & M Johnston, Measures in health psychology: A user's portfolio Causal and control beliefs*. 1995;35:37.
33. Schaufeli WB, Leiter MP, Maslach C. Burnout: 35 years of research and practice. *Career Development International*. 2009;14(3):204-220. doi:10.1108/13620430910966406
34. Melamed S, Ugarten U, Shirom A, Kahana L, Lerman Y, Froom P. Chronic burnout, somatic arousal and elevated salivary cortisol levels. *Journal of Psychosomatic Research*. 1999/06/01/ 1999;46(6):591-598. doi:[https://doi.org/10.1016/S0022-3999\(99\)00007-0](https://doi.org/10.1016/S0022-3999(99)00007-0)
35. Papaefstathiou E, Tsounis A, Malliarou M, Sarafis P. Translation and validation of the Copenhagen Burnout Inventory amongst Greek doctors. *Health Psychol Res*. Mar 11 2019;7(1):7678. doi:10.4081/hpr.2019.7678
36. Tsang S, Royse CF, Terkawi AS. Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine. *Saudi J Anaesth*. May 2017;11(Suppl 1):S80-s89. doi:10.4103/sja.SJA\_203\_17