

# Researchers enable smart watches to monitor lockdown lifestyles

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In a first-of-its-kind study, researchers from Tel Aviv University and the Academic College of Tel Aviv-Yaffo used smart watches and a dedicated app to monitor 169 subjects before and during Israel's second COVID-19 lockdown (October 2020). The watches and app provided the researchers with accurate daily data for measuring quality of life parameters, such as mood, stress, duration and quality of sleep, heart rate at rest, meeting others and physical exercise.

The study was conducted by a group of experts from the Iby and Aladar Fleischman Faculty of Engineering at Tel Aviv University led by Dr. Erez Shmueli, Dr. Dan Yamin, Shay Oved and Merav Mofaz, in collaboration with TAU's Prof. Noga Kronfeld Schor of the School of Zoology at the George S. Wise Faculty of Life Sciences and the Sagol School of Neuroscience, and Dr. Anat Lan and Prof. Haim Einat of the Academic College of Tel Aviv-Yaffo. The study was recently published at the leading *Journal of the Royal Society Interface*.

The data collected in the study indicate that, in general, during the lockdown the subjects slept

more (6:08 vs. 6:01 hours) met fewer people face to face (11.5 vs. 7.8 daily encounters), exercised less (30 vs. 27 minutes), walked less (daily step count of 8,453 vs. 7,710) felt less happy (0.87 vs. 0.76 on a scale of -2 to 2) and exhibited a lower heart rate at rest (62.6 vs. 62.1 beats per minute).

Among the young participants, a more substantial drop was registered in the daily step count: from 9,500 steps before to 8,200 steps during the lockdown. In comparison, the average daily step count in the 60+ age group decreased from 7,500 to 7,200.

The lockdown was also very detrimental to the younger subjects' mood. On a scale of -2 to 2, their average score declined from 0.89 before to 0.72 during the lockdown, while older subjects reported only a small decrease—from 0.85 to 0.8.

Interestingly, when zooming in on the younger age group, the increase in sleep-duration was mainly expressed in late chronotypes (7:05 hours before vs. 7:24 during the lockdown). Late chronotypes, especially in the age of our younger group which usually work or study and have [younger children](#) (also in our study), normally suffer sleep loss. With no need to wake up the children or go to everyday obligations, the more relaxed social schedule induced by the lockdown could allow them to wake up later without using an alarm clock and increase their sleep duration. In contrast, when zooming in on the older age group, the increase in sleep-duration was mainly expressed in early chronotypes (6:48 hours before vs. 6:58 during the lockdown). It is possible that this population could not perform some early social activity like group sports, but other explanations may also be possible.

Analysis by gender revealed that while men's stress level decreased from -0.79 before to -0.88 during the lockdown, women's stress rose from -0.62 to -0.52. The researchers suggest several possible

explanations for these findings:

First, according to the Israeli Ministry of Finance, more women lost their workplace (fired or sent to unpaid vacation) than men. Second, schools and daycares were closed during lockdowns and parents to young children had to stay with them at home. Several studies reported that during lockdowns, men were more concerned about paid work while women were more worried about childcare. Third, according to Israeli Police data, domestic violence against women increased during lockdowns.

Moreover, the lockdown was more 'effective' in keeping women from meeting others face to face. While for men, the number of such encounters decreased from 11 to 9, women reported a sharper decline from 12 to 7 daily encounters on average. Face to face encounters, even a random meeting with a neighbor or a public transportation driver, are known to improve people's mood and reduce depression and anxiety.

"During lockdowns women were more secluded and stressed than men, and generally their welfare and mental health were significantly more affected than men's," adds Dr. Shmueli.

"We were lucky," says Dr. Shmueli. "Roughly two years before the outbreak of the pandemic, we planned a large-scale experiment with the goal of providing earlier and improved diagnosis of infected diseases, by integrating multiple sources of data such as self-reported questionnaires and smart watches. Clearly, we didn't have COVID-19 in our mind back then, but the running experiment allowed us to monitor subjects for a relatively long period before and during the second [lockdown](#) in Israel."

"The findings of our study are important by themselves and suggest that certain subpopulations should receive more attention than others during lockdowns. However, in addition to the direct negative effects of lockdowns on wellbeing, lockdowns may also indirectly affect our immune system—it is well known that mood, stress, physical activity and sleep duration and quality have a major effect on our immune system. Paying more attention to the affected subpopulations may

therefore help in coping better with the virus, and even improve the effectiveness of vaccines."

"The COVID-19 crisis has channeled substantial resources to the wellbeing and welfare of the elderly, and rightly so, since they are more exposed than the younger population to the health hazards of the disease itself. But our study shows that emphasis should also be placed on the [mental health](#) of young people—who paid a heavier price for measures like social distancing and lockdowns."

**More information:** Shay Oved et al, Differential effects of COVID-19 lockdowns on well-being: interaction between age, gender and chronotype, *Journal of The Royal Society Interface* (2021). [DOI: 10.1098/rsif.2021.0078](https://doi.org/10.1098/rsif.2021.0078)

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