Review of: "Exploring the Multidimensional Influences on Sleep and Active Heart Rate Dynamics: A Comprehensive Study"

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Potential competing interests: No potential competing interests to declare.

Overall, the article is well-structured, presents a robust analysis, and provides valuable insights into the factors that influence heart rate during sleep and activity. Although the study offers a relevant contribution to the literature, the authors could improve the work by exploring potential limitations of the devices used and discussing in greater depth the applicability of the results in public health and personalised medicine contexts.

The literature review is well-structured, clearly addressing the social, personal, psychological, environmental, and behavioural factors that can influence heart rate. However, it would be beneficial to include more detail on the specific studies that substantiate the association between psychological characteristics, such as conscientiousness and depression, and heart rate variation. Although the article mentions known influences, delving deeper into the empirical evidence could strengthen the theoretical basis and enrich the understanding of how these factors modulate the cardiovascular response.

The use of Fitbit devices to collect continuous heart rate data is a practical and comprehensive methodological choice. However, the accuracy of the device for measuring heart rate variability in different states could be discussed in more depth, as these devices have limitations regarding accuracy compared to high-fidelity monitoring equipment.

What were the criteria for using Fitbit over other heart monitoring devices, especially considering the accuracy of heart rate variability data collection?

The eligibility criteria are short.

Has the sample size been calculated?

Is it a convenience sample?

It would be pertinent to discuss the impact of possible participant selection bias, since the sample is restricted to a specific population, which limits the generalisability of the results to other age groups and demographic contexts.

How did the study measure the influence of social contact on heart rate? Did you consider the quality of social interactions, such as positive or negative interactions, as well as the quantity?

The BMI variable was associated with changes in heart rate. Are there any hypotheses about which physiological or behavioural factors related to BMI might be influencing heart rate variation?

How was BMI assessed?

Why were latent growth curve models (LGCM) chosen over other longitudinal models? Are there specific advantages that LGCM offers for this type of analysis?

Some observed correlations (for example, between mood state and heart rate variability) could be explored further, especially in relation to how these factors can predispose to poor cardiovascular health.

Did you explore possible interactions between personal, social, and behavioural factors? For example, did the combination of physical activity and social interactions have any specific effect on heart rate variability?

You reported a correlation between depression and heart rate. How do you think symptoms of depression might be influencing participants' cardiovascular responses?

Have you considered diurnal and nocturnal differences in heart rate variability in addition to sleep and activity periods? How could these differences contribute to a more detailed analysis of cardiovascular responses?

You have observed a variation in heart rate during different seasons or academic events, such as exam periods. How do you explain the impact of these environmental factors on heart rate?

Physical activity showed a positive correlation with heart rate variability. Is there any hypothesis as to how different types of activity (e.g., aerobic vs. anaerobic) could impact heart rate differently?

The study found significant differences in heart rate between men and women. Do you think these results are influenced by biological or cultural factors, or both? How could these results be applied in personalised interventions?

The article suggests implications for personalised interventions and health programmes, which is appropriate. However, the study could benefit from discussing how these results could be applied in different populations or clinical contexts, expanding the practical impact of the findings.

One limitation that is not discussed refers to the fact that the study is observational and therefore unable to establish causal relationships between the factors examined and heart rate.

In addition, as the data collection is based on Fitbit devices, it is important to emphasise that the accuracy of the data may have been influenced by the variability of use between participants and the quality of the sensors in these devices to detect heart rate variations accurately.

How can the results of this study be applied in clinical or public health contexts?