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Technical comment on Romero, A., Blanch, A., & Chopik, W. J. (2026). Male and female empathy across 24 countries and 60 latitudinal degrees

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ABSTRACT

Romero, Blanch, and Chopik (2026) examined sex differences in self-reported perspective taking and empathic concern across 24 countries, reporting a correlation between these differences and latitude. The authors interpreted their findings as supporting the hypothesis that local climatic conditions influence behavioural and cognitive traits, including sex differences in empathy. However, their study faces significant limitations. Latitude is confounded with economic, social, and cultural variables. While the authors acknowledge this issue and analyse four such factors (GDP, gender gap, individualism/collectivism, and power distance), they do not adjust on these confounders in their regression analyses. Reanalysing their data with multiple regression, we found that latitude's predictive power diminishes for perspective taking and becomes non-significant for empathic concern. Furthermore, the sample of countries is small, with an under-representation of equatorial regions and limited participant numbers in many countries leading to high uncertainty in empathy measurements. Ultimately, the study's data are insufficient to isolate the variance of empathy that is uniquely explained by latitude. Future research with larger, more representative samples and additional confounders is necessary to clarify these relationships.

Romero et al. (2026) reported sex differences in self-report measures of perspective taking and empathic concern across 24 countries. Furthermore, they reported correlations between the size of these sex differences and latitude (distance from the Equator) across these countries. They concluded that "Apart from social and biological factors, geographical location may play a role in shaping national variation in sex differences in empathy", and that "The climatic environment might interact with gender norms and biological factors in shaping the frequent sex differences observed in empathic traits". Thus, the hypothesis being tested and asserted in this study is that of a causal effect of geographical location on sex differences in empathy, independent of potential social and biological confounders.

However, there are a number of important limitations in the data and in the analyses of that study, some of which are acknowledged by the authors, but some of which are not. Amongst the acknowledged limitations, the number of countries (24) is quite small, with an over-representation of countries at high latitudes and an under-representation of countries near the Equator. Furthermore, although some countries feature a large number of respondents, most countries only include a limited number of participants, with those near the Equator having the most limited sample sizes (100 to 300). Thus, the uncertainty of empathy measures at one end of the latitude range is particularly high. If one day this study is extended to a larger sample of countries better representing the whole range of latitudes, and with each country including a sufficiently large and representative population sample, there is a high risk that the results might turn out quite differently. This is illustrated by redrawing the original study's Fig. 3 with confidence intervals to reflect the uncertainty around the estimate of sex differences in empathy measures (Fig. 1).

But the most important limitation in our eyes is the fact that latitude, a purely geographical/climatic factor, is confounded with numerous economic, social and cultural factors that differ between countries, and that happen to be correlated with latitude, thereby obscuring the identification of a potential causal effect of geographical location. The authors partly recognise this problem by analysing four such factors that are available in their dataset: gross domestic product per capita (GDP), gender gap (GG), and Hofstede's cultural dimensions: individualism/collectivism and power distance. They mention several more in their discussion. Each of these four factors is highly correlated with latitude ($|r| = 0.49$ to 0.72, see Supplementary material for this and all other results), suggesting that the confounding problem is real. Estimating a causal effect of a target predictor in the presence of potential confounders requires adjusting the analysis on these confounders, as can be done in a multiple regression analysis (Pearl & Mackenzie, 2018; Rohrer, 2024; Rubinfeld, 2000). Surprisingly, the authors did not report such an analysis. Rather, they reported a series of simple regression analyses, each on a single regressor. Finding that latitude was the best single predictor of Perspective taking, and the second best predictor of empathic concern, they concluded that "apart from cultural and biological factors, geographical and climate factors are also involved in the differential manifestation of male and female empathy". But their simple regressions of empathy measures on latitude fail to test this claim, because they do not take cultural and biological factors into account.

Using the data provided by the authors in their appendix, we have run multiple regression analyses, with the 5 predictors simultaneously entered. In the analysis of Perspective taking (adjusted $R^2 = 0.46$), the coefficient of latitude was decreased and barely significant ($\beta = 0.53$ [0.00, 1.05], $p = 0.0499$), while none of the other predictors was. In the analysis of Empathic concern (adjusted $R^2 = 0.26$), none of the predictors was significant, the highest one being Individualism/collectivism

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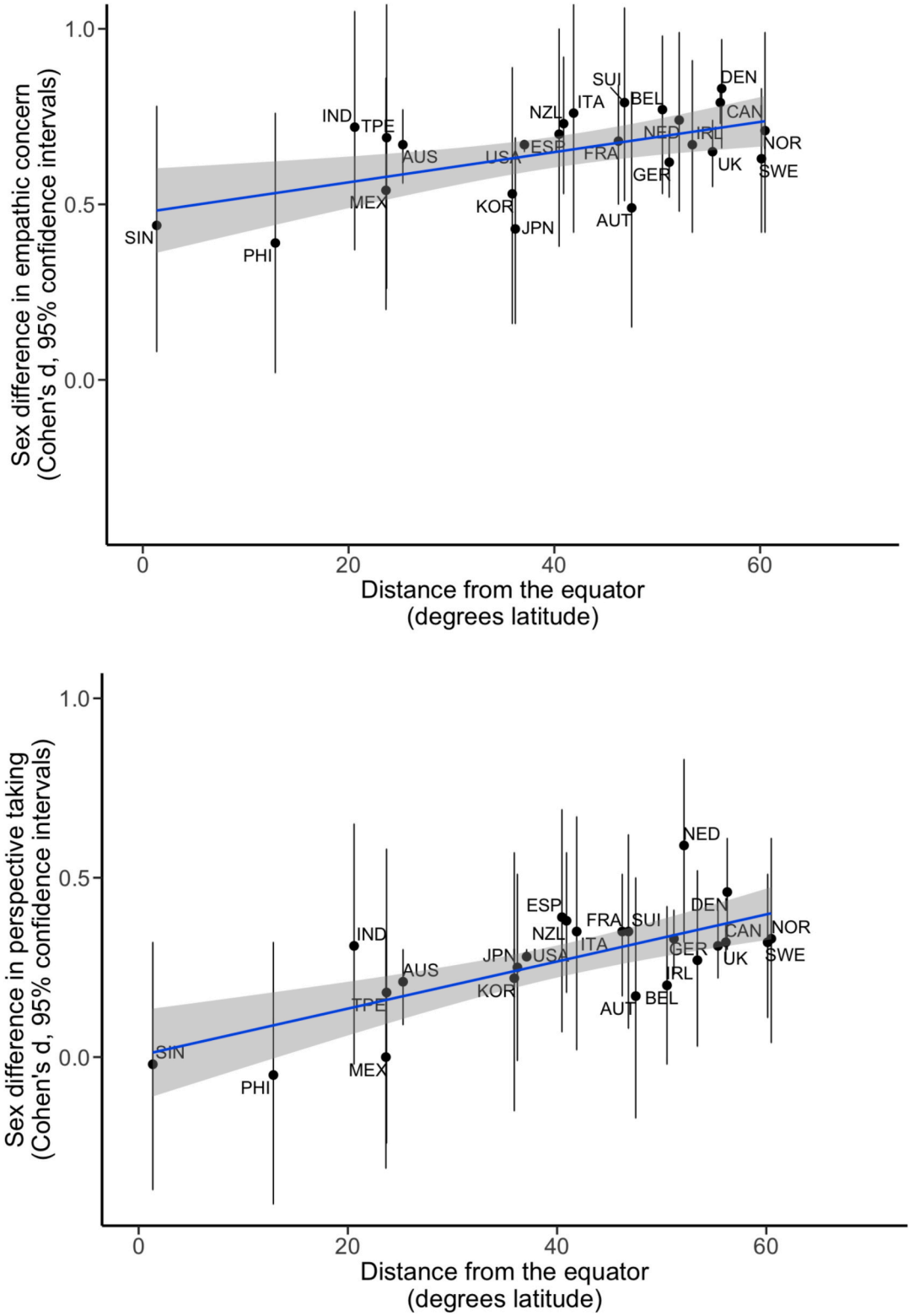


Fig. 1. Sex difference in perspective taking and in empathic concern (Cohen's d), with 95% confidence intervals, as a function of distance from the equator, across 24 countries. Data from Romero, A., Blanch, A., & Chopik, W. J. (2026). Male and female empathy across 24 countries and 60 latitudinal degrees.

($\beta = 0.47$ [−0.06, 1.00], $p = 0.082$). Of course, one might worry that such an analysis is invalid due to high multicollinearity between predictors. The usually accepted criterion to evaluate such a risk is the variance inflation factor. In the present analyses, it ranges from 1.41 to 2.89 (for Power distance), suggesting that multicollinearity is not a problem.

If one remains worried by multicollinearity, there are standard ways to reduce the number of predictors. We used forward stepwise regression, which enters predictors one at a time. The analysis of Perspective taking (adjusted $R^2 = 0.5$) included both Latitude ($\beta = 0.52$, $p = 0.015$) and Individualism ($\beta = 0.29$, $p = 0.16$). That of Empathic concern (adjusted $R^2 = 0.35$) included only Individualism ($\beta = 0.62$, $p = 0.0014$).

A different approach using lasso regression (Tibshirani, 1996) yields similar results (see Supplement). These analyses show that adjusting on confounding factors substantially reduces or even nullifies the predictive power of Latitude. Adding other potentially confounding factors would likely aggravate the problem.

Our point is not that one of these results is more credible than the others. It is twofold: Firstly, there are multiple statistical analyses taking into account confounding factors that would have been more appropriate to test Romero et al.'s hypothesis than the simple regressions they have reported. Secondly, none of these analyses yield clear and robust results, suggesting that the data used in that study are insufficient to disentangle the mutually confounded factors. Data from more countries and more participants per country, taking into account additional potentially confounding factors, will be necessary to have a chance to do so. In the meantime, the hypothesis that latitude/climate itself uniquely influences sex differences in empathy across countries is hardly more supported by evidence than any of the alternative hypotheses.

CRediT authorship contribution statement

Sophie Brunsberg: Writing – review & editing, Visualization, Investigation, Formal analysis, Conceptualization. **Franck Ramus:** Writing – original draft, Validation, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2026.113790.

Data availability

Data available in the original paper

References

Pearl, J., & Mackenzie, D. (2018). *The book of why: The new science of cause and effect.* Hachette UK.

Rohrer, J. M. (2024). Causal inference for psychologists who think that causal inference is not for them. *Social and Personality Psychology Compass, 18*(3), Article e12948. https://doi.org/10.1111/spc3.12948

Romero, A., Blanch, A., & Chopik, W. J. (2026). Male and female empathy across 24 countries and 60 latitudinal degrees. *Personality and Individual Differences, 251*, Article 113596. https://doi.org/10.1016/j.paid.2025.113596

Rubinfeld, D. L. (2000). Reference guide on multiple regression. In *, 179. Reference Manual on Scientific Evidence* (pp. 425–469).

Tibshirani, R. (1996). Regression shrinkage and selection via the lasso. *Journal of the Royal Statistical Society: Series B (Methodological), 58*(1), 267–288. https://doi.org/10.1111/j.2517-6161.1996.tb02080.x

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