**Diversity is the essence of a stable system.** Everywhere we look in nature, we see diversity. Systems naturally tend towards diversity. Natural day and night cycles, seasonal cycles, diversity in plant and animal lives, and the various elements of the periodic table are some examples.

There are pros and cons to each mode or option. **No single mode or option is all pros or all cons.** In order to benefit from the pros of each mode and achieve the overall best system, various modes must come together. Without this diversity, the system will be inherently unstable.

Diversity allows for resilience. If part of such a system is disturbed, the other parts adjust to absorb the disturbance and maintain homeostasis. Conversely, a monotonous system will easily go out of whack with the slightest disturbance, as it lacks the resilience and flexibility of a diversified system.

Biodiversity and temperature extreme are both measures of diversity. Losing either one implies less options for adaptation and adjustment to change. Restoring forces will be overwhelmed by positive feedback loops, potentially leading to runaway situations.

From the above discussion we see the conclusions of the paper cannot be correct. They do not logically follow from the data.

In this case there are two problems. First, taken at the same time, there won’t be enough variation in diversity among countries, especially when we consider how all the nations belong to the same planet and are thus interconnected. (i.e. regional losses will affect the whole world). If the analysis is meant to be on the global scale, then our main focus must be on the diversity of the planet as a whole. Due to persisting ecological overshoot, the environment has been continually degrading, reducing diversity and leading to more frequent outbreaks. As a result of global warming, temperature extremes are also becoming smaller on the global scale (nights are warming faster than days). This loss of diversity can only be used as an explanatory variable over long time periods. **Otherwise the Markov assumption of sufficient variability in explanatory variables will be violated.**

The second issue is that the conclusions do not follow the regression results, in other words the data does not support the article’s conclusions. In frequentist statistics, typically the null hypothesis is rejected at an arbitrarily small level of significance. However, this approach only makes sense if we already have a strong preconception that the null hypothesis is true. Setting up the null hypothesis that degradation doesn’t affect spread rate and using small levels of significance to test it can result in type 2 error. Higher levels of significance or a Bayesian approach should be used.

As for temperature extreme, the correlation is most likely negative. The positive correlation found by the study illustrates the weaknesses of the regression: Countries are not closed systems, there is not enough variation in the explanatory variables (they all pertain to Earth’s climatic conditions in the same year: 2020), and there are omitted variables that need to be controlled for (In other words, the positive correlation is due to random fluctuations in the error term, where the omitted variables are hidden.).

**My suggestions:**

**Control for race, humidity, air quality, proportion of smokers and social distancing** Consider that countries are not closed systems. Unfortunately, you cannot really control for openness, especially the climatic aspect. Loss of biodiversity can be represented with ecological overshoot, i.e the difference between ecological footprint and Earth’s biocapacity, integrated over time (which gives the total degradation). In this way environmental factors would be all lumped into one.

Loss of diversity resulting from environmental degradation is responsible for reduced ability to absorb disturbances, leading to more frequent outbreaks and higher spread rates**. For the sake of the argument, the null hypothesis could be that the regression coefficient for degradation is 0.2 or greater (similarly for temperature extremes). The question that follows is: is there enough evidence to reject this hypothesis at 0.01 or 0.001 significance? Most likely not.**

Also keep in mind that on the global scale, degradation and temperature extreme are strongly correlated. The higher the degradation, the less difference in day and night temperatures.

In case the authors would rather not undertake the task of redoing their regressions, at least the points highlighted earlier such as confounding or omitted variable should be presented as the logical conclusions based on theory.

A final point to consider is that people who have taken the test do not constitute a random sample. This should at least be stated in the article, as the results will be biased for countries.

**Minor corrections:**

Temperature extreme may ~~exaggerate~~ *exacerbate (or aggravate)*

Line 127 Total infected people should be replaced with *total confirmed cases*.

Line 205 We analyzed… *to see if they could* explain

Line 216 was found to *decrease*