

# **Proximal Versus Distal Ecological Stress: Socio-Ecological Influences on Political Freedom, Well-Being, and Societal Confidence in 159 Nations Supplementary Analysis**

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In our study, we use measurements that are both subjective and proximal (compared to measurements that are both objective and distal). Thus, methodological subjectivity and conceptual proximity are essentially perfectly overlapping in the present study, and thus it is hard to tease the two apart. In this supplement, we performed brief follow-up analyses using a separate measurement of air/water quality ecological stress. Specifically, for these ancillary analyses, we used a measure which conceptually parallels our air/water quality measure, but which methodologically focuses on objective measurements of air and water quality (among other things) instead of self-report. This *Environmental Health* measurement comes from Columbia University's Socioeconomic Data and Applications Center (SEDAC) and includes summary measurements of urban particulates, indoor air pollution, drinking water quality, adequate sanitation, and child mortality for each nation (Etsy et al., 2006). However, this measurement paralleled the Distal Stress measurement from the present study more than the Proximal Stress measurement, showing significant negative relationships with cumulative freedom ( $r [131] = -.40, p < .001, 95\% \text{ LCI} = -.52; 95\% \text{ UCI} = -.26$ ) and health/well-being ( $r [131] = -.57, p < .001, 95\% \text{ LCI} = -.67; 95\% \text{ UCI} = -.45$ ), but essentially no relationship to the cumulative societal confidence measure ( $r [131] = .06, p > .50, 95\% \text{ LCI} = -.10; 95\% \text{ UCI} = +.21$ ).<sup>1</sup>

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<sup>1</sup> The SEDAC Environmental Health measurement itself was correlated more with the Distal Ecological Stress measurement ( $r = .62, p < .001$ ) than the Proximal Ecological Stress measurement ( $r = .34, p < .001$ ). This suggests that, in the present study, the air quality/water SEDAC measures show more overlap with distal factors (such as climate) than with proximal factors. The reason for this is unclear, as neither explanation proposed above would predict this pattern. Further it is noteworthy that the SEDAC measure was more highly correlated with GDP/Per capita than either our Proximal or Distal Stress measure – and essentially all if its effects were wiped out (or even reversed) when controlling for wealth. The SEDAC measurement thus seems to be a proxy for societal wealth to a far greater degree than our current ecological stress measurements. The reasons why this is the case are unclear and indeed beyond the scope of this article.

What are we to make of this ancillary result? One possibility involves the psychological precision (via subjective measurement) of the Proximal Ecological Stress measurement from the present study. It may be that the *perception* of all kinds of ecological stress – conceptually proximal or otherwise – would lead to a loss in societal confidence; but the line between the existence of potential ecological stressors (e.g., air particulate measurements) and the perception that they are a problem (e.g., satisfaction measurements) is often jagged. As a result, it may be the subjective psychological perception measurements are simply a more predictive method of understanding self-report confidence in social institutions. Thus, if we had subjective self-report perceptions of, say, harsh climates, it is possible that those perceptions would also be inversely related to societal confidence. In other words, it is possible that the difference between the two is driven by methodological subjectivity and not conceptual proximity.

However, we are inclined to believe otherwise, for two related reasons. (1) While the Distal Ecological Stress measure did show consistently stronger results than the Distal Ecological Stress measure on the other GWP items, it is nonetheless the case that the Distal Stress measure showed overwhelmingly significant effects in the expected direction for both the cumulative freedom and well-being measures ( $r$ 's = -.35 and -.42,  $p$ 's < .001). If the primary factor explaining the differential pattern for Societal Confidence is purely methodological subjectivity, then this same methodological difference would likely have applied to the freedom and well-being measurements (causing them to also be non-significantly related for distal ecological stress). And yet it did not. While the effect sizes for Proximal Ecological Stress measure on the GWP measures remained relatively stable across measures, Distal Ecological Stress showed overwhelmingly significant effects for well-being and freedom measures, but little effect for societal confidence. (2) Further, from a conceptual point of view that focuses on

attributions, it is this exact effect – that for societal confidence – where we would be most likely to expect Proximal and Distal Ecological Stress to differ. As a result, this increases our confidence that the found pattern is due, not to subjective methodology overlap, but to conceptual expectations. However, the present study cannot definitively tease apart these explanations.