

Researchers find a new way to explain population differences in personality structure among humans

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How people behave in one situation often tells us how they will act in

others. A shy introvert in one place, for example, isn't likely to be the gregarious life of the party in another.

Such is personality—patterns of behavior within individuals that are reasonably stable over time and contexts. But what creates those patterns of behavior, and why do they persist?

Different behaviors tend to covary, or present together. Gregarious people, for example, are also likely to be assertive. But this covariation in behavioral tendencies is neither random nor easily explained by genes. The social and ecological environments in which we develop, scientists say, have a lot to do with how we develop.

Socioecological niches and navigating daily life

New work by researchers at UC Santa Barbara, UC Merced, California State University Fullerton and the University of Richmond suggests that societies differ in the personality profiles of their members because societies vary in the number and richness of their socioecological niches—the shorthand for all the occupational, social and other ways of navigating successfully through daily life. Their findings are published in the journal *Nature Human Behaviour*.

"We developed a [computational model](#) to create a world in which we can vary how many niches are in the environment," said Michael Gurven, a professor of anthropology at UC Santa Barbara and the paper's senior author. The researchers wanted to discover whether increasing the number of niches in a particular environment resulted in the kinds of shifts in personality structure that coincide with their theory. Their idea is that more complex societies (i.e. those having more niches) will show a greater diversity of personality types.

"Each niche has an ideal personality profile to fit it," Gurven continued.

"People in the environment are born with some initial personality picked at random. And then we let people sort across the landscape in ways that might best suit their personality—if you're a loner, for example, maybe you don't want to live in the middle of New York City; if you love mountains and snow, you probably don't want to live in Phoenix, Arizona."

The researchers also varied the extent to which individuals can adjust their personalities to better fit the environments in which they find themselves.

Societal complexity in populations

As it turned out, it didn't matter whether they were working with a population of a hundred individuals or a thousand. Increasing the number of niches made personality traits tend to look more like those in the Big Five. This separable quintet of dimensions that psychologists have long believed universally define the structure of human personality include openness, conscientiousness, extraversion, agreeableness and neuroticism. "Increasing the number of niches in a population results in lower correlations among personality traits, so you need a larger number of higher-level Big Five-like factors to best explain personality," Gurven said.

The crux of their argument rests on the degree of societal complexity in a population—i.e. specialization in all areas of life, including jobs, clubs and hobbies. "Simpler" societies have fewer niches, while more "complex" societies have many. "You can think about it like a five-band equalizer on a stereo. The more bands you have, the more combinations and nuances of sound you can create," said Gurven, "Imagine if all you have is one volume control. The only thing you can change is loudness."

"The socioecological environment shapes who we are," said lead author

Paul Smaldino, an assistant professor of cognitive and information sciences at UC Merced. "Within a socioecological niche, particular behavioral characteristics may contribute to more or less success and be more or less reinforced."

An unexpected prediction

Their model results demonstrate how differences in the diversity of niches can explain the interesting empirical patterns. The team had earlier shown that across 55 nations where the Big Five were measured using the same methods, greater complexity (measured as a combination of urbanization, development and a country's product diversity portfolio) was associated with lower correlations among Big Five personality traits. The researchers' new model helps explain this result, and also yields an unexpected prediction: Personality traits should exhibit more internal variation in more complex societies.

Re-examining their 55-nation dataset, the researchers found support for their prediction: Indeed, personality factor variance correlates with socioecological complexity.

What's behind the Big Five

The social complexity and personality project was borne of a confluence of coincidences. Gurven, co-director of the Tsimane Health and Life History Project, had begun collecting personality data among the Tsimane, an isolated indigenous population in the Bolivian Amazon, to assess health and fitness costs and benefits associated with different personality types. When he and Christopher von Rueden, formerly a graduate student in anthropology at UC Santa Barbara and now an associate professor at Jepson School of Leadership Studies and a co-author of the paper, began analyzing the data using all the standard tools

of the trade, they realized they couldn't replicate the Big Five personality structure.

What's more, they were struck by the fact that there is no theory in personality psychology that can explain the Big Five structure from first principles. Why do certain traits—like trust and sympathy, impulsivity and anxiety—bundle together the way they do? There are many possibilities for what personality structure might look like, so why does something like the Big Five appear in so many places? How can the Big Five be a human universal, yet scientists have little understanding about why trait covariation takes this exact form over another?

Gurven's previous work with the Tsimane revealed a Big Two (prosociality and industriousness), as opposed to Five, among that population and led the researchers to contemplate the role of societal structure, divisions of labor and specialization. Together with Aaron Lukaszewski, who completed his Ph.D. in evolutionary psychology at UC Santa Barbara and is now an assistant professor of psychology at CSU Fullerton and also a co-author of the paper, the group developed a verbal theory of how [personality traits](#) might emerge in response to societal complexity. They tested this with the [personality](#) data from 55 nations.

At the same time, Smaldino had been developing a theory of social identity signaling and social complexity that involved similar arguments. "I found my theory difficult to model as social identity doesn't have well-established, cross-culturally validated measurement paradigms, and was looking for a way to make progress," he said. "Personality data fit the bill and was a way to show how [social complexity](#) can shape the emergence of psychological features."

A new model

The model developed by the researchers is intentionally a simple one that ignores a number of features that spring to mind when considering this topic, like social networks and social influence, developmental processes and competition. "We initially designed and build a much more complicated model that included many of those things, as well as frequency-dependency payoffs within niches, membership in multiple niches and competing drives for similarity and differentiation," Smaldino explained. "But this model had so many parameters that analyzing it was complicated and not particularly informative. We were forced to ask ourselves: What is the essence of our theory?"

Only when they simplified their model by building it around only the essentials of their theory were they able to make progress.

More information: Paul E. Smaldino et al. Niche diversity can explain cross-cultural differences in personality structure, *Nature Human Behaviour* (2019). [DOI: 10.1038/s41562-019-0730-3](https://doi.org/10.1038/s41562-019-0730-3)

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