Figures and figure supplements

Do wealth and inequality associate with health in a small-scale subsistence society?

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Figure 1. Overview of wealth and inequality distributions. (A) Mean wealth by age of household head. (B) Mean wealth by population-level wealth Z-score. (C) Map of study communities (n = 40) and mean wealth at the community level. (D) Map of community-level wealth inequality. Note: (A) and (B) use raw wealth, while (C) and (D) are based on age-corrected values. Heat maps in (C) and (D) give a rough sense of the distribution; circle size indicates the number of sampled households (range = 9–81). Data for individual villages are not directly shown to protect confidentiality. Yucumo and San Borja are local market towns inhabited by non-Tsimane, Mission is the site of a Catholic mission and the largest Tsimane settlement.
Figure 1—figure supplement 1. Overview of the sample. Ever sampled by THLHP refers to the period potentially included in this study, that is, up to December 2015; note that this sample includes 92 communities. Target communities (N = 40) were those with any wealth data collected during the periods included here (2006/2007, 2013). The main reason why 2075 people who lived in a target community did not have wealth data is likely that no one in their household was available to be interviewed about their assets, most likely because they were temporarily absent from the community (e.g., people sometimes stay near their far-away fields, go on extended hunting trips, or visit town or other communities). The majority of the 681 individuals who lived in a household with wealth data but lacked age, sex, and data on at least one of the outcome variables were most likely small children and infants who had not yet been sampled in detail. For a further missingness breakdown of the sample by specific outcome variable, see Table 1. THLHP: Tsimane Health and Life History Project.
Figure 2. Wealth and inequality posterior parameter values for models with adults (>15 years). Points are posterior medians and lines are 75% (thick) and 95% (thin) highest posterior density intervals. Numbers in each panel represent the proportion of the posterior distribution that is greater than zero (P>0). All models control for age, sex, distance to market town, and community size. Rough categories of dependent variables (psychosocial, continuous health outcomes, and binary health outcomes) are distinguished by rows and colors. For the first two rows, the outcomes are expressed as Z-scores, the bottom row as log odds. See Figure 2—figure supplement 1, Figure 2—figure supplement 2, and Figure 2—figure supplement 3 for predicted associations of household wealth, community wealth, and wealth inequality, respectively.
**Figure 2—figure supplement 1.** Predicted conditional effects of relative household wealth on all psychosocial and health outcomes for adults. Lines are posterior means and shaded areas are 95% credible intervals on mean values. Numbers in each panel represent the proportion of the posterior distribution that supports the predicted negative association between wealth and the outcome ($P_{\text{negative}}$). All predictions control for age, sex, inequality, distance to market town, community size, and mean community wealth, holding all other variables at the mean, with sex = female. Rough categories of dependent variables (psychosocial, continuous health outcomes, and binary health outcomes) are distinguished by rows and colors. For the first two rows, the outcomes are measured as Z-scores, the bottom row as probabilities.
Figure 2—figure supplement 2. Predicted conditional effects of mean community wealth on all psychosocial and health outcomes for adults. Lines are posterior means and shaded areas are 95% credible intervals on mean values. Numbers in each panel represent the proportion of the posterior distribution that supports the predicted negative association between wealth and the outcome ($P_{<0}$). All predictions control for age, sex, inequality, distance to market town, community size, and mean community wealth, holding all other variables at the mean, with sex = female. Rough categories of dependent variables (psychosocial, continuous health outcomes, and binary health outcomes) are distinguished by rows and colors. For the first two rows, the outcomes are measured as Z-scores, the bottom row as probabilities.
Figure 2—figure supplement 3. Predicted conditional effects of wealth inequality (Gini coefficients) on all psychosocial and health outcomes for adults. Lines are posterior means and shaded areas are 95% credible intervals on mean values. Numbers in each panel represent the proportion of the posterior distribution that supports the predicted negative association between wealth and the outcome ($P_{<0}$). All predictions control for age, sex, inequality, distance to market town, community size, and mean community wealth, holding all other variables at the mean, with sex = female. Rough categories of dependent variables (psychosocial, continuous health outcomes, and binary health outcomes) are distinguished by rows and colors. For the first two rows, the outcomes are measured as Z-scores, the bottom row as probabilities.
Figure 3. Wealth and inequality posterior parameter values for models with juveniles (≤15 years). Points are posterior medians and lines are 75% (thick) and 95% (thin) highest posterior density intervals. Numbers in each panel represent the proportion of the posterior distribution that is greater than zero (P>0). All models control for age, sex, distance to market town, and community size. Rough categories of dependent variables (continuous health outcomes and binary health outcomes) are distinguished by rows and colors. For the first row, the outcomes are measured as Z-scores, the bottom row as log odds. See Figure 3—figure supplement 1 for predicted associations of household wealth, community wealth, and wealth inequality.
Figure 3—figure supplement 1. Predicted conditional effects of household wealth, community wealth, and inequality (Gini coefficients) on all health outcomes for juveniles (<15 years). Lines are posterior means and shaded areas are 95% credible intervals on mean values. Numbers in each panel represent the posterior probability, that is, the proportion of the posterior that supports an association between inequality and the outcome. All predictions control for age, sex, distance to market town, and community size, holding all other variables at the mean, with sex = female. For the first two columns, the outcomes are measured as Z-scores, the remainder as probabilities.
Figure 4. Covariate posterior parameter values for models with adults (>15 years). Points are posterior medians and lines are 75% (thick) and 95% (thin) highest posterior density intervals. Numbers in each panel represent the proportion of the posterior distribution that is greater than zero (P>0). Full models are given in Supplementary file 1a-1m. Rough categories of dependent variables (psychosocial, continuous health outcomes, and binary health outcomes) are distinguished by rows and colors. For the first two rows, the outcomes are measured as Z-scores, the bottom row as log odds.
**Figure 5.** Covariate posterior parameter values for models with juveniles (≤15 years). Points are posterior medians and lines are 75% (thick) and 95% (thin) highest posterior density intervals. Numbers in each panel represent the proportion of the posterior distribution that is greater than zero (P>0). Full models are given in Supplementary file 1n and o. Rough categories of dependent variables (continuous health outcomes and binary health outcomes) are distinguished by rows and colors. For the first row, the outcomes are measured as Z-scores, the bottom row as log odds.
Figure 6. Interactions between sex, wealth, and inequality. Plots show the predicted values for each outcome and Gini Z-score. Red shading indicates poorer individuals (wealth $Z = -2$), blue indicates wealthier individuals ($Z = 2$). For each model, the proportion of the posterior $>0$ is shown in the numbers above: GxW: Gini $\times$ Wealth; SxG = Sex $\times$ Gini; SxW = Sex $\times$ Wealth.
Appendix 1—figure 1. Causal relationships assumed by the mediation analyses.
Appendix 1—figure 2. Causal diagram highlighting multiple mediation.
Appendix 1—figure 3. Causal diagram highlighting multiple mediation and collider bias.