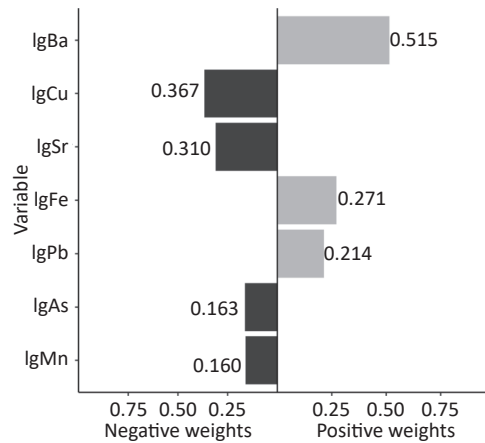


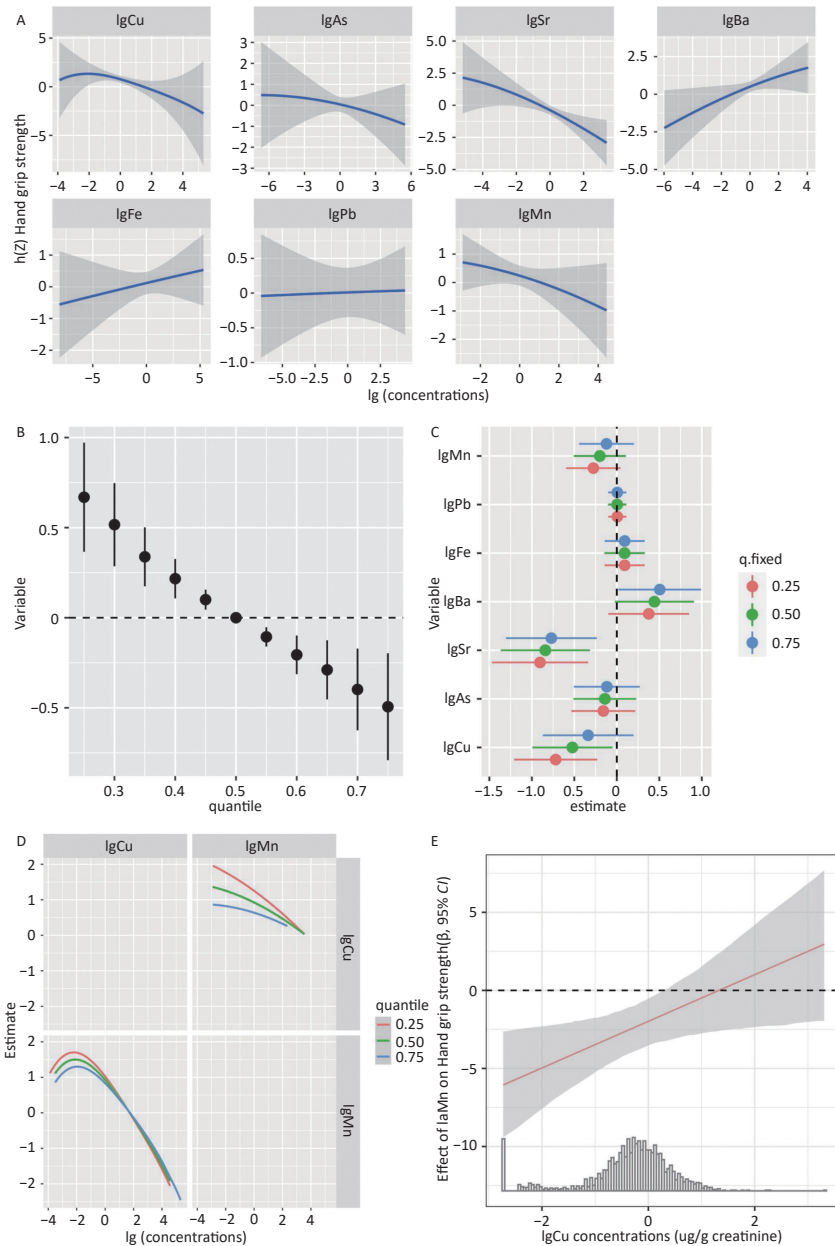
Supplementary Table S1. Correlation between 7 metals and handgrip strength by linear regression analysis ($n = 1,892$)

Total	β (95% CI)	P value*
Cu	-2.318 (-3.886, -0.750)	0.004
As	-0.600 (-2.119, 0.919)	0.439
Sr	-2.385 (-3.769, -1.002)	0.001
Ba	0.836 (-0.023, 1.696)	0.057
Fe	1.041 (-0.318, 2.400)	0.133
Pb	0.167 (-0.581, 0.915)	0.662
Mn	-0.304 (-0.717, 0.109)	0.150

Note. * $P < 0.05$; adjusted for smoke, alcohol consumption, age, sex, education, ethnicity, diabetes mellitus, BMI, occupation, physical activity, dietary protein intake and dietary energy intake. Cu, copper; As, arsenic; Sr, strontium; Ba, barium; Fe, iron; Pb, lead; Mn, manganese.



Supplementary Figure S1. Weight ratio of each metal in the positive-negative association in the Quantile g-computation. Exposures have been \log_{10} -transformed and models have been adjusted for smoke, alcohol consumption, age, sex, education, ethnicity, diabetes mellitus, BMI, occupation, physical activity, dietary protein intake and dietary energy intake. BMI, Body mass index; Cu, copper; As, arsenic; Sr, strontium; Ba, barium; Fe, iron; Pb, lead; Mn, manganese.



Supplementary Figure S2. The combined effect of Cu, As, Sr, Ba, Fe, Pb and Mn on grip strength levels. (A) Univariate exposure-response functions and 95% credible intervals (shaded areas) for each metal with the other metals kept at the median. Estimate can be interpreted as the contribution of predictors to the response. (B) The combined effect of exposure and 95% confidence intervals using the BKMR model. (C) Individual risk estimates for each metal element the association of the grip level with each element from the 25th to 75th percentile when the other elements in the mixture were fixed at the 25th, 50th, and 75th percentiles. (D) Interaction effect for Cu at different Mn quantiles (lower left panel of A) or Mn at different Cu quantiles (top right panel of A) on handgrip strength levels estimated by Bayesian Kernel. (E) Machine Regression (BKMR) model (D) and regression estimates of Mn effects (red line) and the 95% credible interval (shaded area) on handgrip strength levels as a function of Cu in Huayuan area. Exposures have been log10-transformed and models have been adjusted for and/or sex, and/or age, smoke, alcohol consumption, education, ethnicity, diabetes mellitus, BMI, occupation, physical activity, dietary protein intake and dietary energy intake. BMI, Body mass index; Cu, copper; As, arsenic; Sr, strontium; Ba, barium; Fe, iron; Pb, lead; Mn, manganese.