## A closer look at civic honesty in collectivist cultures

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Yang and colleagues (hereafter YAC) conducted a replication and extension of our lost wallet study in China (1, 2). They argue that in collectivist cultures, civic honesty manifests as holding onto a wallet for safekeeping, without contacting the owner ("safekeeping"). By contrast, in more individualistic cultures, civic honesty manifests as actively contacting the owner to return a wallet ("emailing"). Thus, using email contact rates may distort civic honesty measurement in collectivist countries.

We agree with YAC that, especially for cross-cultural research, use of a single outcome measure may limit generalizability and examining additional measures is of value (3). However, upon closer examination, many of YAC's findings are spurious and other conclusions are contradicted by their data.

A key finding in YAC is city-level collectivism predicts safekeeping but not emailing, which would suggest civic honesty expresses itself differently across cultures. This result, however, is entirely due to an error in their regression specifications; once corrected, the relationship between collectivism and safekeeping disappears. YAC's regressions include both city fixed effects (i.e., where the study was performed) and city-level rates of collectivism (i.e., degree of collectivism in a city). Including both variables leads to "double dipping" on the same information and perfect multicollinearity. Table 1 illustrates the problem: arbitrary changes to the model—which should have zero effect on the collectivism coefficient—alter the coefficient from significantly positive to significantly negative to no

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## Table 1. Arbitrary changes to YAC's regressions lead to different conclusions

	YAC's	YAC's cification Arbitrary changes to YAC's specification										Corrected specification
	specification (1)											
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Reference city	Beijing	Guangzhou	Shanghai	Tianjin	Nanjing	Chengdu	Xi'an	Harbin	Hangzhou	Shenzhen	Beijing	—
Money	2.046	2.046	2.046	2.046	2.046	2.046	2.046	2.046	2.046	2.046	2.046	2.189
	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.812)	(3.924)
Male	-3.934	-3.934	-3.934	-3.934	-3.934	-3.934	-3.934	-3.934	-3.934	-3.934	-3.934	-4.358
	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.033)	(6.154)
Age ≥ 40	-1.736	-1.736	-1.736	-1.736	-1.736	-1.736	-1.736	-1.736	-1.736	-1.736	-1.736	-1.806
	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.169)	(7.396)
Computer	9.237	9.237	9.237	9.237	9.237	9.237	9.237	9.237	9.237	9.237	9.237	6.701
	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.270)	(7.334)
Coworkers	-3.016	-3.016	-3.016	-3.016	-3.016	-3.016	-3.016	-3.016	-3.016	-3.016	-3.016	-4.433
	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.490)	(6.613)
Other bystanders	-8.315	-8.315	-8.315	-8.315	-8.315	-8.315	-8.315	-8.315	-8.315	-8.315	-8.315	-9.298
	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(6.167)	(5.825)
% of rice paddies	0.456***	0.284	-1.989***	0.253*	0.718	-0.199	0.199	0.225	-0.578	-0.578	(dropped)	0.097
	(0.116)	(0.837)	(0.521)	(0.119)	(1.238)	(0.246)	(0.119)	(0.123)	(0.752)	(0.752)		(0.062)
Controls:												
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Institution FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ν	434	434	434	434	434	434	434	434	434	434	434	434
R <sup>2</sup>	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.105	0.034
Adjusted R <sup>2</sup>	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	-0.003

Notes: Ordinary least squares coefficients with robust standard errors in parentheses. Model 1 reproduces the specification reported in Column 6 of Table 2 in YAC (1), showing the relationship between their measure of civic honesty ("wallet safekeeping") and collectivism ("% of rice paddies"). Models 2 to 10 permutate the reference city when including city fixed effects, which introduces no new information and for a properly specified model should not affect any predictors or overall model fit. However, since collectivism is perfectly collinear with cities, one of the city fixed effect cannot be estimated and is instead "absorbed" by the collectivism coefficient. As a result, changing the reference city leads the collectivism coefficient to swing wildly from significantly positive (model 1) to significantly negative (model 3) to anything in between. Model 11 is identical to model 1 except we simply swap the order of the predictors when running the code for the analysis; because of the perfect collinearity between collectivism coefficient reduces by nearly 80% and is no longer statistically significant. Annotated code to reproduce all analyses is available at https://researchbox.org/1844. <sup>i</sup> P < 0.05, <sup>\*\*</sup>P < 0.01.



**Fig. 1.** Survey responses and simulation results. (A) Pairwise response percentages (95% confidence intervals) in YAC's nationally representative survey. Respondents were asked if it is dishonest to i) steal the contents of a lost wallet and ii) not contact the owner. (B) Results from 10,000 Monte Carlo simulations that match the design and coding of outcomes reported in YAC. We examine the likelihood of observing a negative treatment effect (i.e., a lower total wallet recovery rate in the Money condition) assuming no difference in total wallet recovery across conditions. YAC's design (dark gray bars) yields a negative treatment effect in 96% of simulations and a false positive rate of 41% (under the null these figures should be 50% and 5%, respectively). When we remove the data censoring issue inherent to YAC's design and rerun the simulations (light gray bars), the biased treatment effect and inflated false positive rate disappear. Annotated simulation code is available at https://researchbox.org/1844.

longer estimable. Correcting the problem requires removing city fixed effects from the model; when this is done, the relationship between collectivism and wallet safekeeping is no longer statistically significant. To be thorough, we tried 4,400 other model combinations and not once was collectivism a significant predictor.

Another core claim by YAC is that in China, "(safekeeping) conforms more with the social norms for civic honesty than the failure to contact the owner by email" (p. 3). Yet, their nationally representative survey data contradicts this claim. Respondents were asked if it is dishonest to a) steal the contents of a lost wallet and b) not contact the owner. Safekeeping implies a "Yes" response only to the first question (i.e., one should not steal, but is not obligated to contact the owner), while emailing implies "Yes" to both (i.e., one should not steal, and should contact the owner). Fig. 1A shows over twice as

many respondents endorse emailing as a norm compared to safekeeping.

Third, while YAC replicate our result that email rates are higher for wallets with money than without, they find the opposite when examining missing items from wallets that were returned. However, their analysis relies on a flawed comparison that mechanically produces this result. The negative treatment effect for total wallet recovery arises because some wallets with money are returned with money missing, while wallets without money cannot have money missing. Simulations matching YAC's study find that their design is virtually guaranteed to generate their results even when no difference exists and leads to an eightfold increase in the false positive rate (Fig. 1*B*). Testing for missing items across conditions requires all wallets to contain the same number of items.

<sup>1.</sup> Q. Yang et al., Unraveling controversies over civic honesty measurement: An extended field replication in China. Proc. Natl. Acad. Sci. U.S.A. 120, e2213824120 (2023)

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