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REPLY TO CLAESSENS ET AL.:

Maybe the Footbridge sacrifice is indeed the only one that sends a negative social signal

Edmond Awad^{a,1}, Sohan Dsouza^b, Azim Shariff^{c,1}, Iyad Rahwan^{b,d,e,1}, and Jean-François Bonnefon^{f,1}

In their letter, Claessens et al. (1) report an interesting alternate analysis of our dataset, in which relational mobility no longer predicts sacrifice in Switch and Loop but becomes a stronger predictor of sacrifice in Footbridge. As the authors mention, these results could mean that supporting the Footbridge sacrifice risks provoking social disapproval, whereas supporting the Switch and Loop sacrifices does not. Such risks would prove costlier in societies where relational mobility is limited and social relationships are less replaceable. As it turns out, every experiment we know of that showed a negative social signal of a sacrifice decision employed either the Footbridge scenario (2, 3), a comparable scenario—for example, the murder of a crying baby to avoid detection by enemy soldiers, which would result in the death of several persons (4)—or a battery of scenarios that included at least one Footbridge or comparable scenario (4, 5). The question, then, is whether this effect can be obtained when only Switch or Loop sacrifices are involved.

We do not know of any study that used the Loop scenario. However, we know of two studies that used the Switch scenario only and failed to demonstrate a negative social signal of the decision to sacrifice (2). We should be careful not to draw strong conclusions from these two studies, though, since they were conducted with North American participants—participants in Asia may not be as indifferent to the Switch sacrifice. However, the current state of evidence is compatible with the suggestion from Claessens et al.

(1): It could be that relational mobility strongly predicts sacrifice in Footbridge, but not in Switch or Loop, because only the Footbridge sacrifice sends a strong, negative social signal.

This reinterpretation would still leave us with a mystery, though. If relational mobility only affects responses in the Footbridge scenario, what is the hidden cultural variable that would explain variation in Switch and Loop? Has this cultural variable even been measured yet? Given our original findings, Ockham's razor would have argued against the existence of such a variable. The results of Claessens et al. (1) suggest reopening the case, but to solve it will probably require new, alternate analyses, as well as the consideration of new country-level variables. We encourage interested researchers to make use of our dataset in this pursuit. The statistical modeling used by Claessens et al. (1) on these data differed in many respects from the minimal modeling we adopted in our original article (6)—in a sense, the two models are two distant points in the multiverse of possible analyses (7). For example, Claessens et al. (1) chose to include data from countries with fewer than 200 participants, which were filtered out in our paper. Although we had not anticipated these specific decisions, they were possible because the entire dataset was made public, not only the subset of data that was needed to reproduce our analyses. Hopefully, this availability will prompt yet further refinements of our findings by other groups.

¹ S. Claessens, T. Kyritsis, Q. D. Atkinson, Revised analysis shows relational mobility predicts sacrificial behavior in Footbridge but not Switch or Loop trolley problems. *Proc. Natl. Acad. Sci. U.S.A.* **117**, 13203–13204 (2020).

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