

Replication of Horne et al., 2015
“Countering antivaccination attitudes”
PNAS 2015 112 (33) 10321-10324.
<https://www.pnas.org/content/112/33/10321>

The original paper contains one experiment, which is carried out over two days. In this between-subject experiment, participants are on the first day presented with the vaccine attitudes scale and beliefs on moral issues. On the second day, participants are randomized to read information on (i) risks associated with getting a disease (“disease risk”), or (ii) on research showing that vaccines do not increase the risk of autism in children (“autism correction”), or (iii) control group. After this, participants are again asked about their vaccine attitudes. We focus on the comparison of the disease risk and autism correction treatments. The positive change in attitudes toward vaccines is larger for the disease risk treatment than for the autism correction treatment.

Hypothesis to replicate and bet on: Participants who are exposed to factual information about the dangers of communicable diseases report a larger positive change in attitudes towards vaccines than participants in an alternative intervention aimed at undercutting vaccination myths. After an initial ANOVA including all three treatments, the above hypothesis is tested in an independent samples *t*-test comparing the participants’ change (posttest – pretest) in vaccine attitude scores between the disease risk treatment and the autism correction treatment (independent samples *t*-test assuming equal variances: $t(203) = 2.41, p = 0.017$); p. 10322. This test was randomly chosen.

Criteria for replication: The criteria for replication are an effect in the same direction as the original study and a *p*-value < 0.05 in a two-sided independent samples *t*-test.

Power analysis: The original study had 205 participants in the two treatments who completed the follow-up online survey (47% response rate). The standardized effect size (Cohen’s *d*) was $d = 0.337$. To have 90% power to detect 67% of the original effect size, a sample size of $n = 835$ is required.

Sample: As in the original study, we will restrict our HITs to US participants. Participation in any previous study by the original authors’ group precluded participation in subsequent studies – this is not something we can enforce. 11.2% of participants were excluded for failing attention checks on the first day, and 7.6% of participants were excluded for failing attention checks on the second day. An example of an attention check question is the following: “We just want to make sure you are paying attention. Select ‘somewhat disagree’ from the options below to pass this attention check.” We will apply the same exclusion criteria and we will make sure that participants can only participate once from the same account in this specific study, and we will only recruit participants with a HIT approval rate of 95% or higher. We will also check all IP addresses via <https://www.ipqualityscore.com/>; and we will remove any participants where one or more of the following is true: fraud score ≥ 85 ; TOR = True; VPN = True; Bot = True; abuse velocity = high. The replication sample size is the sample size after any exclusions of participants.

Materials: The original *Qualtrics* survey used in the original experiment is no longer available but all scales and treatments are available in the SI. The replication team will re-program the survey based on the available information and in consultation with the original authors.

Procedure: We will closely follow the procedure of the original experiment. The following summary of the experimental procedure is therefore largely based on the description of the experiment in the article (pp. 10322–10323):

Participants will first be shown a Captcha, and will thereafter provide informed consent. After this we will include an attention check that participants will need to pass to continue to the study. This attention check is in addition to any other potential attention check(s) used in the original study. On day 1, participants will be presented with the vaccine attitudes scale and asked to rate their agreement with each item on a six-point scale ranging from “strongly disagree” to “strongly agree.” Participants will also be asked to respond to an additional question about the link between vaccinations and autism (autism link question) and about their beliefs on several different moral issues, such as abortion and euthanasia. These additional questions are meant to serve as distractors to prevent participants from identifying the purpose of the study on day 1 and to prevent selection effects for participants returning for day 2 of the study. Finally, attention check questions will be embedded within each of these scales to ensure that participants will be properly attending to the task.

At the end of their participation on day 1, participants who passed attention check questions will be invited to return for the second part of the experiment on the following day (day 2), which will be available from the next day at 9:00 AM Pacific Standard Time and will be closed at 8:00 PM Pacific Standard Time that day.

On day 2, participants will be randomly assigned to read the information contained in the disease risk or autism correction. Participants assigned to the disease risk treatment will read three pieces of information presented in randomized order: (i) a paragraph written from a mother’s perspective about her child contracting measles, (ii) a picture of a child with measles, a child with mumps, and an infant with rubella, and (iii) three short warnings about how important it is for people to vaccinate their children. Participants assigned to the autism correction treatment will instead read information summarizing recent research showing that vaccines do not increase the risk of autism in children. The two sets of materials presented were originally compiled from information on the CDC website (www.cdc.gov). We will include timing controls that ensure that participants spend a sufficient amount of time reading the provided materials. After reading their treatment specific materials, participants will again be asked to complete the vaccine attitude scale followed by the same distractor questions as on day 1. Finally, we will ask participants several questions about their past vaccine behaviors and their intentions to vaccinate their children in the future. Participants will also be asked to provide basic demographic information.

Analysis: The analysis will be performed as in the original article. The analysis code was kindly provided by the original authors. We will compare the participants’ change in vaccine attitude scores between the disease risk condition and the autism correction condition using an independent samples *t*-test.

Subject payment: We are standardizing payments across all replications so that studies have a certain show-up fee depending on the expected length of the study, with an hourly wage from the show-up fee of \$8 and a minimum payment of \$1 (for studies with incentive payment we use the same incentive payment as in the original study; and this payment is paid in addition to the show-up fee). If we have problems recruiting, we will increase the show-up fee.