Nahmias, Coates & Kvaran (2007) Replication

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September 26, 2017

Original Study: Nahmias, Coates & Kvaran (2007)

This paper reports a preregistered replication of Experiment 1 in the paper

> Nahmias, E., Coates, D. J., & Kvaran, T. (2007). Free will, moral responsibility, and mechanism: Experiments on folk intuitions. *Midwest studies in Philosophy*, 31(1), 214-242.

Nahmias et al. (2007) collected a sample of 1124 Georgia State University undergraduates. Participants were contacted through e-mail correspondence and participated for extra credit in a critical thinking course. Each participant was randomly assigned to one of eight different conditions. Four of these conditions were most directly relevant to Nahmias et al.'s hypotheses and our replication focuses primarily on these four cases.

Participants were randomly assigned to read one vignettes which described a deterministic universe. The four crtical versions varied whether the mechanism by which determinism operated was described in psychological terms or neuroscientific terms and also whether the world that was described to participants was meant to be our own actual world, or a different alien world (called "Erta"). These descriptions read as follows (the differences between the neueroscientific and psychological descriptions of the mechanisms are indicated in brackets):

> **Real world**: Most respected neuroscientists [psychologists] are convinced that eventually we will figure out exactly how all of our decisions and actions are entirely caused. For instance, they think that whenever we are trying to decide what to do, the decision we end up making is completely caused by the specific chemical reactions and neural processes [thoughts, desires, and plans] occurring in our brains [minds]. The neuroscientists [psychologists] are also convinced that these chemical reactions and neural processes [thoughts, desires, and plans] are completely caused by our current situation and the earlier events in our lives, and that these earlier events were also completely caused by even earlier events, eventually going all the way back to events that occurred before we were born.
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> So, if these neuroscientists [psychologists] are right, then once specific earlier events have occurred in a person's life, these events will definitely cause specific later events to occur. For instance, once specific chemical reactions and neural processes [thoughts, desires, and plans] occur in the person's brain [mind], they will definitely cause the person to make the specific decision he or she makes.
>
> **Ertan world**: On Erta, the landscape and life are very similar to Earth, and there are advanced life forms called Ertans who look, talk, and behave very much like we do. For instance, the Ertans have families, schools, various jobs, parties, arguments, etc. However, the Ertans' science has advanced far beyond ours. Specifically, Ertan neuroscientists [psychologists] have discovered exactly how Ertans' brains [minds] work. For instance, they have discovered that whenever an Ertan is trying to decide what to do, the decision the Ertan ends up making is completely caused by the specific chemical reactions and neural processes [thoughts, desires, and plans] occurring in his or her brain [mind]. The neuroscientists [psychologists] have also discovered that these chemical reactions and neural processes [thoughts, desires, and plans] are completely caused by the Ertan's current situation and the earlier events in his or her life. these events were also caused by even earlier events, eventually going all the way back to the events that occurred before the Ertan was born.
>
> So, once specific earlier events have occurred in an Ertan's life, these events will definitely cause specific later events to occur. For instance, once specific chemical reactions and neural processes

> [thoughts, desires, and plans] occur in the Ertan's brain [mind], they will definitely cause the Ertan to make the specific decision he or she makes.

After reading, participants completed a simple True/False comprehension check which made sure that they understood the deterministic nature of the situation presented in the vignette. For example, in the Ertan conditions, participants completed the following comprehension check:

> **Ertan world comprehension check**: According to the story, is this statement true or false?
>
> The specific chemical reactions and neural processes [thoughts, desires, and plans] occuring an Ertan's brain [mind] at a partiular time are completely caused by the Ertan's current situation and earlier events in the Ertan's life, and these events were completely caused by even earlier events, eventually going back to the events that occured before the Ertan was born.

In the real world conditions, participants instead completed the following comprehension check:

> **Real world comprehension check**: "According to these neuroscientists [psychologists], is this statement true or false?
>
> The specific chemical reactions and neural processes [thoughts, desires, and plans] occuring in a person's brain [mind] at a partiular time are completely caused by the person's current situation and earlier events in the person's life, and these events were completely caused by even earlier events, eventually going back to the events that occured before the person was born.

After completing this comprehension check, participants rated their agreement with ten statements in random order, five of which were most critical for their hypotheses. For example, in the Ertan world cases, the five critical statements were as follows:

> **Free will**: Ertans are able to make decisions of their own free will.
>
> **Moral responsibility**: Ertans should be held morally responsible for their decisions.
>
> **Up to**: Ertan's decisions are up to them.
>
> **Blame**: If an Ertan does something bad, then he or she deserves to be blamed for it.
>
> **Praise**: If an Ertan does something good, then he or she deserves to be praised for it.

In the real world cases, the five critical statements were as follows:

> **Free will**: If the neuroscientists [psychologists] are right, then people make decisions of their own free will.
>
> **Moral responsibility**: If the neuroscientists [psychologists] are right, then people should be held morally responsible for their decisions.
>
> **Up to**: If the neuroscientists [psychologists] are right, then people's decisions are up to them.
>
> **Blame**: If the neuroscientists [psychologists] are right, then people deserve to be blamed for the bad things they do.
>
> **Praise**: If the neuroscientists [psychologists] are right, then people deserve to be praised for the good things they do.

In all conditions, participants responded on a scale from 1 ('strongly disagree') to 6 ('strongly agree'), with an additional seventh option to simply indicate "I don't know". Lastly, participants completed another similar comprehension check to ensure they had not forgotten the deterministic nature of the description they previously read, and anwered a few demographic questions.

After excluding participants who failed either one of the comprehension checks, the original study analyzed the data from 307 remaining participants. They then analayzed each of the five critical dependent measures independently using a 2 (Mechanism: Psychological vs. Neuroscientific) $\times$ 2 (World: Real vs. Ertan) analysis of variance ($ANVOA$). For judgments of *free will*, Namias et al. reported that participants more agreed that the ertan or person had free will when determinism was described as functioning through a psychological

mechanism than a neuroscientific mechanism, $F(1,298) = 36.375$, $p < 0.001$, $d = 0.69$. Similarly, for judgments of *moral responsibility*, they found that participants more agreed that the ertan or person was morally responsible psychological condition than in the neuroscientific condition, $F(1,295) = 52.81$, $p < 0.001$, $d = 0.83$. Judgments of *blame* also showed the same pattern, $F(1,294) = 44.973$, $p < 0.001$, $d = 0.77$, as did judgments of whether the agent's decisions were *up to* them, $F(1,301) = 36.45$, $p < 0.001$, $d = 0.69$, and judgments *praise*, $F(1,297) = 18.84$, $p < 0.001$, $d = 0.5$. The pattern of results across these measures was taken to support their hypothesis that most people will judge that determinism is not threatening to free will and moral responsibility if determinism is described in nonmechanistic (psychological) terms, but that significantly more people will judge determinism to be threatening to free will and moral responsibility if determinism is described in mechanistic (neuroscientific) terms.

Replication Demographic Information

For this replication, 250 participants were recruited from Amazon's mechanical turk (135 females; $M_{age} = 39.86$; $SD_{age} = 11.68$), and paid a small amount of money for participating.

Replication Methods

As in Nahmias et al. (2007), participants were randomly assigned to read one of the descriptions of determinism, which varied both whether determinism was described as operating through psychological or neuroscientific mechanisms, and either described this determinism as part of the real world or part of a different world, called "Erta". After participants read the vignette which conveyed this information, they completed a comprehension question. They then rated their agreement with 5 statements about whether agents under these conditions had free will, were morally responsibile, deserved praise, deserved blame, and whether their decisions were up to them. As in the original study, participants responded on a scale from 1 ('strongly disagree') to 6 ('strongly agree'), with a seventh option to indicate 'I don't know'. Participants then completed a second comprehension check and a a demographic questionnaire before being debriefed.

Differences from Original Study

Three notable differences between the original study and this replication are:

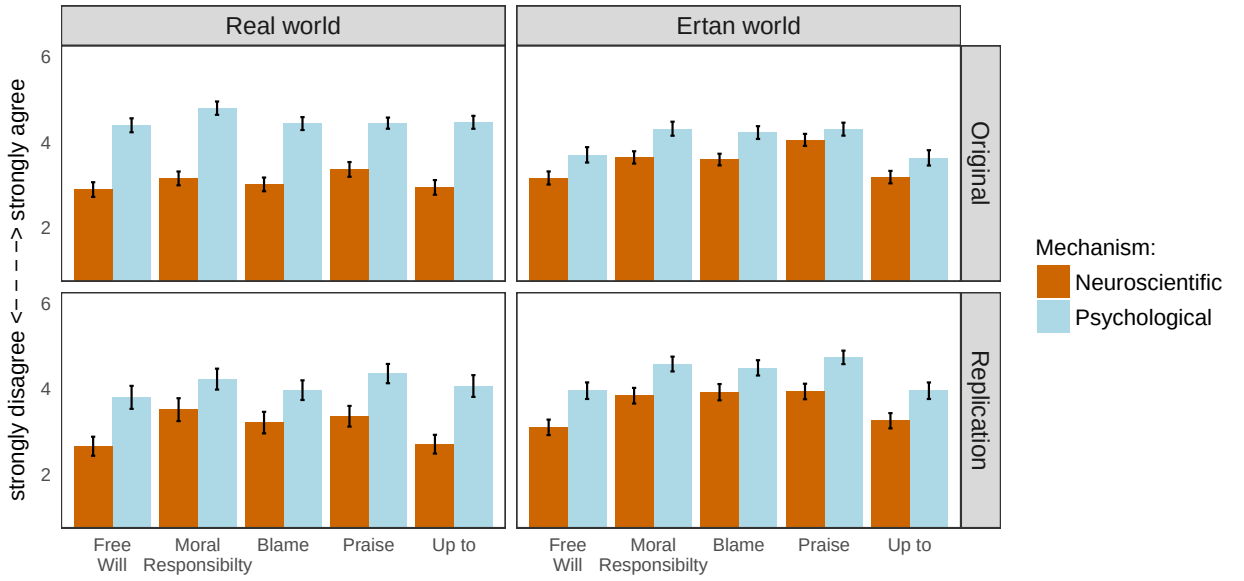
1. Participants were recruited from Amazon's Mechanical Turk (http://www.mturk.com) rather than from a critical thinking class at Georgia State University
2. Our sample size was somewhat smaller than the original study.
3. Participants only answered 5 (rather than 10) of the dependent measures included in the original study. These five measures were the ones of primary interest in the original study.

Replication Results

A total of 67 participants were excluded from our analyses, either for failing at least one of the two comprehension check or for participating twice (1 participant). To replicate the analysis preformed in the orginal study, each dependent measure was separately analyzed using a 2 (Mechanism: Psychological vs. Neuroscientific) $\times$ 2 (World: Real vs. Ertan) *ANVOA*. These analyses revealed a significant effect of mechanism on judgments of *free will*, $F(1, 172) = 20.08$, MSE $= 2.02$, $p < .001$, $\eta^2_G = .105$, *moral responsibility*, $F(1, 173) = 11.04$, MSE $= 2.08$, $p = .001$, $\eta^2_G = .060$, *blame*, $F(1, 173) = 8.72$, MSE $= 2.05$, $p = .004$, $\eta^2_G = .048$, *praise*, $F(1, 175) = 18.14$, MSE $= 1.84$, $p < .001$, $\eta^2_G = .094$, and whether or not the agent's decisions were *up to* them, $F(1, 175) = 20.94$, MSE $= 1.94$, $p < .001$, $\eta^2_G = .107$.

While there are some differences from the original study, these patterns overall indicate a successful replicaton of Experiment 1 in Nahmias et al. (2007).

Replication Graph



Related Resources

- The experiment can be viewed at:
  - http://mprlab327.webfactional.com/games/jphil/XphiRep/Nahmias2007/code/index.html
- The pre- and post-registration materials, data, and script for this write-up can be found at:
  - https://osf.io/pjdkg/
- The original paper can be found here:
  - http://djustincoates.com/uploads/3/1/5/2/3152230/nahmias_et_al-2007-midwest_studies_in_philosophy.pdf

Table of descriptive statistics

question	mechanism	world	N	mean	sd	se	version
Blame	Neuroscientific	Ertan world	65	3.920635	1.527190	0.1894246	Replication
Blame	Neuroscientific	Real world	42	3.210526	1.630087	0.2515279	Replication
Blame	Psychological	Ertan world	45	4.488889	1.198905	0.1787222	Replication
Blame	Psychological	Real world	31	3.967742	1.277599	0.2294635	Replication
Free Will	Neuroscientific	Ertan world	65	3.100000	1.457883	0.1808282	Replication
Free Will	Neuroscientific	Real world	42	2.658537	1.442390	0.2225655	Replication
Free Will	Psychological	Ertan world	45	3.955556	1.296070	0.1932067	Replication
Free Will	Psychological	Real world	31	3.800000	1.494819	0.2684774	Replication
Moral Responsibilty	Neuroscientific	Ertan world	65	3.838710	1.473187	0.1827264	Replication
Moral Responsibilty	Neuroscientific	Real world	42	3.512821	1.730102	0.2669605	Replication
Moral Responsibilty	Psychological	Ertan world	45	4.577778	1.157758	0.1725884	Replication
Moral Responsibilty	Psychological	Real world	31	4.225807	1.359158	0.2441121	Replication
Praise	Neuroscientific	Ertan world	65	3.937500	1.457057	0.1807257	Replication
Praise	Neuroscientific	Real world	42	3.358974	1.564191	0.2413599	Replication
Praise	Psychological	Ertan world	45	4.733333	1.053134	0.1569919	Replication
Praise	Psychological	Real world	31	4.354839	1.252954	0.2250371	Replication

question	mechanism	world	N	mean	sd	se	version
Up to	Neuroscientific	Ertan world	65	3.253968	1.436486	0.1781742	Replication
Up to	Neuroscientific	Real world	42	2.707317	1.418519	0.2188822	Replication
Up to	Psychological	Ertan world	45	3.954546	1.293176	0.1927753	Replication
Up to	Psychological	Real world	31	4.064516	1.412692	0.2537270	Replication
Blame	Neuroscientific	Ertan world	90	3.590000	1.290000	0.1359779	Original
Blame	Neuroscientific	Real world	81	3.010000	1.440000	0.1600000	Original
Blame	Psychological	Ertan world	65	4.220000	1.200000	0.1488417	Original
Blame	Psychological	Real world	71	4.430000	1.270000	0.1507213	Original
Free Will	Neuroscientific	Ertan world	90	3.160000	1.450000	0.1528434	Original
Free Will	Neuroscientific	Real world	81	2.890000	1.540000	0.1711111	Original
Free Will	Psychological	Ertan world	65	3.700000	1.450000	0.1798504	Original
Free Will	Psychological	Real world	71	4.390000	1.370000	0.1625891	Original
Moral Responsibilty	Neuroscientific	Ertan world	90	3.640000	1.360000	0.1433566	Original
Moral Responsibilty	Neuroscientific	Real world	81	3.150000	1.450000	0.1611111	Original
Moral Responsibilty	Psychological	Ertan world	65	4.310000	1.320000	0.1637258	Original
Moral Responsibilty	Psychological	Real world	71	4.790000	1.310000	0.1554684	Original
Praise	Neuroscientific	Ertan world	90	4.050000	1.330000	0.1401943	Original
Praise	Neuroscientific	Real world	81	3.360000	1.550000	0.1722222	Original
Praise	Psychological	Ertan world	65	4.300000	1.220000	0.1513224	Original
Praise	Psychological	Real world	71	4.440000	1.100000	0.1305460	Original
Up to	Neuroscientific	Ertan world	90	3.180000	1.380000	0.1454648	Original
Up to	Neuroscientific	Real world	81	2.940000	1.540000	0.1711111	Original
Up to	Psychological	Ertan world	65	3.630000	1.440000	0.1786100	Original
Up to	Psychological	Real world	71	4.460000	1.270000	0.1507213	Original