

Replication of

## Happiness and Time Preference: The Effect of Positive Affect in a Random-Assignment Experiment

by Ifcher, J./Zarghamee, H. (2011)

in: The American Economic Review, 101(7), pp. 3109–3129.

### Replication Authors:

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Ifcher and Zarghamee study the causal effect of a mood-inducing film clip on time preference. They conclude that exposure to a positive-affect inducing film increases patience (measured by  $p/m$ , where  $p$  is the present value of a reward  $m$  available in the future).

### Hypothesis to bet on:

Showing subjects a film clip inducing positive affect will increase measured patience, excluding subjects who do not discount at all (Table 3, column 5).

### Power Analysis

The simplest effect (Table 3, column 1) of the causal treatment is significant at  $p = .054$ . However, we will focus attention on the regression that excludes subjects who did not discount at all (Table 3, column 5). Excluding the non-discounters is done because non-discounters may be using a simple heuristic that will not permit a causal effect of happiness, and this type of behavior is highly unusual in other subject pools. The  $t$ -statistic on the treatment effect from the focus regression (column 5) is  $t = 2.997/1.352 = 2.217$  with a corresponding two-tailed  $p$ -value of 0.031.

The original sample size is 69 participants of which 58 discounted. To achieve 90% power the required sample size is 131 participants. Note that target sample size must consist only of discounters, so we need to enlarge the sample size such that the net number is 131 (excluding non-discounters).

### Sample

The sample for replication consists of 131 students (after excluding non-discounters) from the Nuffield College (Oxford, UK) subject pool. In the original sample, “*sixty-nine undergraduate students were recruited from introductory English courses that all Santa Clara students are required to take; these courses were chosen in an attempt to avoid potential disciplinary bias.*” Santa Clara is a Jesuit university, and students are rather religious, three-quarters Christian, and 63% white. We will not use any inclusion or exclusion criteria to match this sample to the original Santa Clara sample.

### Materials

We use the material of the original experiment (paper and pencil) along with the original instructions.

### Procedure

We follow the procedure of the original article, with only slight but unavoidable devia-

tions as outlined below. The following summary of the experimental procedure is therefore based on the section “II. Experimental Design” (pp. 3112–3115) in the original study.

In the experiment, subjects first see a mood-inducing video clip. Before making choices, subjects will see either of two film clips. The positive affect clip is a montage of Robin Williams comedy bits from 2002. The neutral clip is landscapes and nature images. We will replicate the experiment using these clips. We must note that Robin Williams committed suicide in August 2014. It is possible that this event and other events will influence the affect induced by this particular clip. However, we are not comfortable trying to repair any such change in induced affect by using a different clip (instead, we will add the following debriefing at the very end of the experiment: (a) Did you know that Robin Williams died last year? [i.e. in 2014] (b) If you did know this, please indicate whether, and how much, this influenced how much you liked the film clip: 1 (it made me even happier) 3 (did not have an affect) 5 (it made me even sadder).)

Then, subjects make a series of 30 decisions equating present-equivalent payments to future payments of amount  $m$  at time delay  $t$  (for five values of  $m$  and six values of  $t$ ). One of the 30 decisions will be chosen for payment, using a BDM procedure that will be explained to subjects. (We will follow the original instructions as closely as possible.) After these 30 choices they rate each of 16 affects on a 10-point scale (PANAS), and answer two additional questions about how the film clip affected their mood.

The experimental procedure for actual payment will not closely follow the original, which made a very special effort to equalize transactions costs. In the original procedure, subjects were issued “certificates of guarantee” which could be redeemed at a different building than the one in which the experimental session is conducted, after a certain point in time (no sooner than one hour after the end of the experiment). The certificates include contact information for

the experimenters and instructions to contact the experimenters if there are any problems redeeming their certificates.

In the original study, subjects are also informed of the anonymous and blind nature of the payment process. They are told (i) that one person will prepare the payment envelopes; (ii) that a second person will distribute the sealed payment envelopes; (iii) that neither will know the subject’s identity, only the subject identification number; and (iv) that the envelope-distributor will not know the payment amount.

Our replication will instead pay subjects by issuing Amazon giftcards (credit to buy Amazon products) using email delivery. Following the original procedure, payments corresponding to “today” will be emailed one hour after the experiment ends. Other payments will be emailed to arrive at 9 am of the day they are payable.

After making their 30 choices and making PANAS ratings, the single question chosen for payment is resolved using BDM. Then subjects answer questions regarding their demographic and psychological characteristics, including happiness and personality traits. Subjects then will be paid based on the same incentives as in the original study.

## **Analysis**

The analysis will be performed exactly as in the original article. We will conduct further analysis, particularly including two self-reported ratings of the mood induction. Those ratings are “subjects were asked whether the film clip made them happier, sadder, or neither; and whether the film clip put them in a better mood, worse mood, or neither.” These should be included on the right hand side of the Table 3 regression (provided their inclusion does not create too much collinearity with the treatment dummy), as the ratings correct for subjects in whom the mood-induction did not work as required for internal validity.

## Differences from Original Study

The replication procedure is identical to that of the original study, with some unavoidable deviations and a difference in payment procedure. The subject pools are likely to be somewhat different. Collecting the same demographic data, and performing the analysis which uses these covariates, should help reduce any such effects. The replication will be performed on students and non-students from the Nuffield College (Oxford, UK) subject pool, while the original data was gathered at Santa Clara University. The experiment will be in English as in the original study.

## Replication Results

The total of 168 subjects participated in the replication experiments (86 in the positive mood treatment and 82 in the neutral treatment), of which 131 discounted. An ordinary least squares regression with standard errors clustered by the individual yields a treatment effect coefficient equal to  $-0.057$ , which is statistically insignificantly different from zero with a (two-sided)  $p$ -value equal to  $0.933$  (see Table 1). Given the effect size of  $2.997$  of the original experiment, the relative effect size of the replication equals  $-1.90\%$ . The inclusion of demographic dummies (college, gender, race, religion, practicing, family income, self-reported happiness; column (8) of Table 3 in the original article) does not change the conclusion: the estimated coefficient on main treatment dummy is  $-0.136$  ( $p = 0.799$ ).

Note that the positive-affect film clip did not induce mood in the same way as in the original study (see Tables 4–5). This could be due to a combination of elapsed years, differences between original (American) and replication-sample (British) tastes for comedy and happiness, or the well-known suicide by the comedian depicted in the original positive-affect clip.

We conduct further analysis including two self-reported ratings of the mood induction. We include two dummies indicating (i) “the film

clip made me happier” and (ii) “the film clip made me sadder” and interactions with the main treatment dummy, and other two dummies (iii) “the film clip put me in a better mood” and (iv) “the film clip put me in a worse mood” and interactions with the main treatment dummy. We also include the same set of demographic variables as in the previous regression (Table 1, (8)). The result is reported in Table 2. Column (1) outlines that the effect of positive affect treatment *for those who felt happier after seeing the video clip* (compared with those in neutral affect treatment and felt no difference in happiness/mood after seeing the video clip) is given by  $\beta + \phi_H + \tau_H = 0.442$ , statistically insignificant from 0 ( $p = 0.557$ ). Similarly, column (2) shows that the effect of positive affect treatment *for those who felt better mood after seeing the video clip* (compared with those in neutral affect treatment and felt no difference in happiness after seeing the video clip) is given by  $\beta + \phi_B + \tau_B = -0.116$ , statistically insignificant from 0 ( $p = 0.868$ ). Including all dummies does not affect the result:  $\beta + \phi_H + \tau_H = 0.589$  ( $p = 0.563$ ),  $\beta + \phi_B + \tau_B = -1.38$  ( $p = 0.201$ ).

## Unplanned Protocol Deviations

The replication experiments were conducted exactly in the way as described above without any deviations from the protocol.

## Discussion

Given the criteria and procedure outlined above, the hypothesis of interest has not been replicated at a significance level of  $\alpha < 5\%$ . The relative effect size equals  $-1.90\%$  and the  $p$ -value of the hypothesis test is  $0.993$ .

The original result testing the joint hypothesis of happiness induction and induced happiness changing time preference is not replicated: a film clip which induced positive affect in the original study did not increase measured patience using the planned statistical test. The main treatment effects reported in Table 1 exhibit the opposite sign (albeit insignificantly dif-

ferent from zero). The additional regression reported in Table 2 is intended to correct for subjects in whom the mood-induction did not work as required for internal validity.

We also run additional regressions in which we include four dummies (similar to regressions in Table 2): (i) “the film clip made me happier” (Happier) and (ii) “the film clip made me sadder” (Sadder) and interactions with main treatment dummy, and other two dummies (iii) “the film clip put me in a better mood” (Better M) and (iv) “the film clip put me in a worse mood” (Worse M). We run regressions for each treatment separately as well as on pooled data from both treatments. The results are reported in Table 3. In the positive-affect treatment (column (6)), the effect of the video clip is 2.080, marginally significant at  $p = 0.093$ .

Mood induction is the key in this experiment. It had the intended effect on affect in the original article: *“The net positive affect—the sum of the positive affects minus the sum of negative affects from the PANAS—of subjects in the positive-affect treatment was significantly higher than subjects in the neutral-affect treatment (7.364 versus 0.531,  $p$ -value = 0.048*

*for one-sided  $t$ -test).”* In the replication study, mood inducement did not have the intended effect on affect. The net positive affect from the PANAS of subjects in the positive-affect treatment was in fact lower than that of subjects in the neutral-affect treatment ( $-2.10$  versus  $2.74$ ,  $p = 0.041$  for one-sided  $t$ -test). Although the response scale was between 1 and 10, some subjects used 0. The above result is unaffected even after replacing those responses to the minimum possible answer, namely 1.

Tables 4 and 5 show the number of subjects who felt happier/sadder or in better/worse mood after seeing the video clip in the two treatments. We observe that 11 out of 86 subjects in the positive-affect treatment actually felt sadder after seeing the clip (compared to only 1 in neutral-affect treatment). The reason is as follows. About 90% of subjects in the positive-affect treatment knew that “Robin Williams has died in 2014.” Of those, 14.8% of subjects answered “it made me even happier,” 39.5% of subjects answered “it did not influence how I felt about the clip,” and 45.7% of subjects answered “it made me even sadder.”

**Table 1:** Estimation results (replication of Table 3 in the original article)

	<i>Original Study</i>			<i>Replication Study</i>		
	(1)	(5)	(8)	(1)	(5)	(8)
Treatment	2.202* (1.124)	<b>2.997**</b> (1.352)	3.507*** (1.207)	-0.298 (0.468)	<b>-0.057</b> (0.672)	-0.136 (0.533)
Discounter		Yes	Yes		Yes	Yes
College			Yes			Yes
Gender			Yes			Yes
Race			Yes			Yes
Religion			Yes			Yes
Practicing			Yes			Yes
Income			Yes			Yes
Happiness			Yes			Yes
Observations	2065	1471	1447	5400	3176	3146
Clusters	69	58	57	168	131	130

\*\*\* Significant at the 1 percent level  
 \*\* Significant at the 5 percent level  
 \* Significant at the 10 percent level

**Table 2:** Additional estimation results

		(1)	(2)	(3)
Treatment	$(\beta)$	-0.451	-0.694	-0.858
Happier	$(\phi_H)$	-0.015		-0.328
Sadder	$(\phi_S)$	0.146		-0.397
Treatment x Happier	$(\tau_H)$	0.908		1.775
Treatment x Sadder	$(\tau_S)$	-0.570		0.213
Better Mood	$(\phi_B)$		-0.891	-0.676
Worse Mood	$(\phi_W)$		-11.410***	-11.578***
Treatment x Better	$(\tau_B)$		1.469	0.152
Treatment x Worse	$(\tau_W)$		11.250***	11.736***
Discounter		Yes	Yes	Yes
College		Yes	Yes	Yes

\*\*\* Significant at the 1 percent level  
 \*\* Significant at the 5 percent level  
 \* Significant at the 10 percent level

**Table 3:** Estimation results (replication of Table 3 in the original article)

	<i>Neutral-Affect Treatment</i>			<i>Positive-Affect Treatment</i>			<i>Pooled</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Happier	0.022		-1.559	1.410		2.080*	0.429		0.782
Sadder	1.845		-0.179	-1.370		-0.759	-0.433		0.763
Better m		-0.689	0.403		0.673	-0.910		-0.074	-0.651
Worse m		-11.430***	-11.851***		-3.312	-2.570		-3.261	-3.623
Observations	1456	1456	1456	1690	1690	1690	3146	3146	3146
Clusters	62	62	62	68	68	68	130	130	130

\*\*\* Significant at the 1 percent level  
 \*\* Significant at the 5 percent level  
 \* Significant at the 10 percent level

**Table 4:** Number of subjects that felt happier, sadder, or neither after the film clip

Treatment	Happier	Neither	Sadder	Total
Positive-Affect	27	48	11	86
Neutral-Affect	24	57	1	82

\*\*\* Significant at the 1 percent level  
 \*\* Significant at the 5 percent level  
 \* Significant at the 10 percent level

**Table 5:** Number of subjects that felt in a better mood, worse mood, or neither after the film clip

Treatment	Better Mood	Neither	Worse Mood	Total
Positive-Affect	28	51	7	86
Neutral-Affect	28	52	2	82

\*\*\* Significant at the 1 percent level  
 \*\* Significant at the 5 percent level  
 \* Significant at the 10 percent level