Supplementary Materials

for

Accentuation and compatibility: Replication and extensions of Shafir (1993) to rethink Choosing versus Rejecting paradigms

*Subramanya Prasad Chandrashekar
Institute of International Business and Governance,
Lee Shau Kee School of Business and Administration,
Open University of Hong Kong
spchandr@ouhk.edu.hk
ORCID: 0000-0002-8599-9241

*Jasmin Weber, *Sze Ying Chan, *Won Young Cho, *Tsz Ching Connie Chu
Department of Psychology, University of Hong Kong, Hong Kong SAR
u3553075@connect.hku.hk (s1047897@stud.sbg.ac.at); csy1029@connect.hku.hk; wycho19@connect.hku.hk (chowonyoung052196@gmail.com); u3519356@connect.hku.hk (conniechutc@gmail.com)

Bo Ley Cheng
Department of Psychology, University of Hong Kong, Hong Kong SAR
boleyc@hku.hk

^*Gilad Feldman
Department of Psychology, University of Hong Kong, Hong Kong SAR
gfeldman@hku.hk
ORCID: 0000-0003-2812-6599

*Contributed equally, joint first authors
^Corresponding author

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Table S0

Authors' contribution table

Role	Prasad	Jasmin Weber, Chan Sze Ying, Won Young Cho, and Chu Tsz Ching	Boley Cheng	Gilad Feldman
Conceptualization		X		X
Pre-registration		X		X
Data curation				X
Formal analysis	X	X		
Funding acquisition				X
Investigation	X	X		X
Methodology		X		X
Pre-registration peer review / verification	X	X	X	X
Data analysis peer review / verification	X	X		
Project administration			X	X
Resources				X
Software	X	X		
Supervision			X	X
Validation	X			
Visualization	X			
Writing-original draft	X			X
Writing-review and editing	X			X

Note: In the table above, we employ CRediT (Contributor Roles Taxonomy) to identify the contribution and roles played by the contributors in the current replication effort. Please refer to the URL (https://www.casrai.org/credit.html) on details and definitions of each of the roles listed in the table.

Power analyses

We conducted a power analysis of the results described in Shafir (1993) ($\alpha = .05$, power = .95, G*Power 3.1.9.3). Based on the smallest effect size reported in the Shafir (1993) a required sample size of 1092 subjects was determined. Please refer to Appendix A for detailed power analysis for each of contrasts in the original study.

Open Science

Data and code

Data and code are shared using the Open Science Framework. Review link for data and code of the study: https://osf.io/ve9bg/

Pre-registrations and Qualtrics study designs

link: https://osf.io/r4aku

Procedure and data disclosures

Data collection

Data collection was completed before analyzing the data.

Conditions reporting

All collected conditions are reported.

Data exclusions

Details are reported in the materials section of this document

Variables reporting

All variables collected for this study are reported and included in the provided data.

Formulas employed in the R functions

R does not yet have functions and packages that allow us to conduct one proportions test and two-proportions test directly. Therefore, we built functions to calculate that calculated z-statistic based on the formulas noted below:

Two proportions test:

$$Z = \frac{(\hat{p}_1 - \hat{p}_2)}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

where:

p1= proportion of subjects with the characteristic of interest in the 1st group (x1/n1)
p2= proportion of subjects with the characteristic of interest in the 2nd group (x2/n2)

and:

$$\hat{p} = \frac{x_1 + x_2}{n_1 + n_2}$$

The R function calculated the estimate of the two proportions, the p-value based on the above formula.

One proportions test:

Again for one proportion test the normal approximation to the binomial distribution to calculate a test statistic ***z.***

The formula for a z-statistic is:

$$z = \frac{\bar{p} - p_0}{\sqrt{p_0(1-p_0)/n}}$$

Where

- n = Sample size
- p_o = Null hypothesized value
- p-dash = Observed proportion

The R function calculated the estimate of the one proportion z-test, the p-value based on the above formula.

Calculation of effect size:

The effect size was calculated by converting the standard normal deviate (z) into the strength of association (r) using Rosenthal (1984, p.25) and then to the standardized mean difference (Cohen's d) using the equation from Friedman (1968, p.246)

$$r = \frac{z}{\sqrt{N}}$$ ---------- Rosenthal (1984, p.25)

$$d = \frac{2r}{\sqrt{1-r^2}}$$ ---------- Friedman (1968, p.246)

Project Process Outline

The current replication is part of the mass pre-registered replication project, with the aim of revisiting well-known research findings in the area of judgment and decision making (JDM) and examining the reproducibility and replicability of these findings.

For each of the replication projects, researchers completed full pre-registrations, data analysis, and APA style submission-ready reports. Each of these four researchers (second to fifth author) independently reproduced the materials and designed the replication experiment, with a separate pre-registration document. The researchers then peer-reviewed one another to try and arrive at the best possible design. Then, then the last two authors reviewed the integrated work and the last corresponding author made final adjustments and conducted the pre-registration and data collection.

The OSF page of the project contains one Qualtrics survey design used for data collection with four pre-registration documents submitted by each of the researchers. In the manuscript, we followed the most conservative of the four pre-registrations.

Verification of Analyses

Initial analyses were conducted by the independent researchers, who were used JAMOVI (jamovi project, 2018) in the analyses. In preparing this manuscript, the lead and corresponding authors verified the analyses in R. One proportions test, two-proportions test, and T-tests were conducted using base R package, point estimates and confidence intervals for Cohen's d were calculated using 'esc' or 'lsr' R package.

Materials and scales used in the experiment

Procedure

Subjects were randomly assigned to one of the two conditions, and in each condition, read eight problems. The survey followed the following sequence:

- Subjects signed the consent form. Then were given instructions, and then were randomly assign to one of the two conditions.
- Demographics questions.
- After that, subjects filled the funneling section that checked if they are seriously filling in the survey, and if they can guess the purpose of the study.

Exclusion criteria

In the pre-registration we included the following:
"We will focus on our analyses on the full sample. However, as a supplementary analysis and to examine any potential issues, we will also determine further findings reports with exclusions. In any case, we will report exclusions in detail with results for full sample and results following exclusions (in either the manuscript or the supplementary).
General criteria:

1. Subjects indicating a low proficiency of English (self-report<5, on a 1-7 scale)
2. Subjects who self-report not being serious about filling in the survey (self-report<4, on a 1-5 scale).
3. Subjects who correctly guessed the hypothesis of this study in the funneling section.
4. Have seen or done the survey before
5. Subjects who failed to complete the survey. (duration = 0, leave question blank)
6. Not from the United States"

Instructions and experimental material

All subjects first read the instruction:

> *This survey consists of a scale, followed by 8 decision-making problems with 2-3 items each. In each problem, you will first make your decision on two or more options in each problem, followed by rating your feelings about each option on a 6-point scale.*
>
> *Read the questions and choice options carefully.*
> *There are no right or wrong answers, please answer to the best of your understanding, based on your own preferences and intuition.*

After that, subjects answered 6 survey items (order randomized) on a scale that ranged between *1 (Strongly disagree) and 7 (Strongly agree)*. Two of the six items were attention check items. The read:

> *Before we begin with the scenarios, please answer these short questions about your general attitudes towards choice by indicating your agreement with the following statements.*

- It's very hard for me to choose between many alternatives.
- When faced with an important decision, I prefer that someone else chooses for me.
- The more choices I have in life, the better.

- In each decision I face, I prefer to have as many options as possible to choose from.
- Fifty is more than one hundred.
- I am human and I read each item carefully.

After that, subjects were randomly assigned to one of two experimental conditions and in each Answered 8 problems. The order of the problems within each condition was randomized.

Experimental condition: Choosing

i. Problem 1

Scenario - Imagine that you serve on the jury of an only-child sole-custody case following a relatively messy divorce. The facts of the case are complicated by ambiguous economic, social, and emo-tional considerations, and you decide to base your decision entirely on the following few observations.

Question - To which parent would you **award** sole custody of the child?

Options:

Parent A

average income

average health

average working hours

reasonable rapport with the child

relatively stable social life

Parent B

above-average income

very close relationship with the child

extremely active social lira5bfe

lots of work-related travel

minor health problems

ii. Problem 2

Scenario - Imagine that you are planning a week vacation in a warm spot over spring break. You currently have two options that are reasonably priced. The travel brochure gives only a limited amount of information about the two options.

Question - Given the information available, which vacation spot would you **prefer**?

Options:

Spot A

average weather

average beaches

medium-quality hotel

medium-temperature water

average nightlife

Spot B

lots of sunshine

gorgeous beaches and coral reefs

ultra-modern hotel

very cold water

very strong winds

no nightlife

iii. Problem 3

Scenario - Assume that you are an undergraduate student and would eventually need to take two courses to fulfill your graduation requirements. But you could only take one in the coming semester, and the other at some time later. You need to make your decision based on the characteristics of the courses.

Question - With the information below, which course would you take in the coming semester?

Options:

Course X is considered an average course, with a reasonable reading list, and with an average work load.

Course Y has an extremely interesting reading list and is taught by a professor who is supposed to be very good. It has the reputation of a tough course, slow-going at times, and it meets more hours per week than the usual.

iv. Problem 4

Scenario - Imagine that you were invited to play one of the following two lotteries.

Question - Which one would you **prefer**?

Options:

Lottery 1 You have a 50% chance to win $50, otherwise nothing.

Lottery 2 You have an 80% chance to win $150, and a 20% chance to lose $10.

v. Problem 5

Scenario - Imagine that you were invited to play one of the following two lotteries.

Question - Which one would you **prefer**?

Lottery 1 You have a 20% chance to win $50, otherwise nothing.

Lottery 2 You have a 60% chance to win $100, and a 40% chance to lose $5.

vi. Problem 6

Scenario - You go to your favorite ice-cream parlor, and have to decide between two flavors: Flavor A is good; Flavor B is excellent, but is high in cholesterol.

Question - Which do you **choose**?

Flavor A Good

Flavor B Excellent, but is high in cholesterol

vii. Problem 7

Scenario - Imagine that you are voting for the president of your town council. You are now considering two final candidates. A friend who is knowledgeable in the area of local politics gives you the following information about them. You find the choice difficult and are trying to decide which candidate to vote for.

Question - Based on the information below, which candidate would you decide to **vote for**?

Candidate A

Enjoys camping and other outdoor activities

Is a local businessman

Was voted "Most Enthusiastic" in high school

Has two children enrolled in the local elementary school

Majored in history in college

Candidate B

Served honorably as the vice president of the council last term

Organized a fund raiser to support the local children's hospital

Was voted "Best Looking" in high school

Has bragged about his promiscuity in the past

Refused to disclose income tax records despite repeated requests

viii. Problem 8

Scenario - Imagine that you were invited to play one of the following three lotteries.

Question - Which one would you **prefer**?

Lottery 1 You have a 50% chance to win $50, otherwise nothing.

Lottery 2 You have a 60% chance to win $50, otherwise nothing.

Lottery 3 You have an 80% chance to win $150, and a 20% chance to lose $20.

Extension question followed by the decision for every problem

Question - Please rate each option from 0 (very bad) to (very good)

0. Very bad
1. Bad
2. Slightly bad
3. Slightly good
4. Good
5. Very good

Experimental condition: Rejecting

b. Independent variable manipulation

i. Problem 1

Scenario - Imagine that you serve on the jury of an only-child sole-custody case following a relatively messy divorce. The facts of the case are complicated by ambiguous economic, social, and emo-tional considerations, and you decide to base your decision entirely on the following few observations.

Question - To which parent would you **deny** sole custody of the child?

Options:

Parent A

average income

average health

average working hours

reasonable rapport with the child

relatively stable social life

Parent B

above-average income

very close relationship with the child

extremely active social lira5bfe

lots of work-related travel

minor health problems

ii. Problem 2

Scenario - Imagine that you are planning a week vacation in a warm spot over spring break. You currently have two options that are reasonably priced. The travel brochure gives only a limited amount of information about the two options.

Question - Given the information available, which vacation spot would you **cancel**?

Options:

Spot A

average weather

average beaches

medium-quality hotel

medium-temperature water

average nightlife

Spot B

lots of sunshine

gorgeous beaches and coral reefs

ultra-modern hotel

very cold water

very strong winds

no nightlife

iii. Problem 3

Scenario - Assume that you are an undergraduate student and would eventually need to take two courses to fulfill your graduation requirements. But you could only take one in the coming semester, and the other at some

time later. You need to make your decision based on the characteristics of the courses.

Question - With the information below, which course would you **leave for later**?

Options:

Course X is considered an average course, with a reasonable reading list, and with an average work load.

Course Y has an extremely interesting reading list and is taught by a professor who is supposed to be very good. It has the reputation of a tough course, slow-going at times, and it meets more hours per week than the usual.

iv. Problem 4

Scenario - Imagine that you were invited to play one of the following two lotteries.

Question - Which one would you **give up**?

Options:

Lottery 1 You have a 50% chance to win $50, otherwise nothing.

Lottery 2 You have an 80% chance to win $150, and a 20% chance to lose $10.

v. Problem 5

Scenario - Imagine that you were invited to play one of the following two lotteries.

Question - Which one would you **give up**?

Lottery 1 You have a 20% chance to win $50, otherwise nothing.

Lottery 2 You have a 60% chance to win $100, and a 40% chance to lose $5.

vi. Problem 6

Scenario - You go to your favorite ice-cream parlor, and have to decide between two flavors: Flavor A is good; Flavor B is excellent, but is high in cholesterol.

Question - Which do you **give up**?

Flavor A Good

Flavor B Excellent, but is high in cholesterol

vii. Problem 7

Scenario - Imagine that you are voting for the president of your town council. You are now considering two final candidates. A friend who is knowledgeable in the area of local politics gives you the following information about them. You find the choice difficult and are trying to decide which candidate to vote for.

Question - Based on the information below, which candidate would you decide to **not vote for**?

Candidate A

Enjoys camping and other outdoor activities

Is a local businessman

Was voted "Most Enthusiastic" in high school

Has two children enrolled in the local elementary school

Majored in history in college

Candidate B

Served honorably as the vice president of the council last term

Organized a fund raiser to support the local children's hospital

Was voted "Best Looking" in high school

Has bragged about his promiscuity in the past

Refused to disclose income tax records despite repeated requests

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Lottery 3 You have an 80% chance to win $150, and a 20% chance to lose $20.

Extension question followed by the decision for every problem

Question - Please rate each option from 0 (very bad) to (very good)

0. Very bad
1. Bad
2. Slightly bad
3. Slightly good
4. Good

5. Very good

Funneling section
Three funneling questions:

- *What do you think the purpose of the last part was?*
- *Have you ever seen the materials used in this study or similar before? If yes - please indicate where*
- *Did you spot any errors? Anything missing or wrong? Something we should pay attention to in next runs? (Briefly, up to one sentence, write "none" if not relevant)*

Finally, subjects were asked to fill in demographics and were debriefed. No filler items were included.

Additional Tables and Figures

Moved from the main manuscript to keep manuscript short and concise.

Table S1

Difference and similarities between original studies and the replication attempt

	Original Study	Replication Study	Reason of changes
Number of problems per subject	Author of the original study notes that on an average 2 or 3 problems reported in the original study were present to a subject	Subjects provided a response to all the 8 problems	The current study with an aim to replicate the effects of the original study included all the 8 problems.
Filler items	Included	Not included	Including filler items (e.g., unrelated) along with 8 problems have caused respondent fatigue could lead to deterioration of the quality of the responses.
Procedure	Problems were presented in a booklet format	An online survey (Qualtrics) was used.	Allows minimal error in data collection and entry, and useful in faster data collection.
Sample population	Undergraduates from American university.	The online marketplace Amazon Mechanical Turk (mTurk) from an expected that the recruited subjects varied on demographic variables.	To recruit more subjects
Sample Size	Ranged between 139 to 424 across 8 problems	1028 across four experimental conditions (average of 257 subjects/condition)	See power analysis in Supplementary material Part

Table S2

Preregistration planning and deviation documentation

Components of pre-registration	Were there deviations?	If yes describe the details of the deviation(s)	Rationale for deviation	How might the results be different if had not deviated
Procedures	No	N/A	N/A	N/A
Power analysis	No	N/A	N/A	N/A
Exclusion rules	No	N/A	N/A	N/A
Evaluation criteria	Minor	N/A	N/A	N/A
Analysis	Minor additions	Bayesian analysis was performed in addition to null-hypothesis significance tests (NHST).	Bayesian analysis is useful in testing for and quantifying an absence of an effect	With the additional tests along with NHST tests, we are not only able to falsify predictions about the presence of effects, but also declare the absence of meaningful effects.
		Additional analysis that tested for the Accentuation hypothesis.	The collected that closely matched the replication also allowed for testing of the alternate predictions based on the Accentuation hypothesis (Wedell, 1997)	The results of the replication do not change with the additional analysis that tested Accentuation hypothesis

Figures

Target similarity	Highly similar				Highly dissimilar
Category	Direct replication			Conceptual replication	
Design facet	**Exact replication**	**Very close replication**	**Close replication**	**Far replication**	**Very far replication**
IV operationalization	Same	Same	Same	Different	
DV operationalization	Same	Same	Same	Different	
IV stimuli	Same	Same	Different		
DV stimuli	Same	Same	Different		
Procedural details	Same	Different			
Physical setting	Same	Different			
Contextual variables	Different				

Figure S1. Criteria for evaluation of replications by LeBel et al. (2018). A classification of relative methodological similarity of a replication study to an original study. "Same" ("different") indicates the design facet in question is the same (different) compared to an original study. IV = independent variable. DV = dependent variable. "Everything controllable" indicates design facets over which a researcher has control. Procedural details involve minor experimental particulars (e.g., task instruction wording, font, font size, etc.).

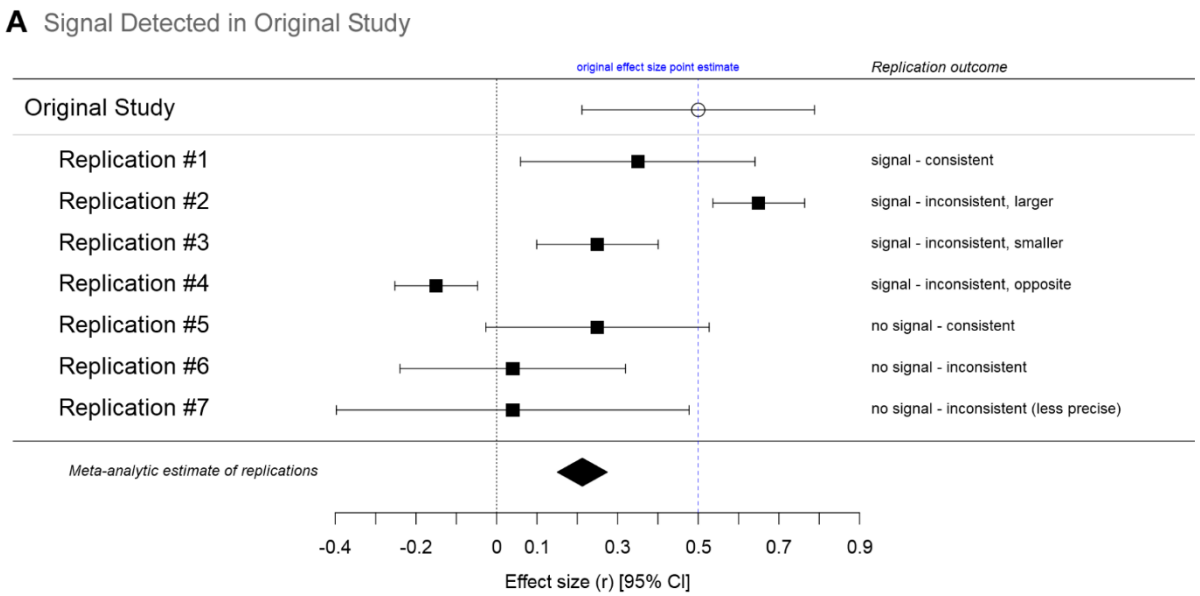

Figure S2. Criteria for evaluation of replications by LeBel et al. (2019). A taxonomy for comparing replication effects to target article original findings.

Table S3

Descriptive statistics of the additional measures

Variable	M	SD	Skewness	Kurtosis	n
Perceived ability to choose	5.00	1.35	-0.54	-0.23	1026
Preference for choice	5.07	1.25	-0.52	-0.04	1026
Choose condition					
Attractiveness of 'Parent A' option	3.55	0.78	-0.51	0.94	514
Attractiveness of 'Parent B' option	3.52	0.96	-0.56	0.63	514
Attractiveness of 'Spot A' option	3.39	0.84	-0.62	1.19	514
Attractiveness of 'Spot B' option	3.25	1.12	-0.37	-0.25	514
Attractiveness of 'Course X' option	3.51	0.77	-0.54	1.54	514
Attractiveness of 'Course Y' option	3.65	1.05	-0.71	0.28	514
Attractiveness of 'Lottery 1' option	3.37	1.04	-0.75	0.88	514
Attractiveness of 'Lottery 2' option	3.76	1.06	-0.93	0.74	514
Attractiveness of 'Lottery 1' option	2.75	1.22	-0.29	-0.33	514
Attractiveness of 'Lottery 2' option	3.48	1.05	-0.73	0.53	514
Attractiveness of 'Flavor A' option	3.74	0.76	-1.42	4.55	514
Attractiveness of 'Flavor B' option	3.26	1.39	-0.43	-0.69	514
Attractiveness of 'Candidate A' option	3.81	0.96	-1.14	1.86	514
Attractiveness of 'Candidate B' option	2.03	1.26	0.25	-0.56	514
Attractiveness of 'Lottery 1' option	3.24	0.96	-0.41	0.76	514
Attractiveness of 'Lottery 2' option	3.39	0.95	-0.69	0.98	514
Attractiveness of 'Lottery 3' option	3.58	1.20	-0.71	-0.07	514

Note: M = Mean; SD = Standard deviation.

Table S4

Descriptive statistics of the additional measures

Variable	M	SD	Skewness	Kurtosis	n
Reject condition					
Attractiveness of 'Parent A' option	3.50	0.80	-0.57	1.38	512
Attractiveness of 'Parent B' option	3.51	0.94	-0.58	0.36	512
Attractiveness of 'Spot A' option	3.36	0.85	-0.56	1.05	512
Attractiveness of 'Spot B' option	3.23	1.06	-0.30	-0.37	512
Attractiveness of 'Course X' option	3.40	0.79	-0.13	0.18	512
Attractiveness of 'Course Y' option	3.61	1.02	-0.66	0.34	512
Attractiveness of 'Lottery 1' option	3.20	0.94	-0.75	1.52	512
Attractiveness of 'Lottery 2' option	3.77	1.10	-0.97	0.74	512
Attractiveness of 'Lottery 1' option	2.63	1.11	-0.24	-0.41	512
Attractiveness of 'Lottery 2' option	3.39	1.02	-0.61	0.28	512
Attractiveness of 'Flavor A' option	3.75	0.74	-1.17	3.00	512
Attractiveness of 'Flavor B' option	3.32	1.35	-0.49	-0.61	512
Attractiveness of 'Candidate A' option	3.65	1.04	-0.93	0.98	512
Attractiveness of 'Candidate B' option	2.13	1.29	0.24	-0.62	512
Attractiveness of 'Lottery 1' option	3.17	0.91	-0.65	1.11	512
Attractiveness of 'Lottery 2' option	3.41	0.86	-0.43	0.48	512
Attractiveness of 'Lottery 3' option	3.66	1.17	-0.77	0.02	512

Note: M = Mean; SD = Standard deviation.

Table S5

Summary of findings of compatibility hypothesis based on additional variables

Comparison	Problem	Replication		Bayes Factor
		T-statistic	**Cohen's d**	
Attractiveness of enriched option between choose and reject experimental conditions	1	t (1023.86) = 0.10, p = .92	0.01 [-0.12, 0.13]	BF_{10} = 0.08; BF_{01}=13.22
	2	t (1021) = 0.27, p = .79	0.02 [-0.11, 0.14]	BF_{10} = 0.09; BF_{01}=11.37
	3	t (1023.51) = 0.72, p = .47	0.04 [-0.08, 0.17]	BF_{10} = 0.14; BF_{01}=7.28
	4	t (1022.53) = -0.07, p = .94	0.00 [-0.12, 0.13]	BF_{10} = 0.07; BF_{01}=15.14
	5	t (1023.73) = 1.42, p = .16	0.09 [-0.03, 0.21]	BF_{10} = 0.35; BF_{01}=2.87
	6	t (1023.13) = -0.72, p = .47	0.04 [-0.08, 0.17]	BF_{10} = 0.04; BF_{01}=23.31
	7	t (1023.13) = -1.30, p = .19	0.08 [-0.04, 0.20]	BF_{10} = 0.03; BF_{01}=31.61
	8	t (1023.42) = -1.09, p = .28	0.07 [-0.05, 0.19]	BF_{10} = 0.04; BF_{01}=28.50
Relative Attractiveness of enriched option between choose and reject experimental conditions	1	t (1022.91) = -0.60, p = .55	0.04 [-0.09, 0.16]	BF_{10} = 0.05; BF_{01}=21.68
	2	t (1023.69) = -0.19, p = .85	0.01 [-0.11, 0.13]	BF_{10} = 0.06; BF_{01}=16.56
	3	t (1020.46) = -0.69, p = .49	0.04 [-0.08, 0.17]	BF_{10} = 0.04; BF_{01}=22.91
	4	t (1019.23) = -1.97, p = .05	0.12 [0.00, 0.25]	BF_{10} = 0.02; BF_{01}=41.73
	5	t (1020.76) = -0.23, p = .82	0.01 [-0.11, 0.14]	BF_{10} = 0.06; BF_{01}=17.03
	6	t (1023.62) = -0.53, p = .60	0.03 [-0.09, 0.16]	BF_{10} =0.05; BF_{01}=20.78
	7	t (1020.49) = -2.26, p = .02	0.14 [0.02, 0.26]	BF_{10} = 0.02; BF_{01}=46.27
	8	t (603.90) = 2.22, p = .03	0.14 [0.02, 0.26]	BF_{10} =1.54 ; BF_{01}=0.65

Note. N = 1026;

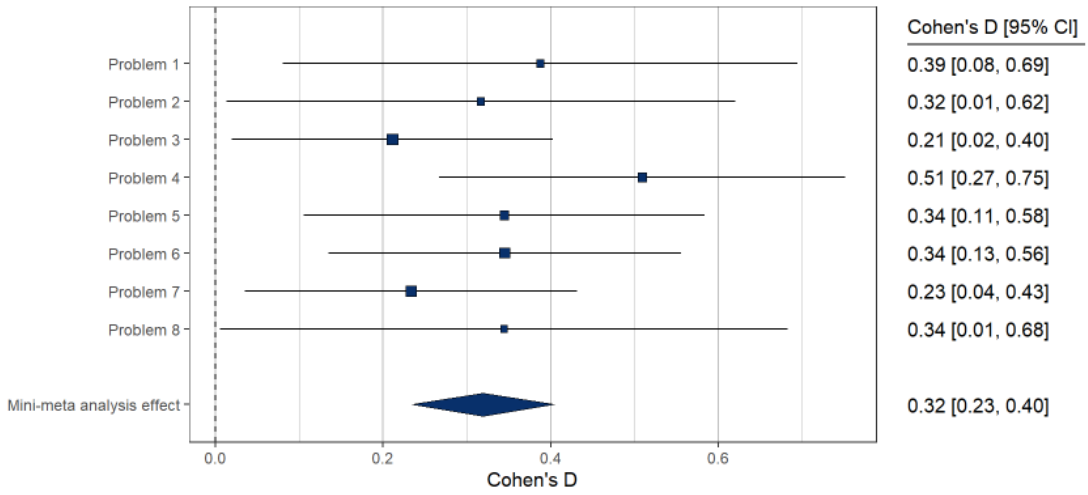

Figure S3.
Forest plots of the mini meta-analytic effect sizes for Hypothesis 1 across eight decision problems in the original study. CI = confidence interval.

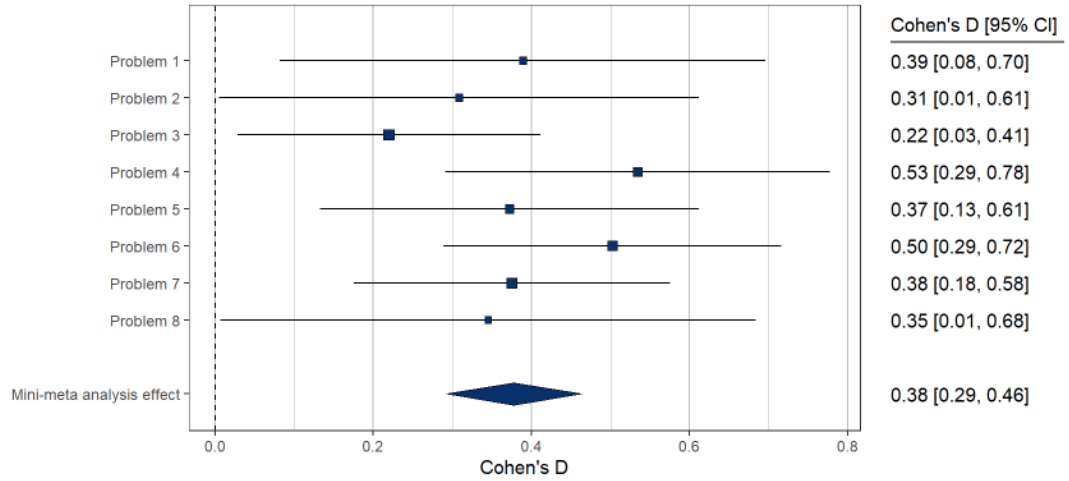

Figure S4
Forest plots of the mini meta-analytic effect sizes for Hypothesis 2 across eight decision problems in the original study. CI = confidence interval.

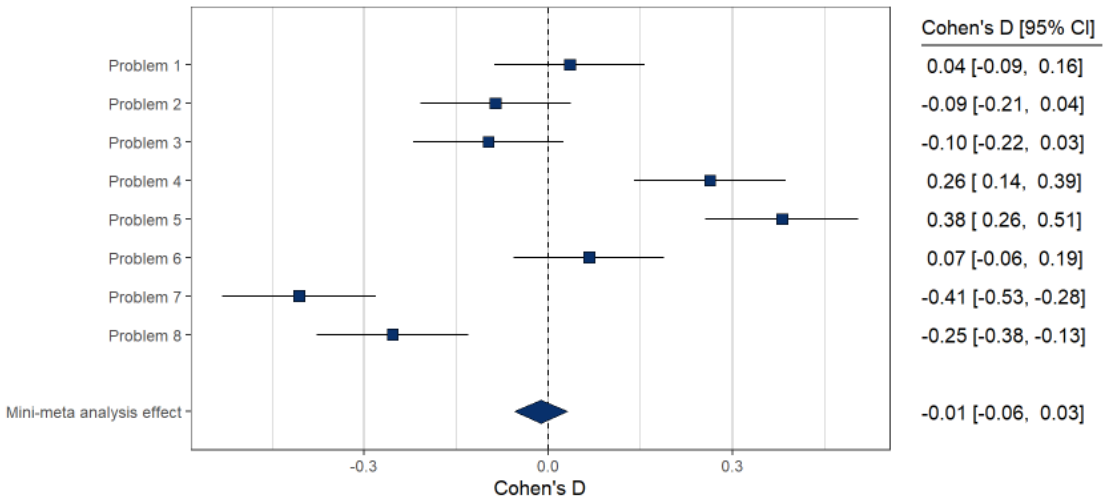

Figure S5

Forest plots of the mini meta-analytic effect sizes for Hypothesis 1 across eight decision problems in the replication study. CI = confidence interval.

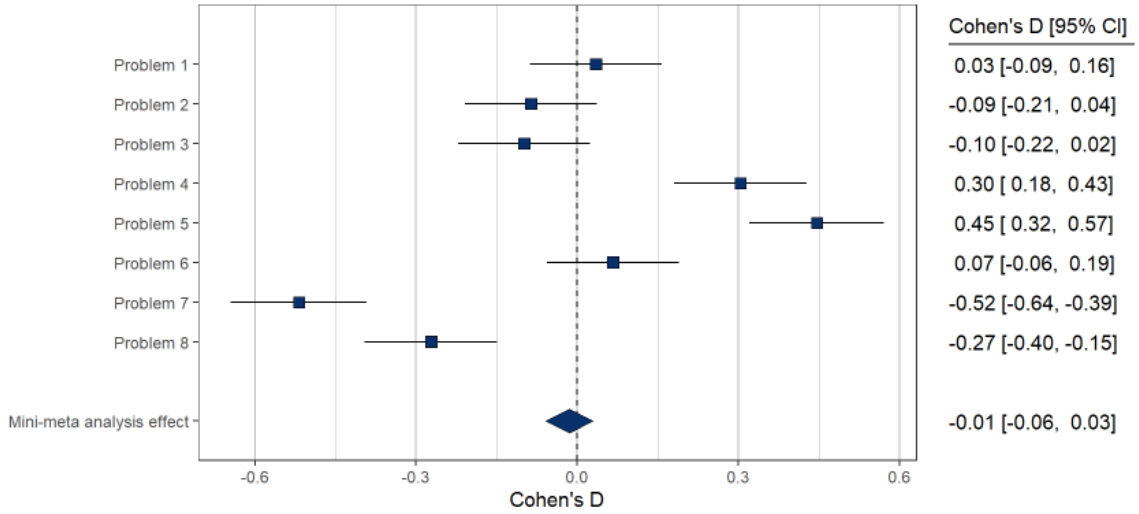

Figure S6

Forest plots of the mini meta-analytic effect sizes for Hypothesis 2 across eight decision problems in the replication study. CI = confidence interval.

Individual differences in preference for enriched alternative.

We examined how individual differences influence the way we make choices. We looked at the exploratory hypotheses that tested if an individual's perceived ability to choose and preference for choice could influence choices.

Prediction: Individuals that rate themselves with a high ability to choose and prefer to have choices focus more on the positive aspects of options. Given the enriched option endowed with more positive features than the impoverished option we expected these individuals more often select the enriched option in both choosing- and rejecting-condition.

We tested the prediction using two separate (one with 'ability to choose' as IV and other with 'preference for choice' as IV) binary logistic mixed-effects regression analysis. In this analysis, we included responses from Problem 1 to 7, as these problems shared the common procedure of choosing between two alternatives (binary).

'Ability to choose' on preference for enriched:

We conducted a binary logistic mixed-effects regression analysis in which experimental condition, ability to choose, and the interaction term (Experiment condition x Ability to choose) were the fixed effects predictors of choosing enriched option (Yes =1; No = 0). The regression included subject ID as a random effect predictor.

The results of the regression revealed the main effect of 'ability to choose' was not significant Wald χ^2 (1) = 0.90, p = .343). The interaction term introduced in step 2 was not significant either: χ^2 (1) = 0.49, p =.485). See the results in Table S6.

We also tested for the correlations between 'ability to choose' measure and attractiveness of choice in each of the problems (See Table S8)

'Preference for choice' on preference for enriched:

We conducted a binary logistic mixed-effects regression analysis in which experimental condition, preference for choice, and the interaction term (Experiment condition x preference for choice) was the fixed effects predictors of choosing enriched option (Yes =1; No = 0). The regression included subject ID as a random effect predictor.

The results of the regression revealed the main effect of 'preference for choice' was not significant Wald χ^2 (1) = 0.41, p =.522). The interaction term introduced in step 2 was not significant either: χ^2 (1) = 1.24, p =.266). See the results in Table S7.

We also tested for the correlations between 'preference for choice' measure and attractiveness of choice in each of the problems (See Table S9)

Table S6

Results of binary logistic mixed-effects regression

	Dependent variable: Predicted probability of enriched	
	Main effect	Interaction
Constant	0.12 (0.098)	0.185 (0.135)
Experimental condition (EXP) (1=Choose; 0=Reject)	−0.043 (0.049)	−0.171 (0.189)
Ability to choose (AC)	0.017 (0.018)	0.004(0.026)
EXP x AC		0.026 (0.036)
Observations	7,182	7,182
Log Likelihood	−4,946.272	−4,946.028
Akaike Inf. Crit.	9,900.55	9,902.06
Bayesian Inf. Crit.	9,928.06	9,936.45

Note: ∗ p<0.1; ∗∗ p<0.05; ∗∗∗ p<0.01

Table S7

Results of binary logistic mixed-effects regression

	Dependent variable: Predicted probability of enriched	
	Main effect	Interaction
Constant	0.143 (0.106)	0.037 (0.142)
Experimental condition (EXP) (1=Choose; 0=Reject)	−0.045 (0.049)	0.177 (0.205)
Ability to choose (AC)	0.013 (0.020)	0.034 (0.027)
EXP x AC		−0.044 (0.039)
Observations	7,182	7,182
Log Likelihood	−4,946.516	−4,945.899
Akaike Inf. Crit.	9,901.03	9,901.80
Bayesian Inf. Crit.	9,928.55	9,936.19

Table S8

The correlation between perceived '*ability to choose'* and variables listed in the table.

Variable	**n**	**r**	**p**	**LL**	**UL**
Preference for choice	1024	0.28	0.000	0.22	0.33
Choose condition					
Attractiveness of 'Parent A' option	512	0.01	0.884	-0.08	0.09
Attractiveness of 'Parent B' option	512	-0.07	0.105	-0.16	0.01
Attractiveness of 'Spot A' option	512	0.00	0.982	-0.09	0.09
Attractiveness of 'Spot B' option	512	-0.08	0.089	-0.16	0.01
Attractiveness of 'Course X' option	512	0.01	0.776	-0.07	0.10
Attractiveness of 'Course Y' option	512	0.05	0.306	-0.04	0.13
Attractiveness of 'Lottery 1' option	512	0.00	0.997	-0.09	0.09
Attractiveness of 'Lottery 2' option	512	0.05	0.288	-0.04	0.13
Attractiveness of 'Lottery 1' option	512	-0.05	0.222	-0.14	0.03
Attractiveness of 'Lottery 2' option	512	0.03	0.558	-0.06	0.11
Attractiveness of 'Flavor A' option	512	0.05	0.219	-0.03	0.14
Attractiveness of 'Flavor B' option	512	-0.01	0.861	-0.09	0.08
Attractiveness of 'Candidate A' option	512	0.07	0.093	-0.01	0.16
Attractiveness of 'Candidate B' option	512	-0.13	0.002	-0.22	-0.05
Attractiveness of 'Lottery 1' option	512	-0.02	0.584	-0.11	0.06
Attractiveness of 'Lottery 2' option	512	0.03	0.455	-0.05	0.12
Attractiveness of 'Lottery 3' option	512	0.09	0.031	0.01	0.18
Reject condition					
Attractiveness of 'Parent A' option	510	0.06	0.180	-0.03	0.15
Attractiveness of 'Parent B' option	510	0.03	0.478	-0.06	0.12
Attractiveness of 'Spot A' option	510	0.05	0.226	-0.03	0.14
Attractiveness of 'Spot B' option	510	0.00	0.949	-0.09	0.08
Attractiveness of 'Course X' option	510	0.01	0.800	-0.08	0.10
Attractiveness of 'Course Y' option	510	0.14	0.001	0.06	0.23
Attractiveness of 'Lottery 1' option	510	0.03	0.552	-0.06	0.11
Attractiveness of 'Lottery 2' option	510	0.13	0.005	0.04	0.21
Attractiveness of 'Lottery 1' option	510	-0.04	0.314	-0.13	0.04
Attractiveness of 'Lottery 2' option	510	0.05	0.301	-0.04	0.13
Attractiveness of 'Flavor A' option	510	0.04	0.421	-0.05	0.12
Attractiveness of 'Flavor B' option	510	0.01	0.735	-0.07	0.10
Attractiveness of 'Candidate A' option	510	0.06	0.208	-0.03	0.14
Attractiveness of 'Candidate B' option	510	-0.08	0.089	-0.16	0.01
Attractiveness of 'Lottery 1' option	510	-0.05	0.306	-0.13	0.04
Attractiveness of 'Lottery 2' option	510	0.01	0.754	-0.07	0.10
Attractiveness of 'Lottery 3' option	510	0.14	0.002	0.05	0.22

Note: r = Pearson correlation coefficient; LL= lower limit of r estimate; UL= upper limit of r estimate;

Table S9

The correlation between *'Preference for choice'* and variables listed in the table.

Variable	**n**	**r**	**p**	**LL**	**UL**
perceived ability to choose	0.28	0.000	0.22	0.33	0.28
Choose condition					
Attractiveness of 'Parent A' option	512	-0.02	0.711	-0.10	0.07
Attractiveness of 'Parent B' option	512	0.12	0.006	0.04	0.21
Attractiveness of 'Spot A' option	512	0.10	0.020	0.02	0.19
Attractiveness of 'Spot B' option	512	-0.01	0.856	-0.09	0.08
Attractiveness of 'Course X' option	512	0.03	0.435	-0.05	0.12
Attractiveness of 'Course Y' option	512	0.12	0.008	0.03	0.20
Attractiveness of 'Lottery 1' option	512	-0.02	0.620	-0.11	0.06
Attractiveness of 'Lottery 2' option	512	0.09	0.051	0.00	0.17
Attractiveness of 'Lottery 1' option	512	-0.01	0.900	-0.09	0.08
Attractiveness of 'Lottery 2' option	512	0.15	0.000	0.07	0.24
Attractiveness of 'Flavor A' option	512	0.09	0.036	0.01	0.18
Attractiveness of 'Flavor B' option	512	-0.03	0.520	-0.11	0.06
Attractiveness of 'Candidate A' option	512	0.14	0.001	0.06	0.23
Attractiveness of 'Candidate B' option	512	0.02	0.650	-0.07	0.11
Attractiveness of 'Lottery 1' option	512	0.00	0.978	-0.09	0.09
Attractiveness of 'Lottery 2' option	512	0.01	0.755	-0.07	0.10
Attractiveness of 'Lottery 3' option	512	0.17	0.000	0.08	0.25
Reject condition					
Attractiveness of 'Parent A' option	510	0.02	0.613	-0.06	0.11
Attractiveness of 'Parent B' option	510	0.04	0.405	-0.05	0.12
Attractiveness of 'Spot A' option	510	0.07	0.092	-0.01	0.16
Attractiveness of 'Spot B' option	510	-0.02	0.612	-0.11	0.06
Attractiveness of 'Course X' option	510	-0.01	0.841	-0.10	0.08
Attractiveness of 'Course Y' option	510	0.14	0.002	0.05	0.22
Attractiveness of 'Lottery 1' option	510	-0.01	0.841	-0.10	0.08
Attractiveness of 'Lottery 2' option	510	0.09	0.048	0.00	0.17
Attractiveness of 'Lottery 1' option	510	0.02	0.707	-0.07	0.10
Attractiveness of 'Lottery 2' option	510	0.04	0.342	-0.04	0.13
Attractiveness of 'Flavor A' option	510	-0.02	0.678	-0.10	0.07
Attractiveness of 'Flavor B' option	510	-0.01	0.900	-0.09	0.08
Attractiveness of 'Candidate A' option	510	0.09	0.046	0.00	0.17
Attractiveness of 'Candidate B' option	510	-0.07	0.098	-0.16	0.01
Attractiveness of 'Lottery 1' option	510	0.02	0.613	-0.06	0.11
Attractiveness of 'Lottery 2' option	510	0.04	0.404	-0.05	0.12
Attractiveness of 'Lottery 3' option	510	0.14	0.002	0.05	0.22

Note: r = Pearson correlation coefficient; LL= lower limit of r estimate; UL= upper limit of r estimate;

Table S10

Results of binary logistic mixed-effects regression with two simultaneous random factors: 1) random intercepts for participant; 2) random intercepts and random conditions slopes for stimuli (i.e. problem numbers)

	Dependent variable: Predicted probability of enriched alternative	
	Main effect	Interaction
Constant	-3.51*** (0.164)	-3.61*** (0.186)
Overall proportion preferring enriched (PEN)	6.82*** (0.287)	7.00*** (0.325)
Experimental condition (EXP) (1 = Choose; 0 = Reject)	-0.04 (0.261)	2.13*** (0.246)
PEN × EXP		−3.98*** (0.426)
Observations	7,182	7,182
Log Likelihood	−4,402.48	−4,386.45
Akaike Inf. Crit.	8,818.96	8,788.91
Bayesian Inf. Crit.	8,847.12	8,843.94

Note: *$p < 0.1$; **$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

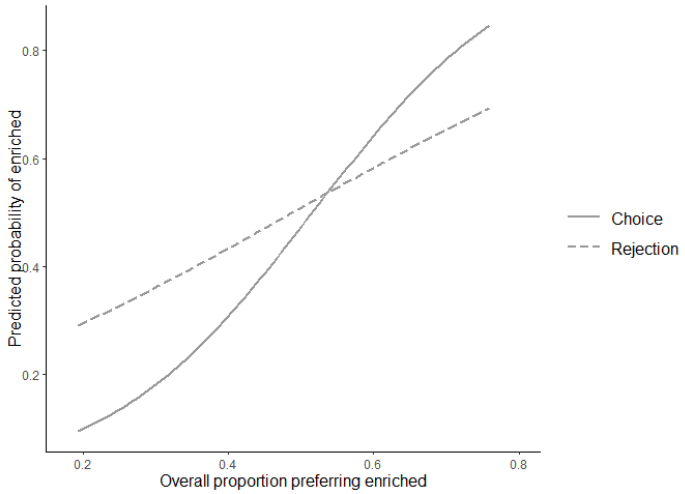

Figure S7

Predicted probability of the enriched alternative in choice and rejection tasks as a function of overall preference for the enriched alternative. Fitted lines are the marginal effects of interaction terms. The relative attractiveness variable used in the regression was calculated based on the responses to extension variables. The model specification included two random factors: 1)random intercepts for participants, 2) both random intercepts and random conditions slopes for stimuli (i.e. problem numbers)

Table S11

Results of binary logistic mixed-effects regression with two simultaneous random factors: 1) random intercepts for participant; 2) random intercepts and random conditions slopes for stimuli (i.e. problem numbers)

	Dependent variable: Predicted probability of enriched alternative	
	Main effect	Interaction
Constant	0.32 (0.391)	0.37 (0.401)
Relative attractiveness of enriched alternative (AEO)	0.64*** (0.022)	0.95*** (0.039)
Experimental condition (EXP) (1 = Choose; 0 = Reject)	-0.10** (0.319)	-0.17 (0.300)
AEO × XP		−0.51*** (0.047)
Observations	7,182	7,182
Log Likelihood	−3,886.71	−3,825.46
Akaike Inf. Crit.	7,787.48	7,666.92
Bayesian Inf. Crit.	7,835.64	7,721.95

Note: *$p < 0.1$; **$p < 0.05$; **$p < 0.01$. The relative attractiveness variable used in the regression was calculated based on the responses to extension variables.

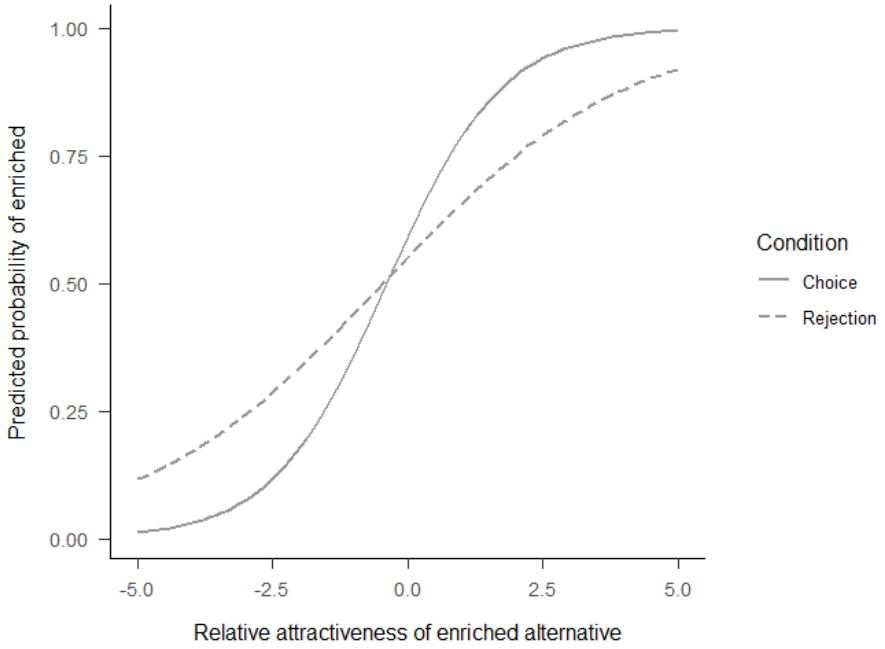

Figure S8

Predicted probability of the enriched alternative in choice and rejection tasks as a function of overall preference for the enriched alternative. Fitted lines are the marginal effects of interaction terms. The relative attractiveness variable used in the regression was calculated based on the responses to extension variables. The model specification included two random factors: 1)random intercepts for participants, 2) both random intercepts and random conditions slopes for stimuli (i.e. problem numbers)

References

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Rosenthal, R. (1984), *Meta-Analytic Procedures for Social Research*. Newbury Park: Sage

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Appendix A

Power analysis was run by G*Power 3.1 (Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G., 2009) to calculate the sample size needed for each question. For Hypothesis 1, the generic binomial test was used; p1 stays 0.5 as it is the null value while p2 is calculated by the proportion of the enriched option over the proportion of both enriched and impoverished options (Credits to Chu Tsz Ching Connie). For Hypothesis 2, z test of comparing two proportions was used; p1 is the proportion of choosing the enriched option while p2 is the proportion of rejecting the enriched option.

Hypothesis 1

Problem 1

Input:		Tail(s)	=	One
		Proportion p2	=	0.595
		α err prob	=	0.05
		Power (1-β err prob)	=	0.95
		Proportion p1	=	0.5
Output:	Lower critical N		=	166
		Upper critical N	=	166
		Total sample size	=	302
		Actual power	=	0.9513149
		Actual α	=	0.0475007

Problem 2

Input:		Tail(s)	=	One
		Proportion p2	=	0.575
		α err prob	=	0.05
		Power (1-β err prob)	=	0.95
		Proportion p1	=	0.5
Output:	Lower critical N		=	258
		Upper critical N	=	258
		Total sample size	=	479
		Actual power	=	0.9508633
		Actual α	=	0.0499467

Problem 3

Input:		Tail(s)	=	One
		Proportion p2	=	0.55
		α err prob	=	0.05
		Power (1-β err prob)	=	0.95
		Proportion p1	=	0.5
Output:	Lower critical N		=	574
		Upper critical N	=	574
		Total sample size	=	1092
		Actual power	=	0.9502119

	Actual α	=	0.0479962

Problem 4

Input:	Tail(s)	=	One
	Proportion p2	=	0.625
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Proportion p1	=	0.5
Output:	Lower critical N	=	98.0000000
	Upper critical N	=	98.0000000
	Total sample size	=	173
	Actual power	=	0.9514084
	Actual α	=	0.0470574

Problem 5

Input:	Tail(s)	=	One
	Proportion p2	=	0.585
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Proportion p1	=	0.5
Output:	Lower critical N	=	203
	Upper critical N	=	203
	Total sample size	=	373
	Actual power	=	0.9501117
	Actual α	=	0.0487048

Problem 6

Input:	Tail(s)	=	One
	Proportion p2	=	0.585
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Proportion p1	=	0.5
Output:	Lower critical N	=	203
	Upper critical N	=	203
	Total sample size	=	373
	Actual power	=	0.9501117
	Actual α	=	0.0487048

Problem 7

Input:	Tail(s)	=	One
	Proportion p2	=	0.565
	α err prob	=	0.05
	Power (1-β err prob)	=	0.95
	Proportion p1	=	0.5
Output:	Lower critical N	=	343
	Upper critical N	=	343
	Total sample size	=	643
	Actual power	=	0.9506907

	Actual α	=	0.0487908	

Problem 8

Input:	Tail(s)	=	One	
	Proportion p2	=	0.585	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	
	Proportion p1	=	0.5	
Output:	Lower critical N	=	203	
	Upper critical N	=	203	
	Total sample size	=	373	
	Actual power	=	0.9501117	
	Actual α	=	0.0487048	

Hypothesis 2

Problem 1

Input:	Tail(s)	=	One	
	Proportion p2	=	0.45	
	Proportion p1	=	0.64	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	
	Allocation ratio N2/N1	=	1	
Output:	Critical z	=	-1.6448536	
	Sample size group 1	=	146	
	Sample size group 2	=	146	
	Total sample size	=	292	
	Actual power	=	0.9500476	

Problem 2

Input:	Tail(s)	=	One	
	Proportion p2	=	0.52	
	Proportion p1	=	0.67	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	
	Allocation ratio N2/N1	=	1	
Output:	Critical z	=	-1.6448536	
	Sample size group 1	=	230	
	Sample size group 2	=	230	
	Total sample size	=	460	
	Actual power	=	0.9506681	

Problem 3

Input:	Tail(s)	=	One	
	Proportion p2	=	0.65	
	Proportion p1	=	0.75	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	

	Allocation ratio N2/N1	=	1	
Output:	Critical z	=	-1.6448536	
	Sample size group 1	=	452	
	Sample size group 2	=	452	
	Total sample size	=	904	
	Actual power	=	0.9500671	

Problem 4

Input:	Tail(s)	=	One	
	Proportion p2	=	0.50	
	Proportion p1	=	0.75	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	
	Allocation ratio N2/N1	=	1	
Output:	Critical z	=	-1.6448536	
	Sample size group 1	=	79	
	Sample size group 2	=	79	
	Total sample size	=	158	
	Actual power	=	0.9512237	

Problem 5

Input:	Tail(s)	=	One	
	Proportion p2	=	0.60	
	Proportion p1	=	0.77	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	
	Allocation ratio N2/N1	=	1	
Output:	Critical z	=	-1.6448536	
	Sample size group 1	=	159	
	Sample size group 2	=	159	
	Total sample size	=	318	
	Actual power	=	0.9501233	

Problem 6

Input:	Tail(s)	=	One	
	Proportion p2	=	0.55	
	Proportion p1	=	0.72	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.95	
	Allocation ratio N2/N1	=	1	
Output:	Critical z	=	-1.6448536	
	Sample size group 1	=	171	
	Sample size group 2	=	171	
	Total sample size	=	342	
	Actual power	=	0.9501308	

Problem 7

Input:	Tail(s)	=	One

	Proportion p2	=	0.08	
	Proportion p1	=	0.21	
	α err prob	=	0.05	
	Power (1-β err prob)		=	0.95
	Allocation ratio N2/N1		=	1
Output:	Critical z	=	-1.6448536	
	Sample size group 1		=	157
	Sample size group 2		=	157
	Total sample size	=	314	
	Actual power	=	0.9510194	

Problem 8

Input:	Tail(s)	=	One	
	Proportion p2	=	0.44	
	Proportion p1	=	0.61	
	α err prob	=	0.05	
	Power (1-β err prob)		=	0.95
	Allocation ratio N2/N1		=	1
Output:	Critical z	=	-1.6448536	
	Sample size group 1		=	185
	Sample size group 2		=	185
	Total sample size	=	370	
	Actual power	=	0.9508737	