

RRR protocol for Dijksterhuis & Van Knippenberg (1998)

Dijksterhuis, A., & Van Knippenberg, A. (1998). The relation between perception and behavior, or how to win a game of trivial pursuit. *Journal of personality and social psychology*, 74(4), 865.

Specific Study: A variant of Experiment 4, with updates based on unpublished replications by the original authors.

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Overview and Motivation

In a landmark study, Dijksterhuis and Van Knippenberg (1998) found that imagining yourself as a soccer hooligan or as a professor influenced subsequent performance on a trivia test. This finding is one of many findings in social cognition in which a priming manipulation affects subsequent goals, behaviors, actions, or performance. Over the past 5 years, several seminal findings from this literature have come under fire when other laboratories did not reproduce the results. Prompted by a letter sent by Daniel Kahneman, both proponents and skeptics of about such priming effects engaged in a prolonged discussion of the value of direct replication and the strength of the collective evidence. As part of that discussion, some of the skeptics asked proponents to identify findings that they believed would be robust enough that other independent labs could find the same results if they followed a suitable protocol. Ap Dijksterhuis volunteered his study of priming of trivia performance.

Dijksterhuis and the editor corresponded about the requirements and nature of the Registered Replication Report process, and Dijksterhuis and his colleagues decided to revisit their 1998 study in order to establish a complete protocol for use with the RRR. The original paper included four experiments assessing the effects of priming on trivia performance. Experiment 1 compared priming with professor to priming with secretary (and a no-prime condition), observing a roughly 13% advantage on trivia performance for those primed with professor. Experiments 2 and 3 manipulated other aspects of the task: The duration of the priming manipulation, the number of trivia questions, and the speed with which participants could complete the trivia items.

Experiment 4 was the only one in the original paper that included both the professor prime and the hooligan prime, the best known and most discussed comparison. That study also included two additional conditions in which participants were primed directly with the traits, intelligent and stupid. Those additional between-groups conditions are not part of this protocol. Given that the original studies were conducted long ago and many of the materials were no longer available, Dijksterhuis and his colleagues updated their protocol based on

Experiment 4. The only other substantive differences between the original Experiment 4 and the updated protocol was the use of 30 trivia items rather than 20 and the elimination of the cover story used in the original tasks. (The RRR protocol uses a variant of the original cover story.)

The two new replications showed a smaller overall difference between priming with professor and priming with hooligan on subsequent trivia performance. Experiment 4 of the original paper showed an approximately 13% overall difference, but the replication studies showed a 2-3% effect. However, the effect in both replication studies was substantially moderated by gender: Men were 7-10% better when primed with professor than with hooligan, but women showed no benefit. They hypothesized that the primes only exert an effect on behavior when they are self-relevant (e.g., Wheeler & Petty, 2001).

Dijksterhuis provided the editors with their updated variant of the Experiment 4 protocol for the study, and coupled with information for the original article, it serves as the basis for the development of this RRR. He and his colleagues assisted the lead lab and the editor in developing the required procedures specified below.

Prior to developing this version of the protocol, Andy DeSoto at APS gathered a large set of trivia items for use in the study and normed them using Amazon Mechanical Turk. Leif Nelson and Michael O'Donnell at the lead lab for this project, UC Berkeley-Haas School of Business, then normed a subset of those items at UC Berkeley. The results for the two norming samples will be available on the OSF project page, and the average accuracy on these items was highly consistent across samples. From these items, Nelson and O'Donnell selected 30 items that met the standards required by the protocol (accuracy in the 40-70% range). The full protocol for the study will be implemented in PsychoPy, an open-source experiment-coding platform for Python. The full procedures are described below, along with the requirements for participating labs.

Effects the RRR will measure:

- 1) The difference in trivia scores for participants primed with professor and participants primed with soccer hooligan (out of 30 possible correct, with non-answers treated as errors). The original 1998 paper (Experiment 4) reported an accuracy difference of 13.1% between those primed with professor and those primed with hooligan. The samples were small, though. We will rely more closely on the effect size in the two more recent replication studies as the basis for this RRR. In those studies, priming with professor led to 2.5% and 2.1% better performance than did priming with hooligan. Note, though, that the effect was moderated by gender (see below) and the sample sizes were substantially larger for women (who did not show the effect) than men (who did), making the weighted averages smaller.
- 2) The moderation of the effects of professor and hooligan priming by gender. Specifically, how much bigger will the professor - hooligan difference be for men than for women? The unpublished follow-up study included two experiments. The first observed a 9.3% difference between professor (61.2%, n=20) and hooligan (51.9%, n=17) priming for men and a -0.3% difference

between professor (48.0%, n=57) and hooligan (48.3%, n=84) priming for women. The second observed a 7.6% difference between professor (56.4%, n=28) and hooligan (48.8%, n=31) priming for men and a 0.3% difference between professor (40.1%, n=53) and hooligan (39.8%, n=42) priming for women.

Method Overview:

Each participant will complete one of two randomly assigned priming tasks and then will complete 30 trivia items. The design is a 2 (gender) x 2 (prime) factorial with at least 25 participants in each cell (ideally at least 50). This, the minimum total sample size is 100 participants, but laboratories are strongly encouraged to test as many participants as possible. Participants will be students at a college or university who are unfamiliar with the original study.

All laboratories will use the same scripts and procedures for the study, and all results will be published as part of a planned meta-analysis using pre-defined effect size measures. Laboratories will also be asked to pre-register their expectations for the outcome of the study.

Participating laboratories are free to add additional measures after the completion of all of the tasks in the RRR protocol, and those additional measures can be reported separately from the RRR manuscript by that laboratory. This flexibility allows laboratories to explore moderators or other measures of interest without affecting the measures necessary for the direct replication.

Protocol Requirements

Minimum sample size: ≥ 25 in each prime x gender condition.

Ideal sample size: ≥ 50 in each prime x gender condition.

Required sample demographics:

- Participants should be students recruited from a psychology participant pool (or an equivalent group)
- Participants should be 18-24 years old, with an average age of approximately 18-20 years.
- Participants must be unfamiliar with the original 1998 study (assessed via funnel debriefing). If students are recruited from a participant pool, they should be recruited before they have covered this study in their class.
- Participants may be compensated with course credit or payment
- If participants speak a language other than English, the laboratory will be responsible for translating the PsychoPy scripts and trivia questions. One translator should adapt all materials to the desired language and a second translator should independently translate the materials back to English to verify their consistency with the original protocol. All stages of the translation process must be documented on the laboratory's OSF site. The editor will provide guidelines for doing so and will coordinate efforts of multiple laboratories will be testing in the same language.

Testing setting:

- Participants must be tested in person and not online

- Participants may be tested individually or in small groups (no more than 10 at a time)
- Participants must be tested in individual cubicles or separated workstations so that they cannot see other participants or their responses.
- Participants must be tested in a setting that ensures that they remain blind to the existence of another priming condition
- Participating laboratories must upload photos of the testing setting to their OSF page.

Experimenters:

- Any graduate student, postdoctoral researcher, faculty member, or trained research assistant (at least 18 years of age). No special expertise is necessary to conduct the study.
- The experimenter should have experience collecting experimental psychology data and interacting with participants; that is, this should not be the first laboratory-based, human-subjects study that this research assistant has conducted.
- The experimenter must be blind to condition assignment. Given that the code handles random assignment to conditions, that should not be an issue.

Data collection:

- Participating laboratories will be provided with a PsychoPy script that will run the study and collect all data. The code will handle random assignment to conditions. Experimenters will enter a subject number and the participant's sex, and the script will assign them to a condition and collect all data.
- If laboratories are required to provide a description of the study for subject pool or recruiting purposes, the description should be "Complete a series of writing tasks and general knowledge questions."
- Participants should not know that there are two different priming conditions.
- During debriefing, participants should be explicitly instructed not to tell other participants about the priming manipulation or other aspects of the study.
- Laboratories are allowed to add additional measures after the completion of the study. They should use their own experimental script for that purpose and should not alter the official RRR experimental script. Additional measures may only be collected after the completion of the RRR script.

Data from a participant should be excluded if:

- They were not in the specified age range (18-24 years) or were not a student.
- They did not follow instructions (e.g, they did not write a response to the priming task or they wrote something unrelated to the prime)
- They did not complete all of the tasks (e.g., they quit before finishing all of the tasks)
- They were aware of the existence of a different priming condition as indicated in the funnel debriefing.
- The experimental script crashed or did not administer the experiment correctly

- The experimenter did not administer the tasks correctly (which should be noted explicitly in a lab log at the time of testing and before examining the data for that participant)
- Laboratories will be provided with a spreadsheet for documenting exclusions. The spreadsheet will store the subject number, date and time tested, and the reason for exclusion. All excluded data should be included with the full data set, but stored in a separate folder. The editors will provide details on how to organize their raw data files for inclusion in the official analyses.

Required data analyses

The primary data analyses will be conducted using official R scripts written to calculate the effect size for the overall priming effect (professor - hooligan) as well as the moderation of that effect by sex (separate professor - hooligan calculations for men and for women and a comparison of those difference scores). Individual labs can calculate means and standard deviations for trivia performance in each combination of Sex x Prime condition. The core meta-analysis will be based on these raw accuracy difference scores. Laboratories are welcome to conduct their own analyses and to report them on their OSF page. The RRR meta-analysis will report the accuracies and effect size measures for each lab and they will be computed directly from the raw data from each laboratory. The official R scripts will be written without viewing the actual data and will be made publicly available. The analyses will be conducted with and without any "judgment call" exclusions.

Procedure

1. Obtain informed consent according to the requirements of your university.
Note that individual laboratories are required to obtain any necessary ethics approval from their university prior to beginning the study.
2. Read the following instructions to participants: "This study consists of a number of unrelated tasks that will provide pilot data and help us develop materials for a variety of future studies. We will let you know the purpose of each task before you complete it, and the computer will provide the instructions for each task."
3. Run the provided PsychoPy script
4. Enter the participant number and participant sex
5. Wait for participants to complete the study
6. Optional: Run scripts for any additional measures being collected in your laboratory
7. Debrief participants and explicitly instruct them not to discuss the study procedures or hypotheses with other potential participants.

Step-by-step summary of contents of PsychoPy script

Page 0

Pop-up window to enter the participant ID number and sex

Page 1

“During this experiment, you will complete a number of unrelated tasks. In the first task, we want you to imagine that you are a (soccer-hooligan/university professor). This task will help us develop materials for an upcoming student project in social psychology. Press the spacebar to continue.”

Page 2

Soccer hooligan condition: “imagine that you are a typical soccer hooligan. Hooligans, as a group, tend to be young men who are fanatical sports fans, generally drink a lot in public, say offensive things to passersby, and sometimes provoke fights or destroy property. Take a moment to imagine being a typical soccer hooligan. Think about the following questions: What are you doing in your daily life as a soccer hooligan? What are your typical activities as a soccer hooligan? What are your typical personality characteristics or attributes as a soccer hooligan? What are your typical passions or hobbies as a soccer hooligan? Write your answers to these on the next page in the first person, as if you actually are a soccer hooligan. You will have 5 minutes to complete this task. You must use this time in its entirety. Press the spacebar to continue.”

Professor condition: “imagine that you are a typical university professor. Professors, as a group, tend to have completed a doctorate degree, work in colleges or universities, dedicate their time to teaching and research, and try to publish their research in academic journals. Take a moment to imagine being a typical university professor. Think about the following questions: What are you doing in your daily life as a university professor? What are your typical activities as a university professor? What are your typical personality characteristics or attributes as a university professor? What are your typical passions or hobbies as a university professor? Write your answers to these on the next page in the first person, as if you actually are a university professor. You will have 5 minutes to complete this task. You must use this time in its entirety. Press the spacebar to continue.”

Page 3

The instructions from Page 2 are duplicated, along with a text box in which participants can enter their answers. The page also shows a 5-minute timer. After 5 minutes have elapsed, the experiment advances to Page 4 automatically.

Page 4

“The next task is for a study by a cognitive psychology student who is developing a general knowledge scale. The scale will eventually have 5 sub-scales ranging from very easy (1) to very difficult. (5) We’re pilot testing the differences between these sub-scales. You have been assigned to receive sub-scale 5 [printed in a different font to make it appear as if it were inserted]. The task consists of 30 questions about a variety of topics. Take your time to think about each answer and try to do as well as possible.”

Page 4.01 – 4.30

General knowledge questions (See Appendix at the end of this file). These questions will be presented with one question per page in a fixed order. The task is to be self-paced.

Page 5

"We now will ask you several questions about yourself."

What is your sex [male | female]

What is your age [text box constrained to an integer between 0 and 99]

What is your native language [English | other with text box]

What is your major [text box]

What is your year of study [1st year | 2nd year | 3rd year | 4th year or higher | not a student]

Page 6

"We will now ask you some questions about the experiment thus far. The first two tasks were described as being pilot projects for student research in different areas of psychology. Please write the area in which the student was working for each task:

Task 1 (the writing task) [text box]

Task 2 (the trivia/knowledge task) [text box]

Page 7

"In your opinion, what was the purpose of these tasks? If you have no idea, you may answer by typing 'no idea.'" [text box]

Page 8

"Do you believe that there could be a link between thinking about a [soccer-hooligan | university professor] and the general knowledge questions? [yes | no]

[If yes] "What kind of link? If you have no idea, you may answer with 'no idea'" [text box]

Page 9

"Do you believe that thinking about a [university professor | soccer hooligan] affected your performance on the general knowledge questions?" [yes | no]

[If yes] How do you think that thinking about a [university professor | soccer hooligan] affected your performance on the general knowledge questions? If you have no idea, you can answer 'no idea.'" [text box]

Page 10

"Do you have any further thoughts or comments about the tasks so far?" [text box]

Page 11

Please quietly inform the experimenter that you have completed the tasks.

Appendix - General knowledge trivia questions

For the purpose of this appendix, the correct answer is always “d.” In the psychoPy script, the order of the answer options will be scrambled. Note that all participants will receive the same question order and the same scrambled ordering of answer options for each item. Treating the trivia items as a fixed measure rather than as a random variable allows direct comparability of performance on the trivia items between the two conditions and across labs.

1. Gaborone is the capital of which African country?
 - a. Zimbabwe
 - b. Zaire
 - c. Uganda
 - d. Botswana
2. What is a character encoding scheme used by many computers called?
 - a. HTML
 - b. Morse Code
 - c. Wordpad
 - d. ASCII
3. Which is the world’s largest living rodent?
 - a. Beaver
 - b. Coypu
 - c. Muskrat
 - d. Capybara
4. Which planet is 92,897,000 miles from the sun?
 - a. Pluto
 - b. Mars
 - c. Uranus
 - d. Earth
5. How many pairs of ribs are in a typical human body?
 - a. 6
 - b. 8
 - c. 15
 - d. 12
6. What country did Jawaharlal Nehru lead?
 - a. Bangladesh
 - b. Pakistan
 - c. Philippines
 - d. India
7. How many zeros in a trillion?
 - a. 9
 - b. 15
 - c. 11
 - d. 12

8. Which of these people is particularly associated with November 5?
 - a. Robin Hood
 - b. Dick Turpin
 - c. Sweeney Todd
 - d. Guy Fawkes
9. What alloy is formed from copper and tin?
 - a. Solder
 - b. Brass
 - c. Pewter
 - d. Bronze
10. What breaks when its height is $\frac{3}{4}$ of its depth?
 - a. Iceberg
 - b. Mountain
 - c. Pillar
 - d. Wave
11. In meteorology, what name is given to lines of equal atmospheric pressure?
 - a. Cyclones
 - b. Fronts
 - c. Isotherms
 - d. Isobars
12. What is the total number of spots on a die?
 - a. 15
 - b. 20
 - c. 25
 - d. 21
13. Which auto manufacturer established Saturn in 1985?
 - a. Mitsubishi
 - b. Chrysler
 - c. Ford
 - d. General Motors
14. What do supplementary angles add up to in degrees?
 - a. 90
 - b. 120
 - c. 360
 - d. 180
15. What is the second planet in distance from the sun?
 - a. Mars
 - b. Mercury
 - c. Saturn
 - d. Venus

16. Which leader of the Soviet Union resigned on December 25, 1991?
 - a. Boris Yeltsin
 - b. Nikita Khrushchev
 - c. Alexander Popov
 - d. Mikhail Gorbachev
17. Where do arboreal animals live?
 - a. In Deserts
 - b. In Rivers
 - c. Underground
 - d. In Trees
18. Which computer was the first to beat a reigning chess champion?
 - a. Deep Thought
 - b. King Blue
 - c. Blue Knight
 - d. Deep Blue
19. What is the name of the submerged fringe of a continent?
 - a. Continental Rise
 - b. Continental Slope
 - c. Continental Abyss
 - d. Continental Shelf
20. What type of government ruled Italy during World War II?
 - a. Republic
 - b. Communist
 - c. Democracy
 - d. Fascist
21. Alexander Fleming won the Nobel Prize for the discovery of what?
 - a. X Rays
 - b. South America
 - c. Stethoscope
 - d. Penicillin
22. Which metal can be described as ferrous?
 - a. Brass
 - b. Bronze
 - c. Copper
 - d. Iron
23. Which river is called "Rio Bravo" by Mexicans?
 - a. Colorado River
 - b. Rio Rojo
 - c. Rio Lobos
 - d. Rio Grande

24. Where is the uvula located?
- In the lungs
 - In the spine
 - In the nose
 - In the throat
25. What region makes up 75% of Russia?
- Belarus
 - Kazakhstan
 - Ukraine
 - Siberia
26. Which is the largest planet in the Solar System?
- Neptune
 - Mars
 - Saturn
 - Jupiter
27. Who composed "The Nutcracker?"
- Mozart
 - Handel
 - Beethoven
 - Tchaikovsky
28. What does a barometer measure?
- Wind Speed
 - Air Temperature
 - Relative Humidity
 - Air Pressure
29. What is the main structural molecule in hair and nails?
- Collagen
 - Elastin
 - Lecithin
 - Keratin
30. Joan of Arc is a national heroine of which country?
- Greece
 - Spain
 - Germany
 - France