

Replication of The Effects of an Implemental Mind-set on Attitude Strength by  
Henderson, de Liver, & Gollwitzer (2008, *Journal of Personality and Social Psychology*)

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## **Introduction**

Henderson, de Liver, and Gollwitzer (2008) conducted five studies that examined whether taking an implemental mind-set (a mind-set related to planning for a future goal) creates stronger attitudes even for topics that are unrelated to the original goal. They reasoned that the “closed” mindset that comes from planning for a goal leads to greater polarization in thought, which should extend to even to domains unrelated to the goal. This tendency toward more polarized evaluation should therefore cause people to have greater certainty in their attitudes.

Studies 1-4 found that attitudes were less ambivalent but more extreme, accessible, and consistent with behavior after participants made a decision about how to act (i.e., after they took an implemental mind-set). The replication effort focuses on Study 5, which posited that focusing on information consistent with a planned goal is the mechanism underlying these effects. One of two implemental mind-sets was induced. In the one-sided focus condition, participants thought about reasons why it would be “desirable and easy” to carry out a decision they had made. In the two-sided focus condition, participants completed the same task, but also thought about reasons why it would “undesirable and difficult” to carry out a decision they had made. Participants in the neutral mind-set condition described seven things they did in a typical day. Participants then read about “an issue that is being hotly debated” – namely, whether the list of convicted sex offenders should be made public. Finally, they indicated the extent of their attitude ambivalence and strength regarding this topic. Participants in the one-sided implementation condition showed less attitude ambivalence than participants in the two-sided implementation condition ( $p < .05$ ) and marginally less attitude ambivalence than participants in the neutral condition ( $p = .10$ ). Participants in the one-sided implementation condition reported greater attitude certainty than participants in the two-sided implementation ( $p < .01$ ) and neutral ( $p < .05$ ) conditions. The target finding for replication is the difference among the groups on the attitude ambivalence measures.

## **Method**

### **Power Analysis**

Power analyses were conducted for the one-way ANOVA testing for the differences among the three conditions and the t-test for independent means testing for

the difference between the two implemental mind-set conditions. To be conservative, planned sample size is based on the lower-power ANOVA analysis. Using proc power in SAS, required total sample sizes to achieve 80%, 90%, and 95% power were calculated as 63, 69, and 90 total subjects, respectively.

### **Planned Sample**

Participants will be Bard College students who have expressed interest in being contacted via email about a psychology study for which they will receive a \$10 giftcard to amazon.com in exchange for their participation. As in the original study, any participants who report having had direct contact with sex offenders will be excluded from data analysis.

Participants will complete the study at a commercial website. If the number of participants exceeds 63, participation rates will be closely monitored and data collection will proceed until there are approximately 90 completed sessions.

### **Materials**

*Mind-set manipulation.* Participants in the “implementation mind-set – one-sided” and “implementation mind-set – two-sided” conditions will “[be] asked to pick for themselves the relationship area (sexual inexperience or honesty) on which they [feel] more capable of giving advice.... Participants [will be] told that if they [consider] themselves to be a person who [gives] better advice on issues related to either sexual inexperience or honesty in relationships, then they should choose that particular area on which to give advice.... participants who [choose] to give advice on the sexual inexperience (honesty) area [will receive] a letter titled ‘Sample Sexual Experience Issue Letter’ (‘Sample Honesty Issue Letter’). The content of the letter [will be] the same, regardless of participants’ choice. The letter [will] contain elements of dishonesty and sexual inexperience.” The letter will be taken from Henderson et al. (2008). After reading their chosen letter, participants in the one-sided focus condition will then list “three reasons why it could be desirable and easy to give advice on their chosen romantic area.” Participants in the two-sided focus condition will then list “three reasons why it could be desirable and easy to give advice on their chosen area and three reasons why it could be undesirable and difficult to give advice on their chosen area.”

Participants in the neutral mind-set condition will be asked “to think about an ordinary day in their life and asked to describe at least seven things that they normally do during a typical day.”

*Dependent measures.* Participants will be “asked to indicate their reaction toward a topic that [is] supposedly being debated within the United States —whether the list of convicted sex offenders should be made available to the general public rather than just the police.” The passage will be taken from Henderson et al. (2008).

Participants will then reply to three questions measuring attitude ambivalence: 1. “I have strong mixed emotions both for and against making the list of convicted sex offenders available to the general public rather than just the police,” 2. “I do not find myself feeling torn between the two sides of the issue of making the list of convicted sex offenders available to the general public rather than just the police,” [reverse-scored] and 3. “To what extent are you indecisive when it comes to making the list of convicted sex offenders available to the general public rather than just the police?” Questions 1 and 2

will be on a scale from -3 (strongly disagree) to +3 (strongly agree). Question 3 will be on a scale ranging from 1 (not at all) to 7 (very much).

Participants will also answer the following question measuring attitude certainty on a 1 (not at all) to 7 (very much) scale: “How certain are you about your attitude toward making the list of convicted sex offenders available to the general public rather than just the police?”

Finally, participants will complete a demographic questionnaire, including a question about the extent of direct contact with sex offenders.

### **Procedure**

Participants who expressed interest in the study will be sent the link to begin the study via email. Upon beginning the study and providing informed consent, they will be randomly assigned to the implementation mind-set one-sided, implementation mind-set two-sided, or neutral mind-set condition. They will complete the appropriate mind-set manipulation described above, followed by the dependent and demographic measures.

### **Analysis Plan**

As in the original article, participants who report direct contact with sexual offenders will be excluded from the analysis. The critical analysis, a one-way ANOVA, will test whether participants’ ambivalence scores differed across the three conditions. As in the original study, three independent samples t-tests will provide specific comparisons between each pair of conditions.

### **Differences from Original Study**

The replication will depart from the original study in several ways related to interactions with participants and implementation. First, interest in the replication study will be solicited locally in person rather than the electronic postings used in the original study. Despite this difference, both samples will be comprised of current and former college students. Second, in the original study, participants ran a computer program that they received via email that automatically emailed their responses to the experimenter; in the current study participants will visit a commercial site (surveygizmo.com) that presents questionnaire-type studies to participants. Finally, participants in the original study received \$10 in exchange for participation; in the current study they will receive a \$10 giftcard to amazon.com. These differences are not germane to the study’s methodology or analytical strategy and are not expected make a difference in the ability of the study to detect the key effect. The first author of the original paper reviewed the web-based version and indicated that “Other than [hyperlinks to online advertisements that were not present when the study was launched], it look[ed] good.”

### **(Post Data Collection) Methods Addendum**

#### **Actual Sample**

Eighty-nine (63 women, 25 men, one gender not indicated) participants completed the study in exchange for a \$10 Amazon gift card. In an effort to reduce attitude bias that was not a function of the manipulation, Henderson et al. (2008) excluded data from one participant who reported ever having experience with sexual offenders. The major

difference between our replication and Henderson et al. was the unexpectedly high number of participants (19) in our sample who reported having contact with sex offenders. The resulting sample provided 84% power to detect an effect of the size in the original study.

### **Differences from pre-data collection methods plan**

As indicated, a surprisingly high number of subjects in the current study reported experience with a member of the sex offender registry. We report the results here with those participants excluded as indicated in our analysis plan, and describe the results for the full sample under exploratory analyses.

## **Results**

### **Data preparation**

As described above, we reverse-coded the appropriate items and averaged them to yield a single measure of ambivalence ( $\alpha = .76$ , original  $\alpha = .93$ ). As in Henderson et al. (2008), participants who reported more ambivalence also reported less certainty on the single-item measuring attitude certainty,  $r = -.52$  (original  $r = -.69$ ).

### **Confirmatory analysis**

The primary finding was investigated using a one-way ANOVA with mindset condition (one-sided focus, two-sided focus, and neutral) as a between-participant variable. Henderson et al. (2008) reported significantly different ambivalence scores as a function of mindset condition. In the current study, mindset did not significantly affect participants' reported ambivalence,  $F(2, 67) = 1.70, p = 0.19$ .

Means by condition for the original and replication studies are in Table 1. In the original study, pairwise t-tests showed that participants in the one-sided condition had significantly less ambivalence than those in the two-sided condition,  $d = 0.93$ , with participants in the neutral condition scoring in the middle (and not significantly differing from either of the mindset groups). In the replication, although an independent samples t-test comparing participants in the one- and two-sided mindset conditions did not reveal a significant difference,  $t(44) = -1.24, p = .22, d = .36$ , the means were in the same direction as the original study with a moderate effect size. As in Henderson et al. (2008), participants in the neutral and one-sided implemental mindset conditions did not significantly differ from one another,  $t(45) = -0.51, p = .61, d = .15$ . However, participants in the two-sided implemental mindset condition reported marginally greater ambivalence than those in the neutral condition,  $t(45) = -1.95, p = .06, d = 0.57$ .

**Table 1**

	Original Study	Replication ( <i>A Priori</i> Inclusion)	Replication (Full Sample)
Neutral	1.23 (1.64)	-.38 (1.44)	-.37 (1.41)
One-sided	.16 (1.85)	-.14 (1.66)	-.12 (1.63)
Two-sided	1.82 (1.86)	.39 (1.24)	-.05 (1.47)
Independent t-test comparing two mindset groups	t (28) = 2.46 p < .05 d = 0.93	t (44) = 1.24 p = .22 d = 0.36	t (58) = 0.18 p = .86 d = 0.05

*Note:* Cell values in the first three rows represent means, with standard deviations in parentheses. Replication (*A Priori* Inclusion) column presents statistics for the sample only including people with no reported contact with sex offender, and Replication (Full Sample) presents statistics including all participants.

### Exploratory analyses

We repeated the same analyses including all participants, since it seemed that 1. Our criterion for including participants was more conservative than in the original study; and 2. Very few people (only one out of 46 in the original study) would be likely to be excluded based on Henderson et al.'s (2008) criterion. Our inclusion criteria reduced power to detect the original effect size from .91 to .84. As seen in Table 1, the means and standard deviations were quite similar in the neutral and one-sided mindset conditions with and without the excluded participants. However, among participants in the two-sided mindset conditions, ambivalence was higher when participants who reported experience with a sex offender were not included.

Among the full sample, the crucial one-way ANOVA examining ambivalence as function of mindset condition remained nonsignificant,  $F(2, 86) = .38$ ,  $p = .68$ ,  $\eta^2 = .01$ . Participants in the one-sided and two-sided mindset conditions did not significantly differ in their level of reported ambivalence,  $t(58) = 0.18$ ,  $p = .86$ ,  $d = .05$ .

## Discussion

### Summary of Replication Attempt

The target finding for replication was the difference among the three conditions on attitude ambivalence (as indicated by an omnibus ANOVA), and, more specifically, the difference between the one- and two-sided mindset conditions (as indicated by an independent samples t-test). We conducted analyses excluding people who reported direct contact with a sex offender and with the full sample. Regardless of the exclusion criteria, neither of the critical tests was statistically significant.

After excluding participants who reported experience with a sex offender, the trend in the data was similar to those reported in Henderson et al. (2008), albeit with a smaller – but still moderate – effect size. These results might suggest that the original

report overestimated the size of a real effect<sup>1</sup>. On the other hand, when using the full sample, participants in the one- and two-sided mindset conditions differed only slightly. Such results might suggest the original finding was a false positive.

### Commentary

The question naturally arises: Which of these cases is more likely to be a reliable test of the original hypothesis? Henderson et al. (2008) “excluded 1 participant from the analyses who reported having direct contact with a sex offender in her neighborhood” “[i]n order to reduce the likelihood that participants already held a strong attitude toward this issue” (p. 406). In retrospect, we realize that the wording of our question “Have you had experience with sexual offenders, or the list of convicted sex offenders?” was more likely to elicit positive responses than a question about direct contact with an offender in one’s neighborhood. Nevertheless, Henderson et al.’s logic still holds – people with experience with sex offenders may hold stronger attitudes to start with, and be less likely to become more ambivalent as a result of an experimental manipulation. Indeed, consistent with such speculation, participants who reported experience with an offender in our study reported moderately (but nonsignificantly) less ambivalence ( $M = -.63$ ,  $SD = 1.49$ ) than those who did not ( $M = -.05$ ,  $SD = 1.47$ ),  $t(87) = 1.53$ ,  $p = .13$ ,  $d = 0.39$ . Such an argument points to the analyses with excluded participants – which were in line with the original findings – as the more appropriate one.

As seen in Table 1, participants in the original study’s neutral condition – which arguably provides a baseline – reported greater ambivalence ( $M = 1.23$ ) than those in the replication’s neutral condition ( $M = -.38$  with excluded participants,  $M = -.37$  without). As would be expected based on such a finding, participants in the original study’s neutral condition also reported lesser attitude certainty ( $M = 4.25$ ) than those in the replication’s neutral condition ( $M = 4.54$  with excluded participants,  $M = 4.55$  without). Indeed, the magnitude of the difference between the two samples’ neutral conditions (1.61 scale units) was almost as large as the difference between the one- and two-sided conditions in the original study (1.66 scale units). Students at the school where the replication was conducted may, as a group, hold particularly strong opinions (either in general or about the sex offender registry). If so, then one might reasonably expect that their attitude ambivalence would be less susceptible to an experimental intervention, and predict a smaller effect size in such a population. Another possibility for the differences between the two studies is that public attitudes toward the relevant issue changed and/ or became more crystalized in the years between when the original and replication studies were conducted.

Finally, we tested the combined original and the replication samples by calculating a weighted average of the effect size ( $r$  associated with each study converting them using Fisher’s  $z$  transform, and then back to  $r$  for reporting purposes). The weighted average of the two studies,  $r = .28$ , significantly differed from zero,  $p = .02$ .

In summary, although the key replication findings were not statistically significant, there are several reasons not to discount the original findings. When using our *a priori* exclusion criterion, a moderate trend in the same direction as the original

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<sup>1</sup> A replication attempt with 30 participants per condition and effect size observed in the replication would not have detected a significant difference between the two mindset conditions, *estimated*  $t(58) = 1.43$ ,  $p = .16$ .

study emerged, and the most important difference was significant in the meta-analytic summary of both studies. Given these findings, and the differences in baseline level of ambivalence between the original and replication samples, future research that clarifies the nature of the discrepancies between the two studies would be useful.