The effect of perceived similarity and behavioral options on automatic behavior

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Abstract

Behavioral priming effects have been well established in past research. More recent studies have investigated factors that moderate behavioral priming effects such as social comparison processes, individual goal states and environmental features. In spite of this research, however, the boundary conditions of behavioral priming effects remain unclear. In the present study we investigated these boundary conditions by examining the interplay between behavioral priming, multiple behavioral options and perceived similarity with the primed category. To this extent, we primed participants with both hooligans and nerds and manipulated their perceived similarity with these categories. We then asked participants to take a general knowledge test. Results showed that participants who were primed with hooligans performed better on science and nature questions than participants who were primed with nerds. Furthermore, we found that participants' performance on a general knowledge test was enhanced by increased elaboration on similarities with hooligans.

Perceived Similarity, Multiple Behavioral Options and Automatic Behavior

In 1956 James Vicary, a market researcher, claimed that over a six-week period, 45,699 visitors at a movie theater in Fort Lee, New Jersey were shown two advertising messages, "Eat Popcorn" and "Drink Coca-Cola" while they watched the film *Picnic* (Dixon, 1971). Once every five seconds, one such message, 3 milliseconds in duration, was flashed throughout the movie: a duration so short that the viewers were unaware that they were being flashed at all. Despite this unawareness, Vicary claimed that over the six-week period the sales of popcorn rose 57.7% and the sales of Coca-Cola rose 18.1%. Although other researchers were unable to replicate these results and nowadays Vicary's claims are widely considered to be a hoax, they do raise an intriguing question. To what extent does automatic behavior result from mere perception? Since Vicary a lot of studies have addressed this question and established a direct relation between priming and behavior within different behavioral domains such as locomotion (e.g., Bargh, Chen & Burrows, 1996), intellectual performance (e.g., Dijksterhuis & van Knippenberg, 1998) and interpersonal behavior (e.g., Macrae & Johnston, 1998).

Although these studies have established clear behavioral priming effects, the boundary conditions of these effects remain somewhat unclear. That is, in most studies the priming behavior relation has been established in experimental settings where participants were offered only one behavioral option. Yet in everyday life, situations in which only one behavioral option is present are quite rare. Does this mean that the relation between priming and behavior can only be found in strict experimental settings or does it also exist in situations that contain multiple behavioral options? In the present study we addressed this question by using a design in which participants were offered multiple behavioral options. In our opinion, this design is a necessary next step in further understanding the boundary conditions of behavioral priming effects. Furthermore, we investigated whether varying participants' level

of perceived similarity with the primed category would enhance the perception-behavior link. We argue that higher levels of perceived similarity with the primed category should lead to stronger behavioral priming effects.

Understanding Behavioral Priming

There has been abundant research exploring behavioral priming effects (e.g. Bargh et al., 1996; Dijksterhuis & van Knippenberg, 1998; Macrae & Johnston, 1998). In a recent overview, Dijksterhuis and Bargh (2001) explained the effects of behavioral priming with the activation of the cognitive representation of behaviors and traits assumed to be associated with a stereotype or category, following priming of that stereotype or category. This activation makes category-relevant behavior more salient and increases the probability that a person will engage in that behavior. For example, Bargh et al. (1996; Experiment 1) showed that when participants were primed with the stereotype of the elderly, they subsequently walked more slowly down the corridor after leaving the experiment compared to participants in the control conditions. Similarly, Dijksterhuis and van Knippenberg (1998) showed that participants performed better on a general knowledge test after being primed with the stereotype of professors compared to hooligans.

Given that behavioral priming effects are well established, the next step is for research to begin examining the boundary conditions of behavioral priming. Clearly, the primed participants in the Bargh et al. study walked more slowly down the corridor. But what if, after leaving the corridor, they would arrive at the waiting room for a next experiment? Would they prefer to read the latest *Geriatrics* or possibly the new *Surfer* magazine. Establishing a perception-behavior link within an experimental setting where the participants only have one behavioral option is one thing, establishing this relation in a more complex social environment is clearly another.

Multiple Behavioral Options and Automatic Behavior

In their seminal paper on behavioral priming Bargh et al. (1996) already took note of this issue of multiple behavioral options: “The limited range of behavioral options that participants had in our experimental situations may also account for the strength of the findings” (p. 240). One would expect more recent studies to take this notion into account. Much to our surprise, however, no subsequent studies have investigated the issue of multiple behavioral options. Because of that, it remains unclear whether the results of these studies would apply in everyday life. Thus, to the extent of investigating the generalizability of behavioral priming effects a simulation of a more complex social environment that contains multiple behavioral options is needed.

Other research has already provided partial answers to the questions about the boundary conditions of behavioral priming effects in a more complex social environment. Macrae and Johnston (1998) examined how both environmental features and two competing goal states can inhibit behavioral priming effects. After they had primed participants with helping behavior, these participants were more likely than participants in the control condition to offer assistance and pick up a pen that accidentally dropped on the floor. However, when this pen was faulty and leaked, the effect of priming on behavior disappeared. Primed participants were no more inclined than participants in the control condition to pick up the leaking pen. Because of the inhibiting cue in the social environment (i.e., the leaking of the pen) the effect of perception on behavior had disappeared. Using the same design in a second experiment, they found evidence for the inhibitory effect of individual goal states on the perception-behavior link as well (Macrae & Johnston, 1998; Experiment 2). This time they told the participants that the experiment was running 5 minutes behind. Again, the effect of perception on behavior disappeared. The authors explained these results with a mechanism of contention scheduling first described by Norman and Shallice (1986). This mechanism states that at any

given point in time multiple behavioral schemas simultaneously compete to influence behavior (see also Dijksterhuis & van Knippenberg, 2000). It is the behavioral schema with the strongest activation level that guides one's behavior. Macrae and Johnston did not offer their participants multiple behavioral options. However, their study does show that a more complex social environment can affect behavioral priming effects.

In the present study we took these results a step further by actually offering the participants multiple behavioral options. We expected that whether behavioral priming effects apply in the presence of multiple behavioral options depends on whether participants perceive themselves to be similar to the target category.

Perceived Similarity and Automatic Behavior

Recent studies have pinpointed that behavioral priming not only leads to behavioral assimilation but also to behavioral contrast (Spears, Gordijn, Dijksterhuis & Stapel, 2004; Schubert & Haefner, 2003). Spears et al. (2004) argue that “when intergroup comparisons become salient, particularly when there is a perception of group difference, there may be an unconscious tendency to distance oneself from the outgroup and contrast one's behavior accordingly” (p. 607). Thus, activation of group identity can reverse behavioral assimilation into behavioral contrast when one considers the target category to be an outgroup. Gordijn and Stapel (2005) extended this research by showing that whether social comparisons lead to automatic contrast or assimilation effects on behavior depends on whether the comparison target (the “other”) is categorized as either an *ingroup member* (she is one of us), or as an *outgroup member* (she is one of them) in an intergroup context, or as another *individual* (she is herself) in an interpersonal context.

These studies clearly show that effects of behavioral priming can depend on a foregoing comparison process classifying others into ingroup and outgroup members. However, the boundaries of what is the ingroup and what is the outgroup may not always be that clear-cut

as these studies suggest. For instance, a student may feel stronger towards being a student when he is attending a class than when he is watching his favorite soccer team play. Thus, the perceived similarity with a certain category may vary with context. This raises the question of whether varying levels of perceived similarity can enhance automatic behavior as well. For example, are people more inclined to behave as a soccer hooligan, if they are primed with this category and their similarity with that category is made salient. As likely as this may seem we know of no research examining this question.

Experimental Overview

The purpose of this experiment was to test our reasoning concerning the interplay between behavioral priming, multiple behavioral options and perceived similarity on subsequent automatic behavior. We tested whether perceived similarity with a target category influences automatic behavior following priming of that category. Furthermore, we tested whether higher perceived similarity with a target category leads to a stronger preference for category-specific behavior. To this extent we used a design in which participants were offered multiple behavioral options.

In this experiment, we first primed participants with the category of nerds or hooligans by having them think about these groups for 1 minute. We then manipulated perceived similarity with the primed category by asking the participants to make up 2, 6 or 10 similarities with that category. In order to test our multiple behavior option logic we then had participants take a general knowledge test.

We predicted that, in general, participants in the nerd conditions would answer more questions correctly than participants in the hooligan conditions. We also predicted that within the nerd conditions, participants in the high similarity condition would answer more questions correctly than participants in the low similarity condition. We expected that within the nerd conditions participants in the high similarity condition would have a stronger preference for

science and nature questions than participants in the low similarity condition. Within the hooligan conditions we expected that participants in the high similarity condition would answer fewer questions correctly than participants in the low similarity condition. We further expected that within the hooligan conditions, participants in the high similarity conditions would have a stronger preference for sports and leisure questions than participants in the low similarity condition.

Method

Participants and Design

Participants were 138 Dutch undergraduates who took part in exchange for course credit. For this experiment we used a 2 (Category: nerd, hooligan) X 3 (Similarity: low, medium, high) between participants design.¹

Procedure

After they had been welcomed to the lab, participants were told that they would participate in two unrelated studies. The first study was said to be on empathy and perspective taking. The second study was ostensibly aimed at developing a valid general knowledge test using questions from the well-known game Trivial Pursuit.

Empathy and perspective taking. At the beginning of the first study, the participants were directed towards an individual cubicle. They received a questionnaire which apparently measured empathy and perspective taking, but actually intended to prime the participants with a category (see Appendix 1).

The priming procedure we used is comparable to procedures that have been used in earlier research (see Dijksterhuis & van Knippenberg, 1998). The participants first received a questionnaire (see Appendix 1). On the first page of the questionnaire, participants had to think thoroughly, for at least one minute, about either the category nerds or hooligans. Then they were asked to elaborate on their associations with these categories. No further

information about the category was given. On the next page of the questionnaire, the participants had to write down 2 (low similarity condition), 6 (medium similarity condition) or 10 (high similarity condition) similarities between themselves and the respective category. These different numbers of similarities were intended to affect perceived similarity with the primed category in an increasingly linear fashion.²

Similarity. After they had made up these similarities, participants were asked how similar they felt to nerds, students, family and hooligans, using Venn diagrams based on Aron, Aron and Smollan's (1992) Inclusion of Other in the Self Scale. For each category, the participants were given a set of five diagrams and asked to indicate which of the diagrams best represented the overlap they saw between themselves and the category in question. The diagrams depicting the most overlap were scored a (5) and the diagrams depicting the least overlap were scored a (1). Participants had to draw a circle around the diagrams which best represented their "interpersonal closeness" with a category (Aron et al., 1992).

Task difficulty and motivation. To see whether participants found it difficult to make up similarities with a category, they were asked to respond to the following statement on a 9-point scale "I found it difficult to make up similarities with hooligans" ("or nerds" 1 = *strongly disagree*, 9 = *strongly agree*) (see Appendix 2). In order to measure to what extent participants were motivated to make up similarities with a category we asked them to respond to the following statement, "I was motivated to make up similarities with hooligans" ("or nerds" 1 = *strongly disagree*, 9 = *strongly agree*).

Prejudice. We were also interested in whether the perceived similarity with a category affects participants' prejudice level toward that category. To see if this were the case, we asked participants to indicate their position on the following ten-point scale "Use the underlying scale to indicate to what extent you feel either warm or cold toward hooligans" ("or nerds" 1 = *very cold*, 10 = *very warm*). In past research, this "feeling thermometer" has

been successful at measuring participants' prejudice toward a target group (Wolsko, Park, Judd & Wittenbrink, 2000).

After the participants had finished the empathy and perspective taking questionnaire, they returned to the main entrance of the lab. They were then told that they had finished the first study and that the second study was about to begin. The participants returned to their cubicles again to start the general knowledge test and a subsequent questionnaire.

General knowledge test. Every participant had to answer 20 questions that were selected from a database of 80 four-option Trivial Pursuit questions, evenly divided over the categories Geography, Science and Nature, Sports and Leisure, and History.³ Before the first question was shown, the participants were told that the study aimed at validating a general knowledge test and that they had to answer a total of 20 questions. It was stressed that for every single question they were free to choose its category. After they had read this information, participants were directed to a next screen where they had to select the category of the first question. After selecting a category a question from that category appeared on the computer screen. The questions were randomly selected from the appropriate category in the database. After this question had been answered, the participants were directed to the category screen again. This loop was run 20 times. Examples of questions and answer choices are: "What is the name of the stadium of soccer club Sparta?" (a. Het Kasteel, b. De Meer, c. De Kuip, d. De Goffert) and "How many bits make a byte?" (a. 2, b. 4, c. 6, d. 8). For every participant the total number of problems chosen from each category as well as the number of right answers per category was recorded. After the participants had finished the general knowledge test, they completed the final questionnaire.

Final questionnaire. The participants were asked to rate on a 9-point scale how difficult they thought the general knowledge test was (1 = *not difficult at all*, 9 = *very difficult*). We

then asked participants to describe what they thought the goal of the study was. Finally, participants had to fill in their gender, age, native language and major.⁴

Results

Our analyses were conducted without the data from 9 participants. For 5 participants, outlier analysis revealed that they had uncommon studentized deleted residuals on relevant performance measures (Judd & McClelland, 2000).⁵ Four other participants were excluded because they guessed the true purpose of the study.

Manipulation Checks

Perceived similarity. The first manipulation check assessed whether we successfully manipulated participants' perceived similarity with the primed category. We expected that, within the *Nerd* conditions, participants in the *High Similarity* condition would feel more similar to nerds than participants in the *Low Similarity* condition and that, on average, participants would feel more similar to nerds than to hooligans. Furthermore, we expected that, within the *Hooligan* conditions, participants in the *High Similarity* condition would feel more similar to hooligans than participants in the *Low Similarity* condition and that, on average, participants would feel more similar to hooligans than to nerds. To test this we first constructed a difference score by subtracting participants' similarity scores with hooligans from their similarity scores with nerds. We then submitted these difference scores to a 2 (Category) X 3 (Similarity) ANCOVA controlling for gender (see Table 1). This omnibus analysis revealed no main or interaction effects, $ps > .15$. We then conducted a focused contrast analysis comparing participants' scores in the *Nerd, Low Similarity* condition (-1), the *Nerd, High Similarity* condition (+1), the *hooligan, Low Similarity* condition (+1) and the *Hooligan, High Similarity* condition (-1). This analysis revealed was not reliable ($F < 1.00$), showing that our measure of perceived similarity may not have been sensitive enough to capture differences in participants' perceived similarity with the respective category.

Prejudice. The second manipulation check assessed whether the perceived similarity with the primed category affects participants' prejudice toward that category. Recall that we used the "feeling thermometer" (Wolsko et al., 2000) to measure participants' prejudice toward a category. We constructed a difference score by subtracting participant's warmth towards hooligans from participants' warmth towards nerds. We first submitted these difference scores to a 2 (Category) X 3 (Similarity) ANCOVA controlling for gender. This analysis revealed no main or interaction effects, $ps > .36$. We then conducted a focused contrast analysis comparing participants' scores in the *Nerd, Low Similarity* condition (-1), the *Nerd, High Similarity* condition (+1), the *Hooligan, Low Similarity* condition (+1) and the *Hooligan, High Similarity* condition (-1). This contrast did not reveal a reliable effect, $F(1, 62) = 1.93$, $p < .17$. However, the pattern of means shows that participants in the *Nerd, High Similarity* and *Hooligan, Low Similarity* conditions felt more warm toward nerds than participants in the *Nerd, Low Similarity* and the *Hooligan, High Similarity* conditions.

Main Analyses

*Percentage of correct answers.*⁶ To investigate what percentage of questions participants answered correctly, we conducted a 2 (Category) X 3 (Similarity) ANCOVA controlling for gender (see Table 2). This analysis revealed an effect for gender, $F(1, 62) = 18.99$, $p < .001$. We then conducted a focused contrast analysis within the *Nerd* conditions, comparing participants' scores in the *Low Similarity* condition (-1) to participants in the *High Similarity* condition (+1). This analysis revealed no effect ($F < 1.00$). The next contrast assessed participants' scores within the *Hooligan* conditions comparing the *Low Similarity* condition (+1) to the *High Similarity* condition (-1). This focused contrast showed an opposite effect, with participants in the *High Similarity* condition ($M = .59$) answering slightly more questions correctly than participants in the *Low Similarity* condition ($M = .50$), $F(1, 62) = 3.38$, $p < .07$.

To see whether possible answering patterns were category-specific we divided the number of correctly answered questions over the four categories. Subsequently we analyzed the answers on both the sports and leisure questions and the science and nature questions.

*Science and nature questions.*⁷ The percentage of science and nature questions answered correctly was analyzed using a 2 (Category) X 3 (Similarity) between subjects ANCOVA controlling for gender. This analysis revealed a marginal effect for gender, $F(1, 53) = 2.67, p = .11$. It also revealed a marginal effect for Category, $F(1, 53) = 3.29, p < .08$ such that participants in the *Hooligan* conditions ($M = .58$) performed better than participants in the *Nerd* conditions ($M = .44$). We then conducted a focused contrast analysis within the *Nerd* conditions comparing participants' percentage of questions answered correctly in the *Low Similarity* condition (-1) to that of participants in the *High Similarity* condition (+1). This analysis did not reveal a reliable effect ($F < 1.00$). Our last hypothesis concerned participants' scores within the *Hooligan* conditions. We conducted a focused contrast analysis comparing participants' scores in the *Low Similarity* condition (+1) to participants in the *High Similarity* condition (-1). This analysis did not show a reliable effect ($F < 1.00$).

Sports and leisure questions. To analyze the percentage of correct sports and leisure questions we conducted a 2 (Category) X 3 (Similarity) ANCOVA controlling for gender. This analysis revealed a marginal effect for gender, $F(1, 62) = 2.84, p < .10$. We then conducted a focused test within the *Hooligan* conditions, comparing participants' scores in the *Low Similarity* condition (-1) to that of participants in the *High Similarity* condition (+1). This analysis revealed the expected effect, $F(1, 62) = 3.87, p = .05$, demonstrating that participants in the *High Similarity* condition ($M = .64$) answered more question correctly than participants in the *Low Similarity* condition ($M = .41$). Within the *Nerd* conditions, we expected participants in the low similarity condition to perform better on the sports and leisure questions than participants in the *High Similarity* condition. A focused contrast analysis

comparing participants' scores in the *Low Similarity* condition (+1) to that of participants in the *High Similarity* condition (-1) did not reveal a reliable effect ($F < 1.00$).

Recall that our hypotheses not only suggested that participants would show differences in answering patterns, but also in patterns of category preference. To see whether this were the case we examined the number of question answered within the sports and leisure and science and nature questions.

Category preference. To investigate whether priming participants with a category affected their preference for certain question types we first constructed a difference score by subtracting participants percentage of sports and leisure questions chosen from their percentage of science and nature questions chosen. This difference score clearly shows participants' preference for one category in comparison with the other category.⁸ We submitted this difference score to a 2 (Category) X 3 (Similarity) ANCOVA controlling for gender. This omnibus test did not reveal any main or interaction effects, $ps > .18$. We then conducted a focused contrast analysis comparing participants' scores in the *Nerd, Low Similarity* condition (-1), the *Nerd, High Similarity* condition (+1), the *Hooligan, Low Similarity* condition (+1) and the *Hooligan, High Similarity* condition (-1). This contrast was not reliable, $F < 1.00$.⁹

Discussion

The experiment presented here highlights some interesting contributions to behavioral priming and social comparison research. Together the most important findings from our research can be summarized as follows.

1) For participants who were primed with hooligans, those who had made up 10 similarities with the primed category performed better on the general knowledge task than those who had made up 2 similarities.

2) Participants who were primed with hooligans performed better on the science and

nature questions than participants who were primed with nerds.

3) For participants who were primed with hooligans, those who had made up 10 similarities with the primed category performed better on the sports and leisure questions than those who had made up 2 similarities.

Perceived Similarity Manipulation

Our hypotheses suggested that increased perceived similarity with the primed category would enhance (*Nerds*) or decrease (*Hooligans*) performance on the general knowledge test and preference for certain question types. However, as our manipulation check demonstrated, we were not successful at enhancing participants' perceived similarity with the primed category. In the following section we will shed some light on the found results, which demonstrate some interesting behavioral priming effects.

Our participants felt more similar to their family and students than they did to nerds and hooligans. Hence, it appears likely that people do not want to perceive themselves to be similar to hooligans and nerds. Being a nerd or a hooligan is surely not that desirable for first year psychology students. This negative connotation with nerds and hooligans might have been too strong to overcome by making up a number of similarities with these categories. A stronger priming manipulation could have been more fruitful in enhancing participants' perceived similarity with the primed category. However, also a more fundamental objection can be made to our perceived similarity manipulation. That is, we asked participants to make up similarities between themselves and the primed category which makes their personal characteristics salient. The activation of personal characteristics in turn makes an interpersonal context salient (see Gordijn & Stapel, 2005). Earlier studies have shown (Brewer & Weber, 1994; Gordijn & Stapel, 2005; Schubert & Haefner, 2003) that whether social comparisons lead to automatic contrast or assimilation effects on behavior depends on whether the comparison target (the "other") is categorized as either an *ingroup member* (she is

one of us), or as an *outgroup member* (she is one of them) in an intergroup context, or as another *individual* (she is herself) in an interpersonal context. We think that, in the present experiment, the activation of an interpersonal context did not match the behavioral prime. Participants' low similarity ratings with nerds and hooligans underline this reasoning. Instead of the intended assimilative comparison process we seem to have activated a contrastive comparison process such that participants contrasted themselves away from the target category.

Performance Measures

Participants who were primed with hooligans performed better on the science and nature questions than participants who had been primed with nerds. This increased performance is probably a result of the contrastive comparison process that was activated among the participants.

We also found other interesting results with the participants who were primed with hooligans that only partly reflect behavioral contrast. Participants who had made up 10 similarities with hooligans performed better on both the sports and leisure questions (*Assimilation*) and the general knowledge test (*Contrast*) than participants who had made up 2 similarities.¹⁰ These effects on performance cannot be the result of increased perceived similarity since our similarity manipulation was not successful. We think however, that the participants who made up 10 similarities with the primed category elaborated more thoroughly on the primed category than the participants who made up 2 similarities. Increased elaboration on a category can lead to stronger cognitive activation of this category. This in turn can lead to stronger (contrastive) behavioral priming effects. In a previous study Dijksterhuis and van Knippenberg (1998) demonstrated that increased elaboration on the primed category did enhance behavioral priming effects. When they asked participants to think for 9 minutes of professors, these participants performed better on a subsequent general

knowledge task than participants who had thought for 2 minutes of. In a similar fashion, the participants in our study who had made up 10 similarities performed better on the general knowledge task and the sports and leisure questions than the participants who had made up 2 similarities.

The performance on the general knowledge test of participants who were primed with nerds was not affected. We think that this is due to the category itself. Several participants did not mention similarities with nerds concerning intellectual performance. Perhaps, people do not associate nerds that strongly with impressive intellectual capacities. Other comparable studies mostly used the category of professors (e.g., Dijksterhuis & van Knippenberg).

Preference Measures

Priming participants with nerds or hooligans did not affect their preference for questions from the science and nature or sports and leisure categories. Preference in the context of the present experiment is defined as choosing a larger number of questions of a specific category. Preference thus implies an explicit choice for a category. Other more fundamental preferences can underlie and overrule this specific preference which then makes it hard to alter. For example, one may prefer sports and leisure questions over science and nature questions because high school science was taught by an unpleasant teacher. It is possible that in our study, in terms of Norman and Shallice's contention scheduling (1986), the behavioral schema activated by the behavioral prime was overruled by a stronger behavioral schema associated with earlier experiences.

The principle of ideomotor action offers us another possible explanation. This principle implies that in order for the priming of a category to influence behavior this behavior needs to correspond to the behavioral implications of this activated category (see for an overview Dijksterhuis & Bargh, 2001). Perhaps, the behavioral options that we offered our participants just did not correspond to the behavioral implications of the activated categories. People then

do not associate hooligans with a preference for sports and leisure questions and nerds with a preference for science and nature questions.

Implications for Behavioral Priming Research

The purpose of this study was to test our reasoning concerning the interplay between behavioral priming, multiple behavioral options and perceived similarity on subsequent automatic behavior. Our hypotheses were not all confirmed, behavioral priming studies are a difficult matter. However, we think that our reasoning considering multiple behavioral options and perceived similarity influencing subsequent automatic behavior offer important insights. Future studies cannot report behavioral priming effects without having considered our multiple behavioral option logic first. Furthermore, it will be interesting to see whether more successful similarity manipulations can enhance behavioral priming effects. We hope that this study can act as a starting point for future studies on this intriguing subject.

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Footnotes

1. We dropped the control condition, for reasons of parsimony and clarity in presentation.
2. In a pilot study we had asked twelve participants to make up 10 similarities with nerds and hooligans. They were asked to indicate from which point onwards they experienced difficulty making up further similarities with the category. Most of the participants indicated this point to be at 6 similarities. Because of that, we expected that making up 6 similarities was of average difficulty.
3. A pilot study with 15 participants who had answered a total of 120 questions, demonstrated that these 80 questions were answered correctly by 40 to 80 percent of the participants.
4. At the University of Groningen a large number of German students are enrolled. Dutch not being their native tongue could have influenced their results. To make sure that we would be able to filter out these possible effects, we asked participants whether Dutch was their native tongue.
5. This index allows us to test whether an additional parameter is needed in the regression model to account for error in our observations that is associated with a particular observation. Moreover, this index can be seen an objective way to detect outliers given that it provides a t-value for each observation. Put simply, an uncommon studentized deleted residual indicates whether “an observation is so extreme that it is unlike the other observations” in the data set (Judd & McClelland, 1989, p. 221; McClelland, 2000).
6. The general knowledge test consisted of 20 questions randomly selected from a database of 80 questions. Unfortunately participants’ answers on question 25 were filed as answers on question 26 making it impossible to find out whether an answer belonged to question 25 or 26. The answers on both these questions were excluded from further analysis. As a result of

this, for some participants 18 or 19 answers were analyzed. We divided their scores by the total number of questions analyzed thus working with percentage scores.

7. The total degrees of freedom for this ANCOVA is 53 instead of 63. Ten participants did not select any science and nature questions.

8. We also constructed a difference score that included all the categories. We first multiplied participants preference for science and nature questions with a factor 3. We then subtracted participants' preference scores for sports and leisure, geography and history. We submitted this difference score to 2 (Category) X 3 (Similarity) ANCOVA controlling for gender. No main or interaction effects were found ($F < 1.00$).

9. It is interesting to note that a focused contrast analysis comparing participants' preference for geography questions in the *Nerd, Low Similarity* condition (-1), the *Nerd, High Similarity* condition (+1), the *Hooligan, Low Similarity* condition (+1) and the *Hooligan, High Similarity* condition (-1) demonstrated a marginal effect, $F(1, 62) = 3.15, p < .08$. Perhaps interest for geography is seen as more typical for nerds than preference for science and nature questions. However, participants' scores on the geography questions did not support this idea. Participants who were primed with nerds did not perform better on these questions than participants who were primed with hooligans ($F < 1.00$).

10. One could also argue that increased performance on sports and leisure questions is a contrastive behavioral priming effect for participants who have been primed with hooligans. Hooligans are often seen as less intelligent. Because of that any increase in intellectual performance, even in the domain of sports and leisure questions, is contrastive.

Table 1.

Mean (SD) Perceived Similarity Difference Score, Prejudice Difference Score

Category	Nerds		
	Low	Medium	High
Perceived Similarity	0.70 (0.68)	1.08 (0.86)	0.90 (1.80)
Prejudice	2.60 (2.22)	3.23 (1.64)	3.00 (2.00)
Category	Hooligans		
	Low	Medium	High
Perceived Similarity	1.25 (0.62)	1.27 (0.88)	1.22 (1.09)
Prejudice	3.08 (1.93)	2.87 (1.60)	1.89 (.145)

Table 2.

Mean (SD) Total Percentage of Correct Answers, Percentage of Correct Science and Nature Answers, Percentage of Correct Sports and Leisure Answers, Category Preference

Category	Nerds		
	Low	Medium	High
Total	0.48 (0.11)	0.47 (0.11)	0.53 (0.16)
Science and Nature	0.47 (0.23)	0.38 (0.29)	0.50 (0.27)
Sports and Leisure	0.47 (0.24)	0.45 (0.27)	0.54 (0.22)
Category Preference	-0.06 (.30)	0.05 (.23)	-0.05 (0.45)
Category	Hooligans		
	Low	Medium	High
Total	0.50 (0.12)	0.55 (0.15)	0.59 (0.13)
Science and Nature	0.65 (0.18)	0.52 (0.20)	0.57 (0.37)
Sports and Leisure	0.41 (0.35)	0.52 (0.32)	0.64 (0.16)
Category Preference	-0.06 (0.25)	-0.07 (0.38)	-0.14 (0.30)

Appendix 1.

Perceived Similarity Manipulation (Hooligan, Low Similarity Condition)

Welkom bij dit onderzoek naar empathie en inlevingsvermogen

Het eerste gedeelte van dit onderzoek zal betrekking hebben op **empathie** en **inlevingsvermogen**. Het is voor dit onderzoek van belang dat je de instructies van de vragen goed doorleest en goed nadenkt over deze vragen. Wees **niet** te haastig. Beantwoord de vragen in de volgorde waarin ze zijn gesteld. Er zijn geen goede of foute antwoorden mogelijk.

Zijn er onduidelijkheden of heb je vragen, stel ze aan de **proefleider**.

Je kan nu overgaan naar de volgende pagina.

Stel je **hooligans** voor. Denk **minstens een minuut** lang goed na over deze groep. **Probeer je in te leven** in deze groep. Bedenk wat **jij** associeert met hooligans.

Wanneer je dit gedaan hebt, ga dan over naar de volgende pagina.

Benoem **twee** overeenkomsten tussen jou en **hooligans**. Probeer wel beknopt te blijven.

1.....

.....

2.....

.....

Appendix 2.

Questionnaire (Hooligan, Low Similarity Condition)

Omcirkel het antwoord dat op jou van toepassing is.

Ik vond het moeilijk om overeenkomsten te verzinnen met hooligans.

Sterk 1 2 3 4 5 6 7 8 9 Sterk
mee oneens mee eens

Ik was gemotiveerd om overeenkomsten te verzinnen met hooligans.

Sterk 1 2 3 4 5 6 7 8 9 Sterk
mee oneens mee eens

Hooligans en ik zijn gelijk aan elkaar.

Helemaal mee oneens	1	2	3	4	5	6	7	8	9	Helemaal mee eens
------------------------	---	---	---	---	---	---	---	---	---	----------------------

Gebruik de onderstaande schaal om aan te geven in hoeverre je gevoelens ten opzichte van **nerds** warm dan wel koud zijn.

Erg koud	1	2	3	4	5	6	7	8	9	10	Erg warm
-------------	---	---	---	---	---	---	---	---	---	----	-------------

Gebruik de onderstaande schaal om aan te geven in hoeverre je gevoelens ten opzichte van **studenten** warm dan wel koud zijn.

Erg koud	1	2	3	4	5	6	7	8	9	10	Erg warm
-------------	---	---	---	---	---	---	---	---	---	----	-------------

Gebruik de onderstaande schaal om aan te geven in hoeverre je gevoelens ten opzichte van **hooligans** warm dan wel koud zijn.

Erg koud	1	2	3	4	5	6	7	8	9	10	Erg warm
-------------	---	---	---	---	---	---	---	---	---	----	-------------

Gebruik de onderstaande schaal om aan te geven in hoeverre je gevoelens ten opzichte van **je familie** warm dan wel koud zijn.

Erg koud	1	2	3	4	5	6	7	8	9	10	Erg warm
-------------	---	---	---	---	---	---	---	---	---	----	-------------

Ik kan me goed inleven in anderen.

Sterk 1 2 3 4 5 6 7 8 9 Sterk
mee oneens mee eens