Intergroup Effects of Visuo-Spatial Perspective-Taking: The Role of Prejudice.

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Abstract

Racial prejudice is a very serious issue in today's society, considering the great amount of suffering that brings to its victims. For this reason, it is essential to investigate potential ways to reduce prejudiced attitudes in order to prevent any negative consequences. Visuo-spatial perspective-taking has shown to be a successful strategy to improve attitudes towards another person. However, previous research on this field has only shown these effects for subjects taking the perspective of individuals from their same group. In the present study, we investigated whether these effects also extend to cases where participants take the perspective of out-group members. We also included measures of prejudice level and motivation to conceal prejudice, in order to investigate whether these variables moderate these effects. We expected participants engaging in visuo-spatial perspective-taking to show improved attitudes towards the targets, compared to when they remain egocentric. Moreover, we expected any difference between attitudes towards in-group and out-group targets, to depend on the participants' prejudice level and motivation to conceal prejudice. The present research had a within-subjects design and it was conducted online. A total of $N = 175$ participants took part in the study. Results showed that participants' attitudes did not improve after engaging in visuo-spatial perspective-taking. We also found no effects of the moderators. Lastly, we discuss the potential obscuring effects of the moderator variables on the results, as well as limitations and implications for future research.

Keywords: Visuo-spatial Perspective-taking, Prejudice, Motivation to Conceal Prejudice

In recent years, the Black Lives Matter movement has exposed how racism is built-in systematically in our society (https://blacklivesmatter.com/). The negative consequences suffered by the targets of racial prejudice are countless. From suffering mental health problems, to the fatal outcomes committed by police. A study by Edwards et al. (2019) found that, in the United States, "Black men are about 2.5 times more likely to be killed by police over the life course than are White men. Black women are about 1.4 times more likely to be killed by police than are White women". Issues related to racial prejudice are not only present in the United States. In the Netherlands, the organization Controle Alt Delete continues to fight against racial profiling policies used by police (see https://www.controlealtdelete.nl/). This type of policies has made it easier for police officers to stop and search citizens, based solely on their racial characteristics (see Hayes et al., 2018).

Another race related issue currently discussed in The Netherlands is the controversial *Zwarte Piet* (Black Pete). Zwarte Piet is a fictional character that has traditionally been part of Dutch culture. He is a Black servant, whose role is to help *Sinterklaas* (Saint Nicholas) bring presents to the children. Traditionally, Dutch towns have celebrated parades on which White people dress as Zwarte Piet, wearing black paint and red lipstick on their face, and black curly wigs. According to Hayes et al. (2018), Zwarte Piet is commonly represented as a dumb and silly individual, with poor language skills. In the last few decades, there has been a large increase in protests against the perpetuation of this practice. (for more information, see http://zwartepietisracisme.org/?mbili=32&tatu=4&nne=1). Protesters explain that this tradition is harmful, as it continues to promote derogatory stereotypes against Black people, such as being incompetent and inferior (Hayes et al., 2018; Smith, 2014). However, there is a big proportion of people in the Netherlands that do not recognise the prejudiced nature of this practice, and instead see it as a harmless national tradition (Smith, 2014).

The overall message from Black people is that everyone needs to consider racial prejudice as a priority issue. Accordingly, in order to move towards an equal society, White people are the ones that have the responsibility to learn about their own prejudiced attitudes and how to eliminate them. Therefore, the main objective that we should currently have is the investigation of potential ways in which prejudice can be overcome. Formally, *prejudice* is defined as the general attitude someone has towards members of a particular group (Kenrick et al., 2014). Crandall and Eshleman (2003) further define it as "a negative evaluation of a social group or a negative evaluation of an individual that is significantly based on the individual's group membership".

Perspective-taking has been found to be a successful strategy to reduce prejudiced attitudes towards out-group members (Galinsky & Moskowitz, 2000; Shih et al., 2009; Todd et al., 2011). *Perspective-taking* is defined as the process by which a person overcomes their own egocentric perspective in favour of adopting another person's mental states (Epley & Caruso, 2009; Erle et al., 2019). Several studies have shown that perspective-taking creates a feeling of *self-other merging* in the participants (Galinsky & Moskowitz, 2000; Galinsky et al. 2005). This merging refers to the overlap between the mental representations of oneself and the mental representations of the other (Galinsky & Moskowitz, 2000; Galinsky et al., 2005). Previous research has shown that the increase of the self-other overlap is characterised by the individual's increase in perceived similarity with the other person (Davis et al., 1996; Galinsky et al., 2005). *Perceived similarity* refers to an individual's subjective perception that another person is similar to themselves (Davis, 2017; Davis et al., 1996).

The classic way in which perspective-taking has been manipulated is by encouraging participants to take the perspective of a person shown in a picture, normally accompanied by a story and a narrative essay task (Galinsky & Moskowitz, 2000; Galinsky et al., 2008). Shih et al. (2009) showed participants a video clip and instructed them to imagine themselves in

the position of the other person, and to imagine how that person was feeling. Then, participants were asked some questions about their attitudes and feelings towards the target person (Galinsky & Moskowitz, 2000; Shih et al., 2009). Previous studies on perspective-taking and prejudice have shown that imagining how an out-group person is affected by his or her own situation, induces empathic reactions (Batson et al., 1997, 2002; Galinsky & Moskowitz, 2000, Shih et al., 2009). Consequently, empathy increases liking and improves helping. This leads to a decrease in prejudiced attitudes towards the out-group (Galinsky & Moskowitz, 2000; Shih et al., 2009). Galinsky and Moskowitz (2000) showed that perspective-taking increased the participants' positive evaluations of the targets. Using behavioral measures of attitudes, the authors also showed that perspective-taking reduced the difference in treatment between in-group and out-group members, during a minimal group paradigm (Galinsky & Moskowitz, 2000). Furthermore, inducing empathy for an out-group member not only improved attitudes towards the target person, but also improved attitudes towards their whole group (Batson et al., 1997; Galinsky & Moskowitz, 2000; Shih et al., 2009).

The classic studies in perspective-taking present some limitations. For instance, these studies do not explain the underlying mechanisms that facilitate the emergence of perspective-taking (Erle & Topolinski, 2015). Additionally, due to the usually distressful nature of the stories presented in these studies, it may be possible for some participants to guess what responses are expected of them. This makes it more difficult to determine whether the participant's responses derive from empathic perspective-taking, or whether they could be a consequence of socially desirable tendencies (Erle & Topolinski, 2017). Also, in these classical studies participants were only exposed to one out of two conditions, either the perspective-taking, or the objective condition. This type of study design does not allow for a comparison between the attitudes of one participant among the different conditions.

In contrast, research on *visuo-spatial perspective-taking* has tackled some of these issues and it has offered several advantages over the classical studies (Kessler & Thomson, 2010). Surtees at al. (2013a, 2013b) explains that there are three main components in a visuo-spatial perspective-taking (VPT) task: the perspective-taker (the participant), the target (whose perspective the participant takes), and an object on which the perspective will be taken. During a visuo-spatial perspective-taking task, participants see a picture of a person sitting on the opposite side of a table (Erle et al., 2018). There are two objects on the table, one to the right, and one to the left of the depicted target. The main task of the participant is to indicate what is the location of one of the objects (left or right). In some trials, the participant will be instructed to do this from his or her own perspective (egocentric trials), or from the perspective of the target (VPT trials; Erle et al., 2018).

Instead of inducing perspective-taking by asking participants to emotionally empathize with the target, this novel type of perspective-taking uses visuo-spatial means (Kessler & Rutherford, 2010; Kessler & Thomson, 2010). In other words, for participants to be able to complete the task from the perspective of the target, they need to perform an embodied process of self-rotation; that is, they have to mentally "move" their body to the target's body position (Kessler & Rutherford, 2010; Kessler & Thomson, 2010; Surtees et al., 2013a, 2013b). Previous research has reported that this embodied process occurs at an 80°-degree angle and higher, between the participant and the target, when the difference between their visuo-spatial frame of reference, considerably increases (Erle, 2019; Erle & Topolinski, 2017; Kessler & Rutherford, 2010; Kessler & Thomson, 2010).

Erle and Topolinski (2017) further investigated whether this bodily merging mechanism, characteristic of visuo-spatial perspective-taking, led to similar outcomes as the ones related to psychological self-other-merging (Galinsky & Moskowitz, 2000; Galinsky et al., 2005). Subsequently, Erle and Topolinski (2017) found that visuo-spatial perspective-

taking and empathic perspective-taking produced similar effects. Specifically, they found that visuo-spatial perspective-taking increased sympathy and perceived similarity, as well as liking and trust towards the other person (Erle et al., 2018; Erle & Topolinski, 2017).

The visuo-spatial perspective-taking paradigm offers some innovations compared to traditional perspective-taking instructions (Erle et al., 2018; Erle & Topolinski, 2017). As previously discussed, visuo-spatial perspective-taking is induced by the task itself, and the mechanisms by which it operates are well understood (see Erle, 2019; Erle & Topolinski, 2017). Also, the visuo-spatial perspective-taking paradigm enables to implement different trials, in which a single participant can be instructed to complete the task from their own perspective (i.e., remain egocentric), as well as from the perspective of the target. It is also possible to present participants with different targets. Therefore, it is possible to perform multiple comparisons between the different trials.

However, the previously reported effects of visuo-spatial perspective-taking on the improvement of attitudes are limited to in-group, and avatar-like targets (Erle et al., 2018; Erle & Topolinski, 2017). In the present study, we want to check if these findings extend to a situation in which the target is an out-group member. In other words, we want to investigate whether visuo-spatial perspective-taking also improves attitudes towards out-group members. To be able to assess the effects of visuo-spatial perspective-taking on attitudes in this new context, we need to consider two conceptually crucial factors. First, by introducing an out-group member as a target, assessing participants' prejudice level becomes relevant. Prejudice level refers to the participants' general attitudes towards the whole out-group. In the context of the present study, these are the attitudes towards Black people in general. Consequently, we want to see whether the participants' prejudice level influences their attitudes towards the specific out-group targets, i.e., the Black persons depicted during the visuo-spatial perspective-taking task. Second, it is possible that participants do not openly show their

prejudice, either because they do not want to appear prejudiced to others, or to themselves (see Crandall & Eshleman, 2003; Dunton & Fazio, 1997; for more information). Thus, it is important to measure whether participants bear any motivation to conceal their prejudice. Therefore, considering the previous points, the central question of the present research is, what is the effect of visuo-spatial perspective-taking on attitudes towards out-group members and, is this effect moderated by prejudice level and the motivation to conceal it.

The goal of the present study is to investigate whether the findings from the literature on empathic perspective-taking and prejudice (Galinsky & Moskowitz, 2000; Shih et al., 2009; Todd et al., 2011), also generalize to visuo-spatial perspective-taking; similarly to what Erle et al. (2018); and Erle and Topolinski (2017) accomplished for in-group members and avatar-type targets. As previously mentioned, during the visuo-spatial perspective-taking task, participants will see a picture of a target person sitting across the table with two objects in front of them. We will ask participants to grab one of these objects either from their own perspective (i.e., egocentrically, or EGO), or from the perspective of the target (VPT). Participants will perform the visuo-spatial perspective-taking task with both in-group (IGM), and out-group (OGM) targets, which will be pictures of actual people, instead of avatars. Participants' prejudice level (PL) and motivation to conceal prejudice (MCP) will also be measured, as they are important conceptual variables that could potentially affect the relationship between visuo-spatial perspective-taking and attitudes towards an out-group member.

Based on the evidence that visuo-spatial perspective-taking improves attitudes towards the targets of the task (Erle et al., 2018; Erle & Topolinski, 2017), we hypothesize that participants engaging in visuo-spatial perspective-taking (VPT), compared to when they remain egocentric (EGO), will show improved attitudes towards both in-group and out-group members (Hypothesis 1).

Previous research has found that an individual's evaluation of another person can be influenced by their perceived similarity with the target (Davis, 2017; Galinsky & Moskowitz, 2000). Additionally, perceived similarity is typically higher for members of the same group (Brown, 1995). Consequently, we hypothesize that participants will have more positive attitudes towards in-group members than towards out-group members (Hypothesis 2).

Finally, previous research has shown that attitudes towards specific out-group members can be affected by the individual's pre-existent prejudice against the whole group (Brown, 1995). Moreover, individuals often want to avoid exhibiting any prejudice, and tend to control any expression of it (see Crandall & Eshleman, 2003; Dunton & Fazio, 1997). Hence, we hypothesize that the effect of visuo-spatial perspective-taking will be moderated by the participant's prejudice level and their motivation to conceal it (Hypothesis 3). Particularly, we expect visuo-spatial perspective-taking to have the smallest effect on attitudes for participants with high levels of prejudice and low motivation to conceal them. We also expect participants high in motivation to conceal prejudice to show higher improvement in attitudes when they engage in visuo-spatial perspective-taking, compared to when they remain egocentric. This pattern corresponds to a three-way interaction between the effects of the visuo-spatial perspective-taking task, the effects of prejudice level, and the effects of the motivation to conceal prejudice.

Method

Open Practices and Power Analysis

The present study was pre-registered on the Open Science Framework, where the full pre-registration can be found, as well as the data and materials (see https://osf.io/49sjz). This study is part of a larger project. For information on the complete project, see https://osf.io/wvg2j.

The target sample size was based on an a priori power analysis that included all variables and analyses in the overall project (see https://osf.io/wvg2j). Based on previous research on visuo-spatial perspective-taking (Erle, 2019; Erle et al., 2018; Erle et al., 2019; Erle & Topolinski, 2017), we expected effect sizes of Cohen's d = 0.33 for the self-reported dependent variable, and Cohen's d = 0.19 for the behavioral dependent variable (part of a separate project, see https://osf.io/pbhvu). We also conducted separate power analyses for the mediation and moderation tests. The sample sizes needed to detect the self-reported dependent variable and the mediation and moderation effect were considerably smaller than the sample size needed to detect the behavioral dependent variable. Thus, we based the rationale for the target sample size on the latter power analysis. To be able to detect an effect of d = 0.19 with a power of (1 - beta) = 0.80 in a one-tailed t-test, a target sample size of N = 173 was needed.

Design

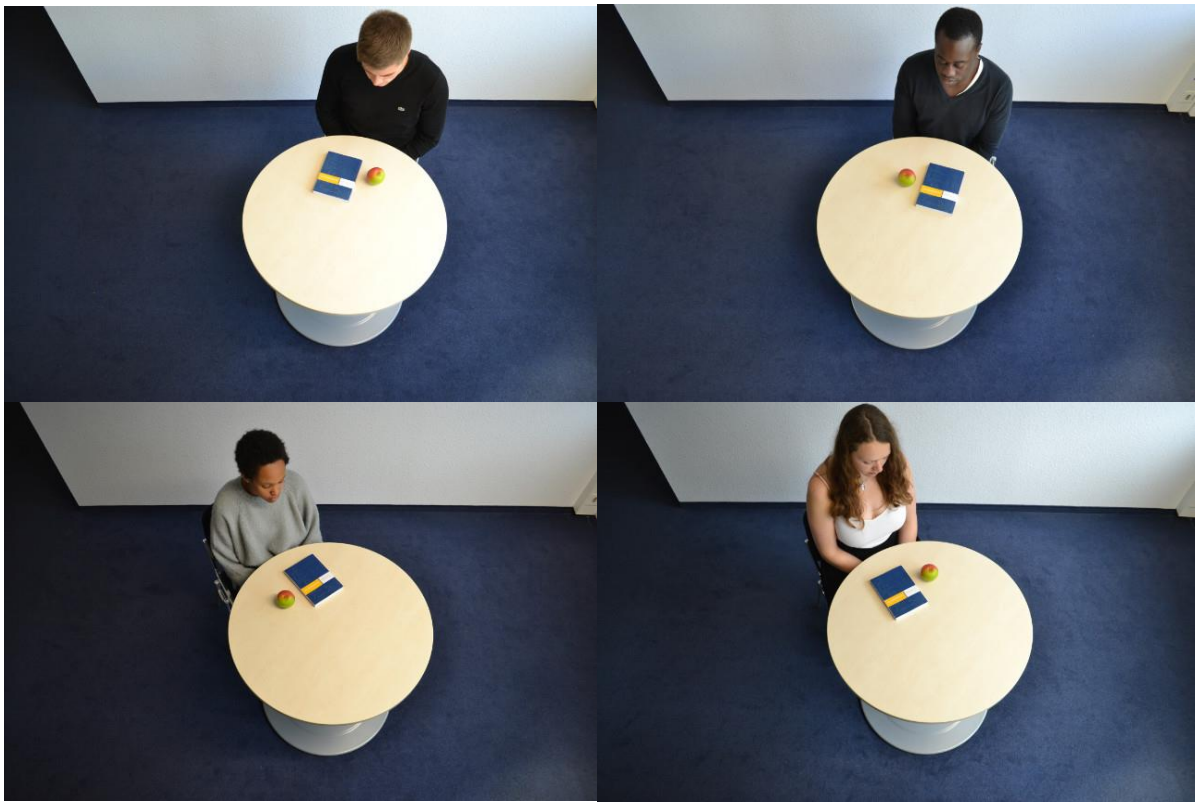
The study had a 2 (Perspective: Egocentric vs. Perspective-taking) by 2 (Group Status: In-group vs. Out-group) within-subjects design. Additionally, the scores from the prejudice and motivation to conceal prejudice questionnaires, were used as continuous predictors of the main dependent variable.

Procedure

After providing informed consent, participants completed the visuo-spatial perspective-taking task. In total, participants completed 64 trials. Thirty-two of them were completed from their own perspective (egocentric trials) and 32 from the perspective of the target (VPT trials). Participants saw 4 targets in total, 2 in-group members and 2 out-group members, of whom one was female, and one was male in each case (see Figure 1). Participants completed the task egocentrically for one in-group and one out-group member, and they completed the task from the perspectives of the remaining two targets. For

Figure 1

Visuo-Spatial Perspective-Taking Task



Note. The four target persons shown in the visuo-spatial perspective-taking task.

which target participants took the perspective and for which they remained egocentric was randomized. The order in which we presented each possible trial was also randomized.

After participants completed all trials, we assessed their attitudes towards the four targets of the VPT task. For these ratings, participants saw the picture of the respective person on screen and had to answer three questions about the depicted person. Next, participants completed a hypothetical decision game with all 4 targets. The order in which these measures were taken for the four targets was randomized anew for each participant.

Finally, we assessed participants' prejudice level, participants' motivation to conceal prejudice, and some basic demographic data (age, gender, nationality, and ethnicity). After all

questionnaires were completed, participants were thanked for their participation. As the study was conducted in the online platform Prolific, participants were asked to indicate their Prolific ID number in order for them to be able to obtain their monetary compensation. Then, the study concluded. The study was approved by the Ethics Review Board of Tilburg School of Social and Behavioral Sciences.

Manipulated Variables

Perspective

Perspective refers to the two conditions participants were exposed to within the visuo-spatial perspective-taking paradigm. Perspective was manipulated in two levels, egocentric (EGO) and visuo-spatial perspective-taking (VPT). In egocentric trials, participants had to perform the task from their own perspective; in VPT trials, they had to perform the task from the perspective of the target.

Participants repeatedly saw a picture of a person sitting at a table with two objects in front of them, a book and an apple (see Figure 1). Their task was to identify which hand they – or the other person – needed to use to grab one of these objects. They had to react as fast as possible by pressing the L key to indicate right hand, and the A key to indicate left hand. Before each trial, they were instructed on whether they should take their own perspective or the perspective of the other person, and whether they had to grab the book or the apple.

The person in the picture was sitting either at a 160° or a 200°-degree angle (rotated either clockwise or counterclockwise) from the perspective of the participant (see Figure 1). As previously mentioned, the VPT trials were implemented by asking participants to grab the object from the perspective of the target. Previous studies have usually implemented egocentric trials by instructing participants to grab the object from the perspective of a target that was located at a 40°-degree angle or lower, from the perspective of the participant (Erle, 2019; Erle et al., 2019; Erle & Topolinski, 2015, 2017). The reason behind this is that, for

lower angles, the frame of reference between the participant and the target is the same. Therefore, no embodied simulation is needed to perform the task (Erle, 2019; Erle et al., 2019; Erle & Topolinski, 2015, 2017). In the present study, egocentric trials were not implemented in the same manner. Instead, we again presented the targets at a 160° or a 200°-degree angle, and we asked participants to grab the object directly from their own perspective. This way, we ensured that participants were able to clearly see all targets, as the targets themselves are an important manipulation of the present study.

Group Status

Group status had two levels, in-group target (IGM) and out-group target (OGM). Group status was manipulated by the skin color of the four target persons depicted during the VPT task. Four different people were shown in the pictures, two Black and two White. Of each group, there was a female and a male target (see Figure 1). Since we originally planned to mainly sample White individuals, we considered skin color to be a salient characteristic, that would be suitable for the in-group-out-group distinction.

Measured Variables

Specific Attitudes Towards the Targets

Similar to previous research (Erle & Topolinski, 2017; see also Batson et al., 1997; Davis et al., 1996), we assessed participants' attitudes towards each of the four targets using three items. These items were: "How much do you like this person?", "What are your feelings towards this person?" and "How much would you like to be friends with this person?". For all three items, the answer option was a slider with 10 positions, that indicated *not at all* and *very much* at the extremes, and *neutral* at the center. The scores on these items were then averaged for every target to form an index of attitudes.

Prejudice Level

To measure the participants' prejudice level, we adapted the scale Prejudice Scales-2 from Cohrs et al. (2012). The scale was adapted to allow us to use it in a non-country specific context (see https://osf.io/wvg2j for materials). The scale consisted of 9 Likert-type items and responses ranged from 1 to 7. Displayed answer options ranged from *completely false* to *completely true*. This scale included statements such as "Foreigners should only get jobs in certain fields", "Foreigners who are unemployed should receive less support than unemployed nationals", and "Foreigners should be controlled by the police more than nationals".

Motivation to Conceal Prejudice

Additionally, we measured participants' motivation to conceal prejudices using the *Motivation to Control Prejudiced Reactions Scale* from Dunton and Fazio (1997). This scale consisted of 17 Likert items, with responses rating from *strongly disagree* (-3) to *strongly agree* (+3). Statements included: "In today's society it is important that one not to be perceived as prejudiced in any manner", "It's important to me that other people not think I'm prejudiced", and "If I have a prejudiced thought or feeling, I keep it to myself".

Other Measures

According to previous research, engaging in visuo-spatial perspective-taking requires a certain level of cognitive effort (Erle, 2019; Erle & Topolinski, 2015, 2017; Kessler & Rutherford, 2010; Kessler & Thomson, 2010; Surtees et al., 2013a, 2013b). A manifestation of this cognitive effort is the amount of time that a person takes to react to the task. For this reason, when visuo-spatial perspective-taking occurs, reaction times should increase (Kessler & Thomson, 2010). Therefore, we checked whether participants engaged in visuo-spatial perspective-taking by measuring participants' reaction times (in ms) separately for both egocentric and VPT trials. In line with previous findings (Erle, 2019; Erle & Topolinski,

2015, 2017), we expected RTs for perspective-taking trials to be higher than for egocentric trials, regardless of group status.

Moreover, we collected some demographic information from the participants. We asked them which gender they identified with, using four response options: *female*, *male*, *other*, and *prefer not to say*. We also asked for their age, nationality, and ethnicity, using an open answer format for all three variables.

In addition, as part of a separate project, we measured participant's behavior towards the targets, using an economic game. The present study did not include any hypotheses related to this variable, as it is part of another project that studies visuo-spatial perspective-taking and prosocial behavior (see https://osf.io/pbhvu). Nonetheless, this variable was considered in post-hoc examinations of the study design.

Sample

The sample consisted of $N = 175$ participants (74 identified as female, 99 as male, and 2 as other). The mean age of the sample was $M = 25.36$ years ($SD = 8.05$). Participants also provided their nationality and ethnicity in an open answer format (see https://osf.io/wvg2j for more information). Participants were recruited online via Prolific Academic (Damer & Bradley, 2014). For their participation, they received 1.20£. On average, participants took 12 minutes to complete the full study. There were no specified criteria for subjects' exclusion, thus, no participant was excluded from the study.

Results

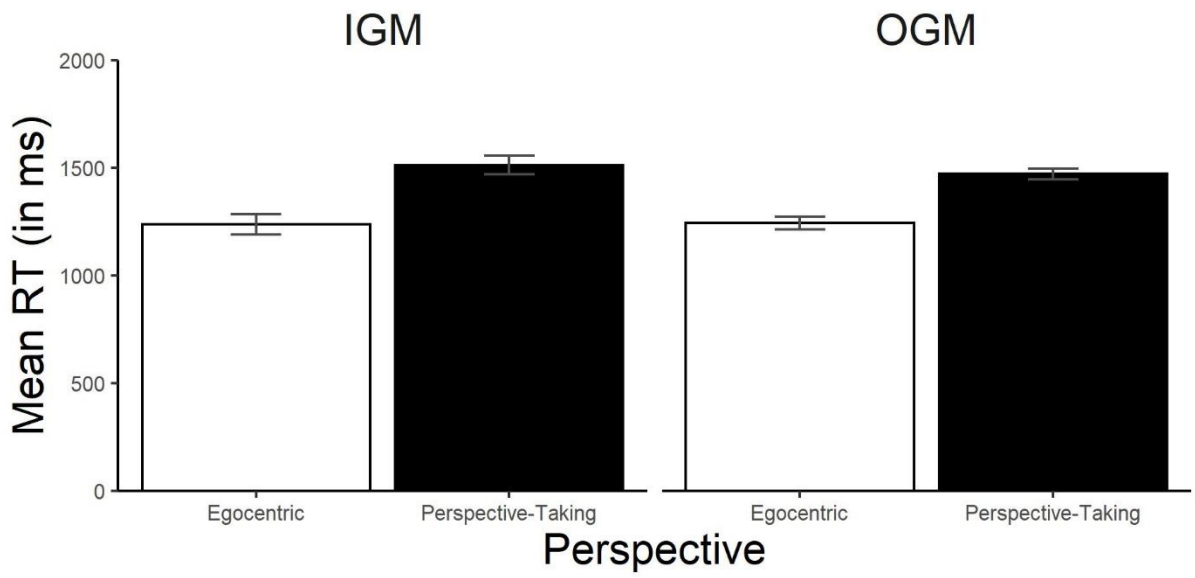
Planned analyses were pre-registered and can be found at https://osf.io/49sjz. All analyses were conducted in RStudio. Moreover, all continuous predictors were *z*-standardized, and a standard significance criterion of $p = .05$ was used for all analyses.

Preliminary Analyses

We measured participants' reaction times as a manipulation check for the VPT task. Higher reaction times in the perspective-taking trials, compared to the egocentric trials, would suggest that the perspective-taking manipulation worked as intended. To test this, RT data was first screened for outliers before it was entered in the model. As stated in the pre-registration (https://osf.io/49sjz), we did this using the Tukey correction method (25th/75th percentile -/+ 1.5 IQR). The remaining trials were analyzed using a mixed-model analysis, with Perspective (contrast-coded: -0.5 = EGO vs. 0.5 = VPT) and Group Status (Contrast-coded: -0.5 = OGM vs. 0.5 = IGM) as fixed effects, and a random intercept for the participants. In support of this hypothesis, we expected a significant main effect of Perspective in the mixed-model analysis. A total of 778/11123 trials were excluded from the analysis (~7%). Moreover, the results of the analysis of the remaining trials showed a highly significant main effect of Perspective, t (10164.189) = 18.486, $p < .001$. This result is in line with our expectations (see Figure 2).

Figure 2

Differences in Reaction Times for the VPT Task



Additionally, we looked at the correlations between the measured variables of the study, to investigate whether they described similar patterns to those reported in previous research. Consequently, we anticipated that the self-reported measure of attitudes would show a positive correlation with the behavioral attitude measure. The connection between a person's attitudes and the behavior they display has been highly documented in the literature (for more information, see Maio & Haddock, 2010). Moreover, previous research has shown that the motivation to conceal prejudices often interacts with different attitude and prejudice measures; thus, showing different effects depending on the individual's specific tendencies (Dunton & Fazio, 1997; Fazio et al., 1995). Therefore, we did not have any specific expectations about the relationship between these variables.

To examine the discussed relationships, we calculated the Pearson correlation between all pairs of measured variables, irrespective of the independent variables. As can be seen in Table 1, results showed a significant positive correlation between the self-reported and the behavioral attitude measure, r (173) = 0.28, $p < .001$. Furthermore, results showed significant positive correlations between the motivation to conceal prejudices and the self-reported attitudes towards the targets, r (173) = 0.11, $p = .003$; as well as the behavioral measure of attitudes, r (173) = 0.14, $p < .001$. Results also showed a highly significant negative correlation between Prejudice Level and Motivation to Conceal Prejudice, r (173) = -.21, $p < .001$.

Confirmatory Analyses

As for the central hypotheses of the present study, we first hypothesized that participants would show improved attitudes for all targets when they engage in visuo-spatial perspective-taking, regardless of Group Status. Additionally, we hypothesized that participants would show more positive attitudes towards in-group members, than towards out-group members. These two hypotheses were tested in the same analysis. As supporting

Table 1

Correlation Matrix Between Measured Variables.

Variables	SA	BA	PL	MCP
SA	1	.28**	.03	.11*
BA[a]	-	1	-.02	.14**
PL	-	-	1	-.21**
MCP	-	-	-	1

Note. SA = specific attitudes towards the targets; PL = prejudice level; MCP = motivation to conceal prejudice; BA = behavioral measure of attitudes towards the targets.

[a] For hypotheses related to the behavioral measure of attitudes, see https://osf.io/pbhvu.

**$p < .001$. *$p < .01$.

evidence of these hypotheses, we would expect the participants' overall attitude towards the targets to be a function of both the type of perspective-taking trial (EGO vs. VPT), and the group membership of the target (OGM vs. IGM), respectively. In other words, we expected to find a significant main effect of Perspective (corresponding to hypothesis 1), and a significant main effect of Group Status (corresponding to hypothesis 2) on the specific attitudes towards the targets. First, we computed an index of attitudes by averaging the three scores of the participants' attitudes towards the targets (Liking, feelings, and interest in friendship). Then, we conducted a 2 (Perspective) by 2 (Group Status) repeated measures ANOVA, using the computed index of attitudes (SA) as the dependent variable. Results showed no main effect of Perspective, F (1, 522) = 0.048, p = .827; and no main effect of Group Status, F (1, 522) = 0.048, p = .827. We also found no interaction effects between the two predictors, F (1, 522) = 0.313, p = .576. Therefore, the results did not support the first two hypotheses. Table 2 shows

the means and standard deviations of the participants' attitudes scores for all levels of Perspective and Group Status.

Lastly, we hypothesized that the difference in attitudes between in-group and out-group members would be moderated by Perspective, Prejudice Level, and Motivation to Conceal Prejudice. In line with this hypothesis, we expected to find a three-way interaction between the mentioned variables. To test this, we first computed the difference between attitudes towards in-group and out-group members, separately for egocentric and perspective-taking trials. Then, we used this difference as the dependent variable in a multiple regression analysis with Perspective (contrast-coded: -0.5 = EGO vs. 0.5 = VPT), Prejudice Level (z-standardized), Motivation to Conceal Prejudice (z-standardized), as well as their interactions, as predictors in the model. In support of our hypothesis, we expected the three-way interaction between Perspective, Prejudice Level (PL), and Motivation to Conceal Prejudice (MCP) to be significant. As can be seen in Table 3, none of the interactions, nor the main effects, were significant. Thus, results did not support this hypothesis.

Table 2

Means and Standard Deviations of the Attitude Scores per Condition

Perspective	Group Status			
	IGM		OGM	
	M	SD	M	SD
EGO	4.240	0.784	4.253	0.753
VPT	4.271	0.788	4.240	0.797

Note. EGO = Egocentric trials; VPT = visuo-spatial perspective-taking trials; IGM = in-group member as target; OGM = out-group member as target.

Table 3

Fixed Effects of the Multiple Regression Analysis corresponding to Hypothesis 3.

Effect	Estimate	Std. Error	df	t-value	p-value
(Intercept)	0.020365	0.046234	171	0.440	0.660
Perspective	0.044786	0.067417	171	0.664	0.507
PL	0.024055	0.046113	171	0.522	0.603
MCP	0.023336	0.046131	171	0.506	0.614
Perspective*PL	0.038524	0.067241	171	0.573	0.567
Perspective*MCP	-0.005210	0.067267	171	-0.077	0.938
PL*MCP	0.056175	0.052148	171	1.077	0.283
Perspective*PL*MCP	0.004651	0.076041	171	0.061	0.951

Discussion

Evaluation of the Findings

As shown above, the main hypotheses of our study were not supported. First, we hypothesized that participants engaging in visuo-spatial perspective-taking would show improved attitudes towards both in-group and out-group members, compared to when they remained egocentric. Previous research has reported various effects of visuo-spatial perspective-taking on attitudes (Erle et al., 2018; Erle & Topolinski, 2017). In their 2017 study, Erle and Topolinski found that, by merely inducing visuo-spatial perspective-taking, participants reported a higher liking towards the targets. In addition to replicating this result, Erle et al. (2018) found that visuo-spatial perspective-taking increased the participant's self-reported trust towards the target. The authors also found that engaging in perspective-taking

indirectly influenced behavioral trust towards the target, with liking of the target acting as a mediator (Erle et al., 2018). Contrary to these findings, we did not find any evidence that visuo-spatial perspective-taking improves attitudes towards any of the targets, as it was indicated by the absence of the main effect of Perspective.

It could be possible that the discrepancy between the present results and previous findings is a product of a faulty manipulation of visuo-spatial perspective-taking. To check whether the manipulation worked as intended, we measured participants' reaction times during the visuo-spatial perspective-taking task. Previous research has shown that an increase in reaction times during the VPT trials potentially reflects the extra cognitive effort that is needed to engage in the self-other-merging process that is characteristic of the visuo-spatial perspective-taking task (Erle, 2019; Erle & Topolinski, 2015, 2017; Kessler & Rutherford, 2010; Kessler & Thomson, 2010; Surtees et al., 2013a, 2013b). In line with previous research, participants in the present study took longer to react in the perspective-taking trials, compared to the egocentric trials (see Figure 2). For this reason, we concluded that participants performed the visuo-spatial perspective-taking task as intended.

Having established that participants did engage in visuo-spatial perspective-taking, it could be argued that the present results show a boundary effect of the visuo-spatial perspective-taking task. In other words, there is truly no effect of visuo-spatial perspective-taking outside the previously studied context of in-group targets. However, it must be noted that we also found no improvement in attitudes towards in-group members. That is, when we introduced out-group targets in the study design, the previously reported effects of the manipulation seem to have disappeared for all targets (see Erle et al., 2018; Erle & Topolinski, 2017). This could suggest that, instead of a boundary effect, the discrepancy between these findings and previous research, could be related to the inter-group dynamics

introduced in the present study. Consequently, this phenomenon still requires further explanation.

Second, we hypothesized that participants would show more positive attitudes towards in-group members than towards out-group members. This hypothesis was based on the previously reported effects between perspective-taking and perceived similarity (Galinsky & Moskowitz, 2000); and between perceived similarity and attitudes (Davis, 2017). Previous research has shown that, during perspective-taking, there is an increase of self-other-overlap between the participant and the target. This self-other-overlap is characterised by the individual's increase in perceived similarity with the target (Galinsky & Moskowitz, 2000). As most participants in our sample were White (see https://osf.io/wvg2j for demographic information), we expected them to have higher perceived similarity with the in-group targets, that were also White. Therefore, we expected participants to show more positive attitudes towards in-group targets. By contrast, we found no main effect of Group Status on the participants' attitudes towards the targets. Hence, the results did not support this hypothesis.

It could be argued that the reason for the absence of this effect is that participants were not aware of the distinction between in-group and out-group members. The present research did not include a direct manipulation check for the variable Group Status. However, we argue that the observed correlations between Motivation to Conceal Prejudice and the attitude measures could be a possible indication that participants noticed both White and Black targets (see discussion of the third hypothesis below).

Another possibility is that participants did not perceive any similarity with the specific in-group targets of the task. The present study did not include any measures of perceived similarity. Initially, we did not consider it crucial to include such measures in our design. However, it could have been beneficial to include these measurements, so that we could have assessed the results of the second hypothesis better. In spite of this, as with the first

hypothesis, we suspect that the divergence of the observed results from previous findings could be related to a conceptual difference between the studies.

As it was explained in the introduction section, we had already anticipated that, by introducing out-group targets in the study design, other constructs related to the in-group and out-group distinction could play a role. For this reason, we included the conceptual variables Prejudice Level and Motivation to Conceal Prejudice in our study. We hypothesized that the effect of the visuo-spatial perspective-taking task would be moderated by the participant's prejudice level and their motivation to conceal it. In other words, we expected that potential differences in the participant' attitudes towards in-group and out-group members would be explained by whether they took the perspective of the target or remained egocentric, whether they had higher or lower prejudice levels, and whether they had any motivation to conceal their prejudice. Conversely, we found no evidence in favor of this three-way interaction between the three predictor variables.

The present study is, to our knowledge, the first to investigate visuo-spatial perspective-taking and prejudice. In order to understand the present findings within this new framework, it is important to investigate the relationship between the participants' attitudes and the added conceptual variables. The results of preliminary analyses showed a significant positive correlation between the self-reported and the behavioral measures of attitudes (see Table 1). The relationship between these two variables has been largely documented in the literature (see Maio & Haddock, 2010). In addition, we found significant correlations between the variable Motivation to Conceal Prejudice and all the other measured variables of the study. First, we found significant positive correlations between Motivation to Conceal Prejudice and both attitude measures (see Table 1). A positive correlation indicates that the higher the participant's motivation to conceal their prejudice, the more positive were their attitudes towards the targets, and vice versa. Furthermore, we found a significant negative

correlation between the Prejudice Level scores and the Motivation to Conceal Prejudice (see Table 1). However, Prejudice Level did not correlate with any of the attitude measures.

From close inspection of these correlations, it seems plausible that the results could have been affected by the two conceptual moderator variables. It could be argued that participants tried to overcompensate their prejudiced tendencies towards the out-group members by rating them similarly to the in-group members. Validity threats related to direct measures of attitudes have been previously documented in the literature (Dunton & Fazio, 1997; Fazio et al., 1995). For instance, previous research has found that certain individuals consciously control their negative attitudes towards Black people when being motivated to do so (Dunton & Fazio, 1997). Moreover, this motivation can simply emerge as a result of asking participants to evaluate Black targets, as well as instructing them to complete racism scales (Dunton & Fazio, 1997; Fazio et al., 1995).

Furthermore, in the present study, Motivation to Conceal Prejudice showed a significant negative relationship with Prejudice Level, while Prejudice Level was not related to any of the other variables. This could be an indication that the participants' motivation to conceal their prejudice affected their prejudice scores. As a result, the prejudice scale might not reflect the participants' genuine prejudice level. Dunton and Fazio (1997) found an interaction between motivation to control prejudice and attitude scores. They stated that highly motivated subjects reported less prejudiced attitudes when answering the Modern Racism Scale (Dunton & Fazio, 1997; Fazio et al., 1995; see McConahay, 1986 for the scale).

In addition, highly motivated individuals evaluated targets more positively even when negative reactions were automatically activated, showing the influence of a control mechanism (Dunton & Fazio, 1997). The authors explained that these circumstances can arise as a result of two situations. First, some individuals might seek to project a non-prejudiced image of themselves in certain social situations. Second, when individuals self-identify as

non-prejudiced, they might be motivated to suppress their automatic negative reactions, in order to preserve the integrity of their own self-identity (Dunton & Fazio, 1997). Both explanations seem to be plausible when applying them to our study. It could be the case that, when participants were exposed to Black target persons, they deliberately adapted their answers, to either appear in a socially desirable way, or to preserve their self-identity.

Limitations

Dunton and Fazio (1997) have reported that, by directly asking participants about their attitudes towards out-group members, participants can be prompted to purposely control their evaluations of the targets, in order to show no indications of prejudice. In the present study, participants' attitudes were assessed using three questions (How much do you like this person? What are your feelings towards this person? How much would you like to be friends with this person?). Consequently, this type of direct measurement could be considered a limitation of our study, as it is possibly not the most optimal method to assess attitudes towards out-group targets.

However, it could also be the case that this control mechanism was not activated by the attitude measures. Instead, it could be related to the participants' mere exposure to both White and Black targets. In a study by Erle et al. (2018), participants were instructed to play an economic game with the same targets of a visuo-spatial perspective-taking task. The researchers provided some participants with information about the target's previous behavior on the economic game. They expected participants to use this information to infer whether the targets had collaborative or competitive tendencies (Erle et al., 2018). The authors used the amount of money participants allocated to the targets, as a measure of behavioral trust. They found that, when participants were presented with additional information about the target, there were no effects of visuo-spatial perspective-taking on behavioral trust (Erle et al., 2018). That is, when objective information about the target was provided, participants

used that information as a reference for their attitudes towards the target, instead of the effects caused by the VPT task (Erle et al., 2018).

Similarly, in the present study, the salience of the in-group and out-group distinction could have acted as such objective information, potentially overwriting any effects of the visuo-spatial perspective-taking task. A possible reason for this is that the Group Status manipulation was too clear for the participants, and therefore it could be considered a limitation.

Directions for Future Research

The present research offered several arguments describing the potential influence of the participants' motivation to control their prejudice, on the results of the study. Nevertheless, the central question of the present study remains unanswered. Future research on visuo-spatial perspective-taking and prejudice should create situations in which the participant's motivation to conceal their prejudice can be reduced. Previous research has found that this motivation was reduced when participants were distracted with secondary task demands (Dunton & Fazio, 1997). Another way they found to reduce this control mechanism was to instruct participants to evaluate the targets under time pressure (Dunton & Fazio, 1997).

Furthermore, Dovidio and Gaertner (2000) used an indirect and specific setting to measure prejudiced attitudes towards Black targets. The authors asked participants to directly evaluate the qualifications of White and Black targets for a job position. When the targets' qualifications clearly matched the job's requirements, participants showed no prejudiced against the Black targets (Dovidio & Gaertner, 2000). By contrast, when the suitability between the targets' qualifications and the job position was ambiguous, participants selected the White target significantly more often than the Black target, that had identical qualifications (Dovidio & Gaertner, 2000; see also Gaertner et al. 2005).

The difficulties related to the measurement of attitudes that have been discussed, involve situations in which participants interacted with White and Black individuals. These complications are partially related to the fact that racial prejudice is generally not acceptable in today's society. Therefore, the disclosure of such prejudiced attitudes can potentially have negative consequences for the people that express them. Another possibility for future research could be to also investigate other types of prejudice that are generally less disapproved of. Crandall and Eshleman (2003) explain that, when individuals consider that holding a certain prejudice is socially acceptable, they are much more likely to openly express their own prejudice. Some examples of these types of prejudice are prejudice against the elderly and prejudice against obese individuals. Future research could include targets with these characteristics in the visuo-spatial perspective-taking task, in order to study participants' potential prejudiced attitudes towards these groups. Nonetheless, the degree of acceptability of a given type of prejudice varies between societies (Crandall & Eshleman, 2003). Therefore, this context should additionally be considered.

Conclusion

Altogether, the present experiment is a novel procedure in which the relations between prejudice and visuo-spatial perspective-taking are investigated. In fact, the present study is the first to include out-group targets in the investigation of the effects of visuo-spatial perspective-taking. Moreover, the results of the present research emphasize the complexity of such a new context. Specifically, we elaborated on the potential obscuring effects of the variables Prejudice Level, and Motivation to Conceal Prejudice. We argued that the individuals' conscious control over the disclosure of prejudice attitudes potentially influenced the results of the present study. For this reason, future research should consider the discussed factors surrounding this disguised phenomenon, to accurately investigate visuo-spatial perspective-taking and prejudice. Further research on this topic is highly relevant,

considering that visuo-spatial perspective-taking could potentially lead to a decrease in prejudiced attitudes towards members of a different group. As discussed at the beginning of this paper, prejudice has far-reaching consequences that are exceptionally detrimental for the people that are victims of it. The present research focused on racial prejudice due to its significance in today's society. Nonetheless, prejudice against any group is equally important and should also be considered in future research on visuo-spatial perspective-taking.

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