The Effect of Visuospatial Perspective-Taking on Attitudes and Prosocial Behavior towards In- and Outgroup Members

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Abstract

Prior research shows that psychological and visuospatial perspective-taking share a common mechanism and are related on a dispositional level. Psychological perspective-taking has been found to decrease stereotyping and to increase helping behavior towards outgroup members. In this research it was tested whether visuospatial perspective-taking leads to a similar improvement of attitudes and prosocial behavior and whether this effect holds for both ingroup and outgroup members. Participants completed a visuospatial perspective-taking task in which they were instructed to either take the perspective of a target person or to stay egocentric. The ethnicity of the targets was manipulated by presenting light- and dark-skinned targets. Hereafter, participants' self-reported attitudes and their prosocial behavior, by means of a dictator game, were measured. We expected to find improved attitudes and more prosocial behavior towards both in- and outgroup members. We furthermore predicted a mediation of attitudes on the effect of perspective-taking on prosocial behavior. Two repeated measures ANOVAs and a linear mediation model were conducted. Contrary to our expectations, no effect of visuospatial perspective-taking on attitudes and prosocial behavior towards in- and outgroup members was found. Reasoning as to why this replication of a well-respected visuospatial perspective-taking task on outgroup members did not show outcomes in line with previous research is further discussed.

Keywords: perspective-taking, visuospatial perspective-taking, attitudes, prosocial behavior, prejudice

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> "All evaluation is made from a definite perspective: that of the preservation of the individual, a community, a race, a state, a church, a faith, a culture."
>
> – Friedrich Nietzsche, *The will to power* (paragraph 259, p. 149)

As Nietzsche suggests, humans perceive the world indeed predominantly from their own perspective; we are thought to be inherently egocentric (Samuel et al., 2019). Processing the world in this manner is cognitively easiest for us, it does not require any "conceptual elaboration beyond what is directly perceived" (Ford, 1979, p. 1171). However, people are social beings and with that comes social interaction. In many situations it is beneficial and sometimes even necessary to take a perspective other than one's own. But what implication does it have to take another person's perspective? Will it affect our attitudes towards that person? Do our attitudes, how we feel about someone, and behaviors, how we act towards someone, change when the person comes not from our own, but a different community, race or culture, as Nietzsche specifies?

Perspective-taking

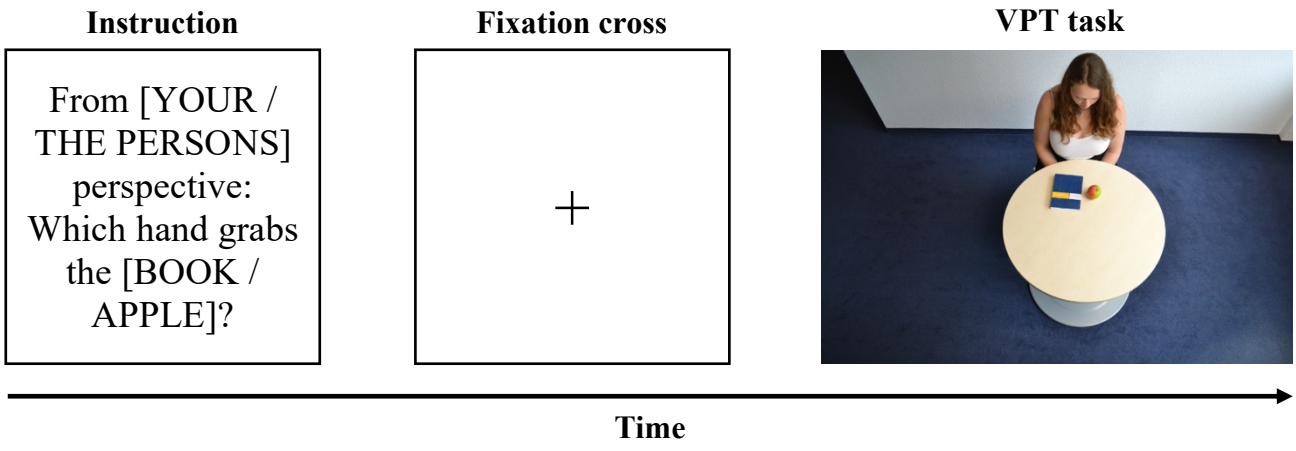
Perspective-taking is the "cognitive and emotional capacity to consider the world from other viewpoints and thus understand and anticipate behaviors of others" (Peña & Hernández Pérez, 2019, p. 945). Taking someone else's perspective has been found to create an overlap between the cognitive representation of oneself and the other person (Galinsky & Ku, 2004; Davis, Conklin, Smith & Luce, 1996). Studies investigating the underlying process of perspective-taking suggest that taking another person's perspective leads to participants feeling more similar to the target (Erle & Topolinski, 2017). Perspective-taking, a concept that has been studied extensively, is also related to many social outcomes. Gehlbach (2004)

stresses that having the ability to understand another person's perspective as well as having the motivation to do so are "critical for navigating most social situations" (p. 208).

Perspective-taking can take place on different levels. It is not necessarily only putting yourself mentally or emotionally in the position of someone else, but can also be to place yourself literally in the position of them by rotating your own body in that of the viewed other person (Kessler & Thomson, 2010). This is called visuospatial perspective-taking, which can be categorized into two levels. Level 1 (VPT-1) perspective-taking is to understand what "lies within someone else's line of sight" (Kessler & Rutherford, 2010, p. 1). Level 2 (VPT-2) perspective-taking refers to taking over another's spatial point of view to make a judgement about how something is seen (Flavell et al., 1981, as cited in Surtees & Apperly, 2012). As VPT-1 is an inherently egocentric process (Kessler & Rutherford, 2010), only the latter is relevant for the present research. This form of perspective-taking can be studied by applying a task in which participants see targets sitting at a table with two objects in front of them (Erle & Topolinski, 2017). The participant's task is to indicate, by a click on the keyboard, if the left or the right hand would be used to reach for the target object, which is here either a book or an apple (see Figure 1). The participant is instructed to either take the target's perspective to reach for one of the objects, or to indicate which hand they would use to grab the apple or the book from their own perspective.

Figure 1

Example of the Visuospatial (VPT) task



Visuospatial perspective-taking used to be seen as distinct from psychological perspective-taking, which includes affective (another's feelings) and cognitive (another's knowledge) perspective-taking (Kahn, 2015). Yet, visuospatial and psychological perspective-taking have a closer relationship than originally believed. The link between the two forms of perspective-taking has been discussed only recently by Erle and Topolinski (2015). The merging of oneself and another person that happens when taking someone's empathic perspective (Batson et al., 1997), is also the driving factor for visuospatial perspective-taking (Erle & Topolinski, 2017). 'Merging' refers to the process in which an observer's thoughts and feelings about a target become more self-like when engaging in perspective-taking. It is argued that perspective-taking leads to a construction of cognitive representations of the target that overlap to a big amount with the perspective-taker's own self-representation (Davis et al., 1996). This self-other merging can be explained by a certain process. As mentioned earlier, level 2 visuospatial perspective-taking is to imagine literally putting oneself into the position of another person. Engaging in VPT-2 creates a physical closeness between the perspective-taker and the target. This generation of physical proximity is the embodied process that creates psychological feelings of closeness in psychological perspective-taking (Erle & Toplinski, 2017). Based on these findings it can be said that psychological and visuospatial perspective-taking are intrinsically linked.

In line with the idea of a shared underlying mechanism, manipulating different kinds of perspective-taking leads to similar outcomes regarding social-cognitive and empathic constructs, such as perceived similarity and sympathy (Erle & Topolinski, 2017) as well as trust (Erle, Ruessmann & Topolinski, 2018). Sympathy in particular was measured by asking how much the target is liked, thus the attitude of the perspective-taker was assessed. The finding that visuospatial perspective-taking creates sympathy shows that visuospatial perspective-taking can play a role during the process of attitude formation.

Attitudes

Studies show that attitudes towards a person or a group can be affected by both visuospatial and psychological perspective-taking (Erle & Topolinski, 2017; Batson et al., 1997). Attitudes are defined as favorable or unfavorable evaluations of an object, a person, a group or an issue (Petty & Cacioppo, 1981; Eagly & Chaiken, 1993; Haddock & Maio, 2017). Attitudes are considered to be based on three classes of information: affective (feelings, moods, emotions), cognitive (beliefs, knowledge) and behavioral information (action intention, actual behavior; Maio & Haddock, 2010). Researchers have described an attitude as a "certain subjective state of preparation to action", foreshadowing how the person will behave towards a certain attitude object (Droba, 1933, p. 447). This suggests that (affective) attitudes can be indicators of behavior.

Prejudice

If attitudes are formed based on the group someone belongs to, the term prejudice is often used. Prejudice is defined as showing negative attitudes, emotions or behaviors to members of a group on the basis of their membership of that group (Vivian & Brown, 1995). The cognitive, affective and behavioral components are respectively called stereotype, prejudice and discrimination (Fiske, 1998). It is often differentiated between the ingroup, people from one's own social category, and those from another social category, the outgroup. Typically the ingroup is favored over the outgroup (Tajfel, 1970).

Prosocial Behavior

To test someone's behavioral attitude, different paradigms can be applied in which subjects react to an individual of a different social or racial group (Stürmer & Snyder, 2012). A common technique is to measure someone's helping behavior. Prosocial behavior is defined as "actions that benefit others without any expectations of latter reward" to oneself, such as charitable giving and generosity (Bar-Tar, 1976, as cited in Triplett, 2012, p. 89). The decision to help or the amount of helping members of different races is then compared. To

measure prosocial behavior, tools of behavioral economics can be used. Experimental decision-making games like the prisoners dilemma, the ultimatum game or the dictator game "have proven of great value for the study of altruism and sharing behavior" (Edele et al., 2013, p. 96; Everett et al., 2015; Caviola & Faulmüller, 2014). Literature supports the external validity of economic games and their high predictive value of individuals' behavior (Benz & Meier, 2008). In the classical dictator game two players divide a fixed sum of money. The dictator proposes a division to the responder. There is no opportunity to reject for the receiver and the proposed division is implemented (Kahneman et al., 1986). The amount of money the participant offers in this game corresponds to the person's altruistic sharing tendencies (Bolton & Ockenfels, 2000).

Existing and present research

How psychological perspective-taking influences attitudes and prosocial behavior not only to people of our own group, but also to outgroups, has been studied before (Batson et al., 2002). Taking someone's psychological perspective has been found to lead to increased liking and helping towards the target (Goldstein et al., 2014). In regard to group membership, perspective-taking decreases stereotyping, discriminatory behavior and ingroup favoritism and increases helping behavior towards outgroup members. It is important to note that this effect is target specific, the behaviors and attitudes only apply to the specific individual of the outgroup the perspective was taken of and don't generalize to all members of that group (Shih et al., 2009; Galinsky & Moskowitz, 2000). Furthermore, Todd et al. (2011) found that perspective-taking weakens automatic expressions of racial bias. In short, perspective-taking improves attitudes and prosocial behavior towards in- as well as outgroup members.

As visuospatial perspective-taking is based on the same processes as psychological perspective-taking (Erle & Topolinski, 2017), the following question arises: Will visuospatial perspective-taking also lead to improved attitudes and prosocial behavior towards in- and outgroup members? Research linking visuospatial perspective-taking with prejudice is

limited. Using the earlier described paradigm, visuospatial perspective-taking was thus far only studied by presenting either artificial avatars or ingroup members as targets. The present study strives to replicate the previous findings, which show visuospatial perspective-taking leads to improved attitudes towards ingroup members, and seeks to generalize those findings to members of an outgroup. In order to do this, the ethnicity of the targets is manipulated in the visuospatial perspective-taking task to measure a possible effect on attitudes and prosocial behavior in the present experiment. This is the first time this specific task is applied to attitudes and behaviors towards people of different group memberships.

The following research question is formulated: How does visuospatial perspective-taking of ingroup members and outgroup members affect attitudes and prosocial behavior towards those and does attitude mediate the effect on prosocial behavior? It is hypothesized that in the visuospatial condition (1) participants' attitudes towards in- and outgroup members will be more positive and (2) more prosocial behavior will be shown towards in- and outgroup members compared to the egocentric control condition. We furthermore predict (3) that the attitude towards the targets mediates the effect of perspective-taking on prosocial behavior; participants that like certain targets more are expected to show more prosocial behavior towards those targets. As a manipulation check, longer reaction times in the visuospatial perspective-taking trials and an overall more positive attitude and more prosocial behavior towards ingroup members are expected.

Method

Procedure

The study was programmed using Inquisit (Version 5; 2016) and conducted on the online platform Prolific Academic (www.prolific.co). It took about twelve minutes to be completed. Once participants provided informed consent, the study began with a measure of perspective-taking, which consisted of visuospatial perspective-taking and egocentric trials. Four different targets were presented in those trials. Two of those targets were light- and the

other two were dark-skinned individuals. Each participant engaged in sixteen trials per target, which results in a total of sixty-four trials. Each individual trial consisted of three parts (see Figure 1). First an instruction screen was presented for 1500 milliseconds, with the following command: “From [YOUR / THE PERSONS] perspective: Which hand grabs the [BOOK / APPLE]?” Next, a fixation cross appeared in the middle of the screen for 250 milliseconds, followed by a photograph of one of the four targets with book and apple on a table in front of them, which was presented until response. Participants had to react by pressing the “A” or the “L” key on their keyboard to indicate with which hand the target object would be reached for. Pressing the key “A” translates to reaching to the target object with one’s left hand, “L” refers to the right hand. The set of instructions that were shown to the subjects can be found in Appendix A. It was randomized for each participant for which of the targets they remained egocentric and of which they took the perspective. The order of trials was also randomized for each participant.

After completing this perspective-taking task participants moved on to an attitude questionnaire and indicated their liking for each target person. On a next screen the rules of the economic game that was used to measure participants prosocial behavior were explained. Participants were asked how much money of their budget they would allocate to the presented person. It was randomized for each participant in what order the targets were presented in the attitude and prosocial behavior measures. Following the economic game, participants were asked to fill out the general prejudice and the motivation to conceal prejudice questionnaires. To conclude the study the following demographics were recorded: Age, gender, nationality and ethnicity.

Design and Materials

This experimental study had a 2 (Perspective: Perspective-taking vs. Egocentric) x 2 (Group-Status: In-group vs. Out-group) within-subjects design. The main dependent variables

were attitude and prosocial behavior. All materials as well as the preregistration of this study are available on the open science framework under https://osf.io/dyn5v/.

Manipulated Variables

Perspective-taking. To manipulate the independent variable perspective, participants were instructed to either reach for the target object from the targets or from their own perspective. To create the perspective-taking task four photographs, each showing a person sitting on a table with a book and an apple in front of him or her, were shown to the participants. The individuals in the photographs were presented at either 160° or 200° angular disparity, to ensure their skin color was visible to the subject (see Appendix B). The position of the two items, book and apple, were switched in half the trials. The photographs (developed by Erle) had been pre-tested in terms of attractiveness. All four targets did not significantly differ in their rated attractiveness.

Group-Status. The second independent variable was manipulated by presenting targets with different skin tones. Two light-skinned and two dark-skinned targets were presented, representing in- and outgroup members. Each set had one female and one male target. The participant was instructed to take the visuospatial perspective of one ingroup and one outgroup member and remained egocentric for the other two targets.

Measured Variables

Dependent variables in this study were (1) the attitude and (2) the prosocial behavior towards the four targets. To measure attitude towards the specific targets, participants answered three questions on a scale from one to seven. They were asked to indicate (a) how much they like the target – from *not at all* to *very much*, (b) how their feelings are towards the target – from *very negative* to *very positive* and (c) how much they would like to be friends with the target – again from *not at all* to *very much*. This was inquired separately about each of the four targets by showing the participants the same photographs of those four individuals

that were presented in the perspective-taking task, one at a time. This measurement of attitudes was based on a very similar measure of liking used by Erle and Topolinski (2017).

Prosocial behavior was measured by the dictator game, with participants in the role of the allocator and targets on the receiving end. In four trials, one for each target, it was assessed how much money from 0 to 10 euros the participant was willing to allocate to each target. Again, photos of the targets were shown. The amount allocated to the targets served as an indicator of prosocial behavior. Participants were informed that the money in this game was hypothetical.

Two further variables, general prejudice and motivation to conceal prejudice, were included as potential moderators in this study. General prejudice was measured with a nine item scale developed by Cohrs, Kämpfe-Hargrave and Riemann (2012). The English version of the scale was slightly adjusted by replacing the phrase “Turks” with “Foreigners” and the phrase “Germans” with “Nationals”. To operationalize the second variable, the seventeen item motivation to control prejudiced reactions scale by Dunton and Fazio (1997) was used. These two dependent variables were included due to this study being part of a more extensive research project and will not be discussed in detail in this research paper.

Participants

For this study, $N = 175$ participants were recruited via the platform Prolific Academic and received a compensation of 1.20 £ for participating. The sample consisted of 74 females and 99 males, as well as 2 participants indicating the gender “other”. The mean age was 25.36 ($SD = 8.05$). Only participants fluent in English were allowed to take part in this experiment. The intended sample size was determined by conducting an a priori power analysis. For the dependent variable attitude an effect size of Cohen’s d = 0.33 was expected. For the behavioral dependent variable, prosocial behavior, an effect size of Cohen’s d = 0.19 was expected. Conducting a one-tailed t-test a sample of N = 173 was needed to find an effect of d = 0.19 with a power of .80.

Results

Data analysis was conducted in the software environment for statistical computing R (R Core Team, 2020). A standard significance level of $\alpha = .05$ was used for all analyses.

Preliminary Analyses

To check whether the main dependent variables are related to each other in the expected way, their correlations were assessed. The Pearson correlation test between all dependent variables was used. It was expected that attitude and prosocial behavior are positively related. If a participant reports a more positive attitude towards a target, they will also act more prosocial towards that target.

The results can be found in Table 1. Attitude and prosocial behavior are indeed positively correlated. Participants that liked a target more also acted more prosocial towards that specific target, that is, they allocated more money to him or her. These results are in line with previous research (Baldner et al., 2020; Bentler & Speckart, 1981), and thus it can be assumed that the main dependent variables were measured in an appropriate way.

Table 1

Pearson Correlations of dependent variables

	Attitude	PB	GP	MCP
Attitude	1	.28**	.03	.11*
PB	-	1	-.02	.14**
GP	-	-	1	-.21**
MCP	-	-	-	1

Note. ** p < .001, * p < .01; PB = Prosocial Behavior; GP = General Prejudice; MCP = Motivation to Control Prejudice.

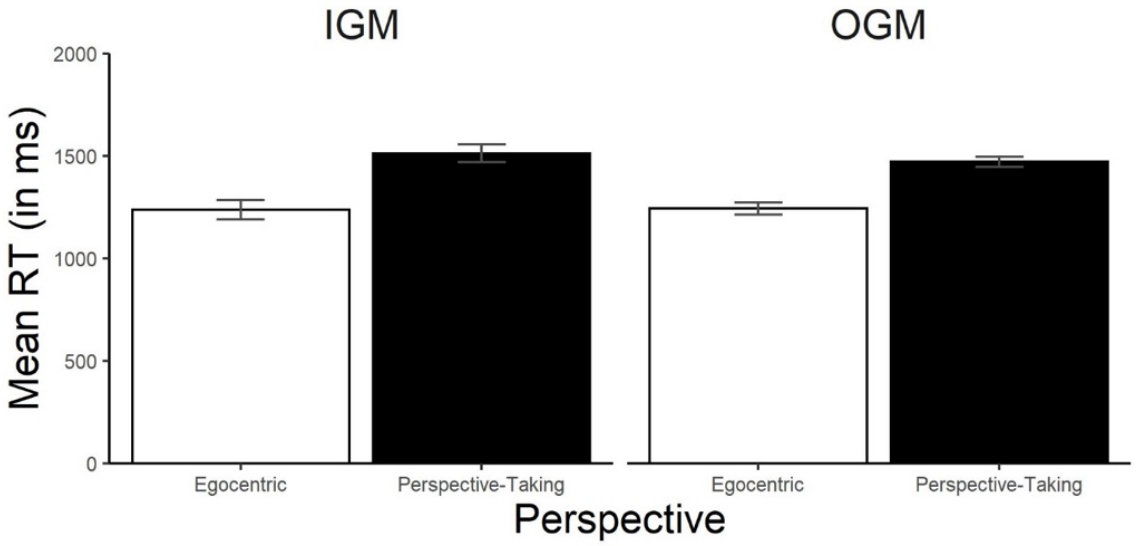
Manipulation Check

Participants' reaction times (RT) on the visuospatial perspective-taking task served as a manipulation check. Since visuospatial perspective-taking trials involve an embodied simulation of the self, whereas egocentric trials do not involve this process, it was expected that RTs for visuospatial perspective-taking trials would be higher than for egocentric trials. This was tested in a mixed-model ANOVA on the reaction times of the perspective-taking task with fixed effects of perspective and group-status. Since the mixed models did not converge otherwise, only a random intercept per participant could be added as a random effect. In line with the hypothesis, we deemed a main effect of perspective as supporting our hypothesis and the feasibility of the visuospatial perspective-taking manipulation.

Prior to the analysis, reaction times were screened for outliers using methods proposed by Tukey (1977), and of the total of 11,123 trials 6.99 percent were excluded following the Tukey method. The reported analysis was thus based on a total of 10,345 trials and revealed a significant main effect of perspective, $t(10164.189) = 18.49$, $p < .001$, in line with the hypothesis. As can be seen in Figure 2, participants indeed took longer for visuospatial perspective-taking trials than for egocentric trials (Perspective-taking (IGM): $M = 1512.6$, $SD = 2303.56$; Perspective-taking (OGM): $M = 1471.67$, $SD = 1353.29$; Egocentric (IGM): $M = 1236.58$, $SD = 2500$; Egocentric (OGM): $M = 1244$, $SD = 1580.12$). These results suggest the manipulation of the independent variable perspective-taking worked as intended.

Figure 2

Mean reaction times as a function of Perspective and Group-Status



Note. Error bars represent +/- 1 SEM.

Hypothesis 1

It was tested whether participants' attitudes towards in- and outgroup members would be more positive in the visuospatial condition compared to the egocentric control condition. This was tested by conducting a 2 (Perspective) x 2 (Group-Status) repeated-measures analysis of variances on the main dependent variable attitude. We deemed a main effect of perspective as supporting our hypothesis.

There was no significant main effect of perspective, $F(1, 522) = 0.05$, $p = .827$. Participants did not significantly like targets they took the perspective of better than targets towards whom they stayed egocentric. No support for this hypothesis could be found.

Additionally, the group-status main effect of this ANOVA was inspected to check for ingroup favoritism. We expected to find a significant effect, indicative of participants preference for the ingroup member over the outgroup member. However, this effect could not be found, $F(1, 522) = 0.05$, $p = .827$, and participants did not show significantly more positive attitudes towards ingroup members compared to outgroup members.

Hypothesis 2

It was tested whether participants would show more prosocial behavior towards in- and outgroup members in the visuospatial condition compared to the egocentric control condition. This too was tested by conducting a 2 (Perspective) x 2 (Group-Status) repeated-measures analysis of variances on the main dependent variable attitude. We deemed a main effect of perspective as supporting our hypothesis.

There was again no significant main effect of perspective, $F(1, 522) = 0.04$, $p = .845$. Participants did not allocate significantly more money to targets they took the perspective of than to targets towards whom they stayed egocentric. This hypothesis could also not be supported by the data.

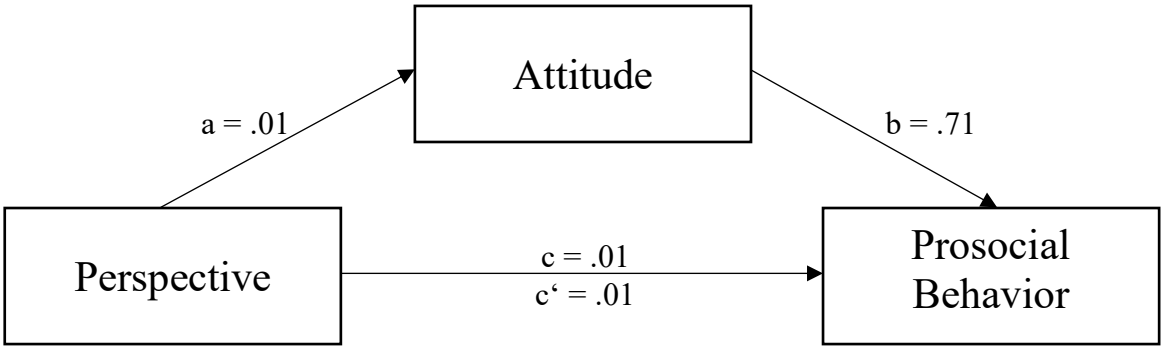
Additionally, the group-status main effect of this ANOVA was inspected to check for ingroup favoritism. We expected to find that participants allocate more money to ingroup members compared to outgroup members. This effect could not be found, $F(1, 522) = 0.68$, $p = .411$. Participants did not allocate ingroup members significantly more money than outgroup members in the prosocial behavior measure.

Hypothesis 3

It was tested whether attitude towards the targets mediates the effect of perspective-taking on prosocial behavior. A linear mediation model was conducted to test this and the joint significance mediation package on R was used (Batailler et al., 2020). Perspective is here the independent variable, attitudes the mediator and prosocial behavior the dependent variable (see Figure 3). Participants that like certain targets more are expected to show more prosocial behavior towards those targets, a significant indirect effect of perspective on prosocial behavior would suggest support for our hypothesis.

Figure 3

Linear mediation with Attitude as mediator between visuospatial perspective-taking and Prosocial Behavior



The independent variable perspective did not have a significant effect on the dependent variable prosocial behavior, nor on the mediator attitude (see Table 2; path a and c'). Yet, a positive relationship between attitudes and prosocial behavior was found ($\beta = .71$, $t(697) = 7.64$, $p < .001$; path b). Since the 95% bootstrap confidence interval of the indirect effect included 0, $b = .01$, $CI_{95\%}$ [-.07, .09], participants' attitude towards the target does not mediate the effect of visuospatial perspective-taking on prosocial behavior. The results do not offer support for the third hypothesis.

Table 2

Linear Mediation Analysis

Direct Effects

	Estimate	SE	t	p
Path a	.009	0.059	0.15	.884
Path b	.710	0.093	7.64	< .001
Path c’	.008	0.145	0.06	.955

Total Effect

	Estimate	SE	t	p
c	.014	0.151	0.09	.924

Note. Linear mediation model with Perspective as independent variable, Attitude as mediator and Prosocial Behavior as dependent variable.

Discussion

Contrary to expectations, visuospatial perspective-taking did not increase attitudes and prosocial behavior towards in- and outgroup members. The aim of this research was to test whether the effects of visuospatial perspective-taking on attitudes and prosocial behavior, as they have been found in psychological perspective-taking, would hold for ingroup and outgroup members. We were striving to replicate the findings by Erle, who established that visuospatial and psychological perspective-taking correlate on a dispositional level (Erle & Topolinski, 2015) and found that visuospatial perspective-taking leads to the same outcomes as psychological perspective-taking for many social concepts like perceived similarity, sympathy and trust (Erle & Topolinski, 2017; Erle, Ruessmann & Topolinski, 2018). More sympathy, and thus a more positive attitude was shown towards ingroup members of which participants took the visuospatial perspective in these studies. Given that people also show

more positive attitudes and act more prosocial towards both in- and outgroup members of which they took the psychological perspective (Shih et al., 2009; Galinsky & Moskowitz, 2000), it was expected this would also be the case for visuospatial perspective-taking. Despite these promising previous findings, the results of the present study showed no such effect. Visuospatial perspective-taking did not improve attitudes and did not improve prosocial behavior. Therefore, there was also no mediating effect of attitudes on the relationship of visuospatial perspective-taking on prosocial behavior. None of the hypotheses were supported.

It is not simple to explain these results considering that the manipulation check of this study revealed that the task was performed as intended, participants took longer to perform the visuospatial perspective-taking task than the egocentric task. Moreover, a correlation between the two dependent variables attitude and prosocial behavior was present, as is supported by literature (e.g. empathy-attitude-action model by Batson et al., 2002). This suggests that those measures were conducted in a common and correct way. It seems unusual that the results of previous studies applying the same visuospatial perspective-taking task could not be replicated. Several explanation attempts are discussed in the ensuing section.

To understand why visuospatial perspective-taking did not affect the dependent variables as expected in this study, one can look at the main difference to the previous studies that applied the same task. The present study tried to replicate Erle's findings to members of an outgroup, in particular to members of different races. The targets that were shown to the participants in previous studies were either avatar-like or ingroup members and always from one group only. This study was the first one to use meaningful categories, that is targets of different races, and this socially sensitive context might have influenced the way participants reacted. Awareness of racism is growing and it has become less tolerable to express prejudice or discriminate against people of other races, which might have lead people to report attitudes they think they should report instead of their actual attitudes (Rothon & Heath, 2003).

Surveys about sensitive topics like racial attitudes can be distorted by social desirability, as Krumpal (2013) discusses. Directly asking about participants' attitude towards two light-skinned and two dark-skinned individuals possibly made the concept race more salient and resulted in participants not wanting to risk showing different liking and behaviors towards one over the other target. This could explain why no ingroup favoritism was shown in our research. Possibly, this effect of prejudice suppression was strong enough to override the effects of visuospatial perspective-taking. It has to be noted here that it doesn't seem to be so unusual that no ingroup favoritism was recorded in the prosocial behavior measure. Research shows that in dictator games "Whites do not consistently discriminate, but may instead give at relatively equal levels" (Burns, 2004, as cited in Triplett, 2012, p. 91). Yet, even if a difference in allocated money can not necessarily be expected for targets of different group membership, one would still assume to find a difference of prosocial behavior in the perspective-taking versus the egocentric condition. To summarize, the effects of visuospatial perspective-taking seem to diminish in a socially sensitive situation as race categorizing. This could suggest, an important boundary effect of the applied visuospatial perspective-taking task has been found.

It is important to note here that part of the results of our study are in fact in line with one particular research by Saetta et al. (2019). These researchers applied a different self-rotation task to study visuospatial perspective-taking. It was found that skin color does not influence performance on a visuospatial perspective-taking task. Contrary to their expectations, the reaction times to take another person's perspective were no different for light- and dark-skinned targets. Other researchers did find an effect of visuospatial perspective-taking on both attitudes and prosocial behavior towards certain groups, applying a different task. These researchers claim game and virtual reality perspective-taking trigger both visuospatial and psychological perspective-taking (Pena et al., 2018), since the participant embodies a character from multiple visual perspectives while also imagining to be that

character. Virtual reality perspective-taking has shown to lead to reduced stereotyping of the elderly (Yee & Bailenson, 2006) and game perspective-taking has an effect on attitudes, behavioral intentions and self-efficacy to help immigrants, as Pena et al. found (2018). Prejudice was reduced by virtual embodiment of a Black avatar and led to more favorable beliefs towards African American men (Behm-Morawitz et al., 2016). These results suggest that an effect of visuospatial perspective-taking on socially sensitive attitudes and behaviors exists, but needs certain measures to be recorded.

It can be of interest to compare these virtual reality perspective-taking studies with those studies that did not show an effect of visuospatial perspective-taking in a racial context. The common thread between our research and that of Saetta et al. (2019) as earlier described, is that when viewing the target person an explicit perspective transformation was required. Comparing this now to Behm-Morawitz et al. (2016), who did find an effect of visuospatial perspective-taking on racial attitudes, participants were not explicitly instructed to switch their perspective in this study. They rather implicitly took the perspective of a character. Possibly this is the crucial point why our manipulation did not lead to the expected attitude and prosocial behavior outcomes in this racial setting.

Future Research and Limitations

To further investigate whether an effect of visuospatial perspective-taking on attitudes and prosocial behavior towards both in- and outgroup members could be found, one could proceed in multiple ways. To ascertain if the effects of visuospatial perspective-taking are indeed prone to be overridden in a socially sensitive situation as race categorizing, the manipulation could be adjusted. A replication study using a slightly moderated task, in which participants are not explicitly told to take on a certain perspective of a target, but intuitively slip into the perspective, might give more insight. Another option is to adjust the measurement. A less obvious measure of attitudes could be used, applying implicit measures of attitudes as for example the Affect Misattribution Procedure (Payne et al., 2005).

Participants could be presented with the targets they engaged with in the visuospatial perspective-taking task. Afterwards, they could be asked to evaluate an ambiguous stimulus. This evaluation reflects back on their attitude towards the target. An adjustment to the measurement could also be to put the participants under time pressure while they rate the targets. As the MODE model of attitude-behavior processes (Fazio & Towles-Schwen, 1999) explains, time pressure activates spontaneous information processing rather than deliberate processing. More implicit attitudes might be activated and possibly this way an effect of visuospatial perspective-taking can be recorded. Similarly, it is also possible to present the participants with targets of more than one race to make the race difference not as salient in a replication study. Instead of presenting two Colored and two White targets, participants can be asked to take the perspective of a number of members of different races. Instead of constructing time pressure, as in the MODE model, the amount of presented information is increased which might also lead to a higher demand of cognitive capacity.

Future research could also explore the effect of visuospatial perspective-taking on different outgroups that are considered as less socially sensitive (Puhl & Brownell, 2001). Batson et al. (2002) discussed the link of empathy and perspective-taking with attitudes and actions towards drug addicts. This or, to name more examples, the effect of perspective-taking on attitudes and prosocial behavior towards elderly, overweight people or religious groups could be examined to test the boundary conditions of visuospatial perspective-taking. As suggested by Nietzsche, beside race and culture multiple other perspectives exist (Nietzsche, Kaufmann & Hollingdale, 1967).

To complete this discussion, two further limitations have to be mentioned. Participants did not receive the money they allocated themselves in the dictator game. Thus there is a possibility they might not have been incentivized to act accordingly to their real opinions. This issue can be addressed by replicating the present study and offering participants the allocated amount. Possibly we can also let them engage with real targets, to increase the

validity of the dictator game. Furthermore, we want to note that this study was conducted in an unusual societal time, with the corona outbreak at its peak. This led to an online execution of this research, rather than conducting the study in a laboratory as was planned.

Conclusion

Given the evidence of a link between psychological perspective-taking and attitudes and behavior towards in- and outgroup members, as well as the link between psychological and visuospatial perspective-taking, an effect of visuospatial perspective-taking was expected. Yet, the conducted study showed no such effect of visuospatial perspective-taking on attitudes and prosocial behavior towards in- and outgroup members. A possible boundary condition of the applied visuospatial perspective-taking task was found. Future research can strive to find a possible effect by (a) slightly adjusting the visuospatial perspective-taking task, (b) changing the operationalization of the dependent variables or implementing time pressure or (c) applying the present visuospatial perspective-taking task to a different outgroup.

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Appendix A

Perspective-taking task instruction A1:

In this experiment you will complete a task, during which you repeatedly see a person sitting at a table with two objects – a book and an apple. During every trial, your task is to grab one of these two objects.

You do this either from the PERSON'S perspective or from your OWN perspective. Which perspective has to be taken and which object will be the target object will always be instructed before every trial.

Continue with A or L.

Perspective-taking task instruction A2:

You will use the A and L keys on the keyboard to react. The A key corresponds to the left hand, which always grabs the left object, and the L key corresponds to the right hand, which always grabs the right object.

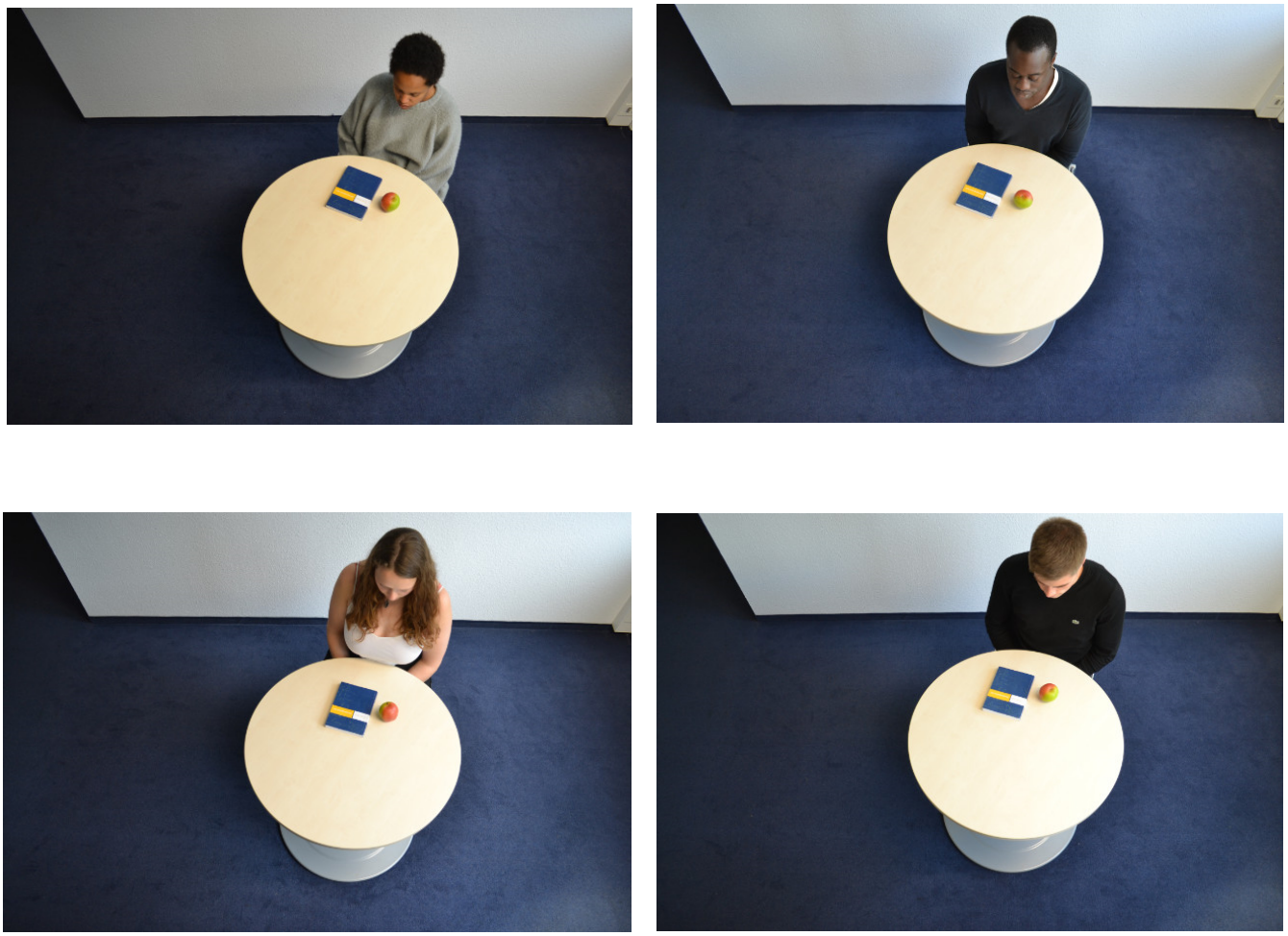
Please always follow this simple rule: The left hand grabs the left object and the right hand grabs the right object. Even if you are, for instance, right-handed, the left key object has to be grabbed with the left hand (i.e., you have to press the A key).

Please pay attention to which perspective is instructed, what the current target object is, and the simple above-mentioned rule. Please also always try to react as quickly and as accurately as possible!

Continue with A or L.

Appendix B

Photographs used in the perspective-taking task and in the measures of the dependent variables:



Note: Photographs of targets at 160° and 200° (here depicted) angular disparity, as well as with the target objects in switched positions were presented in the visuospatial perspective-taking task. Furthermore, photographs with targets at 180° angular disparity were presented in the dependent variable measures.