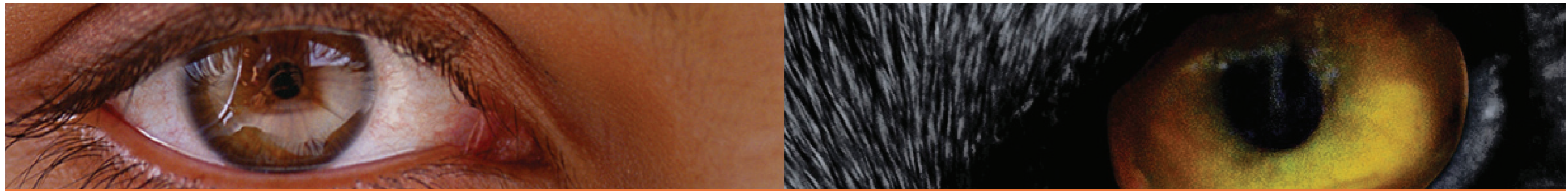


3-DIMENSIONAL AGENT REPRESENTATIONS INCREASE GENEROSITY IN A NATURALISTIC SETTING

Jan Krátký^a, John J. McGraw^b, Dimitris Xygalatas^{a,b}, Panagiotis Mitkidis^{b,c,d} and Paul Reddish^a

^a Laboratory for the Experimental Research of Religion, Masaryk University, Czech Republic; ^b Interacting Minds Centre, Department of Culture and Society, Aarhus University, Denmark; ^c Center for Advanced Hindsight, Social Science Research Institute, Duke University, USA; ^d Interdisciplinary Center for Organizational Architecture, School of Business and Social Sciences, Aarhus University, Denmark.



FACTS A field experiment • Participants engaged in a decision-making task while being exposed to agency and non-agency treatments • Results extend previous findings by showing that 3-dimensional agency cues are more successful in triggering prosocial behaviors.

INTRODUCTION Decisions made in everyday situations are carried out in complex environments rich in socially salient cues that influence the individual's decisions. A wide range of experimental work coming from social psychology and behavioural economics shows, contrary to the standard economic model, that people do not always act as deliberative, rational actors. Various studies have investigated the effects of both material cues and complex environmental settings on behavioural choices.

One particularly common and salient aspect of the environment involves cues related to intentional agents, whether they be our conspecifics, non-human species or supernatural beings. A number of studies have found that exposing participants to cues of agency increase prosocial or cooperative behaviour.

In two separate studies, we investigated the role dimensionality plays in priming inferences of agency. In contrast with previous studies utilizing 2-dimensional images, 3-dimensional representations share many more morphological elements with real life agents which may enhance the salience of the cues. Higher activation of agency detection, in turn, ought to trigger stronger reputational concerns and thus further amplify prosocial behaviour.

STUDY 1

HYPOTHESES. Our first hypothesis was that monetary contributions would be higher in the presence of agentive stimuli than in the presence of a non-agentive stimuli.

Our second hypothesis was that a 3-dimensional agentive stimulus would increase monetary contributions compared to a 2-dimensional stimulus.

METHOD. We used a 2x2 between-subjects factorial design. Our independent variables were agency (presence vs absence of agency) and dimensionality (2-dimensional vs 3-dimensional).

Participants. 345 participants (182 females).



Stimuli. 3D agency stimulus, a pseudo-realistic three-dimensional sculpture of a head (Head 3D), 135mm (width) x 225mm (height) x 150mm (depth). 3D non-agency object, a plant (*Aloe brevifolia*) (Plant 3D) 270mm (height) x 100mm (diameter). For the 2D conditions, photographs of the aforementioned 3D objects were used.

Design and procedure. Participants were encouraged to take one canned drink per person and contribute as much as they considered to be fair by placing their money in an envelope (numbered and marked for gender) and dropping it into the honesty box (a box set up there for that purpose). A cover story and instructions were presented alongside the stand posted near the drinks and box; participants were thus naive to the existence of the research study while still being well-informed about the task and procedure. Stimuli pertaining to each condition were placed visibly near the instructions. The study was conducted over 20 consecutive working days with five days for each of the conditions in randomized order.

RESULTS. All contributions were made in CZK. The median contributions were as follows: Head 3D=6, Head 2D=4, Plant 3D=4, Plant 2D=0. Overall, there was a floor effect in the study, with 149 participants contributing no money (Head 3D=38.68%; Head 2D=42.17%; Plant 3D=44.09%; Plant 2D=50.71%).

To test our first hypothesis we conducted an independent samples t-test between agency conditions (Head 3D and Head 2D combined) and non-agency conditions (Plant 3D and Plant 2D combined).

There was a statistically significant difference, with contributions in the agency conditions

($M=7.13$, $SD=7.98$) being greater than in the non-agency conditions ($M=5.44$, $SD=7.03$); $t(343)=2.07$, $p=.04$, $d=.22$. There was no significant difference in contributions between the Head 2D ($M=5.90$, $SD=6.55$) and Plant 2D ($M=5.37$, $SD=7.30$) conditions; $t(144)=.47$, $p=.64$, $d=.08$. However, there was a significant difference in contributions between the Head 3D ($M=8.08$, $SD=8.85$) and Plant 3D ($M=5.48$, $SD=6.89$) conditions: $t(197)=2.29$, $p=.02$, $d=.33$.

To examine our central hypothesis, that a 3D agency stimulus would produce a greater prosocial effect than a 2D agency stimulus, we compared the Head 3D condition to the Head 2D condition. We found that there was a significant difference, with greater contributions in the Head 3D ($M=8.08$, $SD=8.85$) than in the Head 2D ($M=5.90$, $SD=6.55$) conditions $t(187)=1.88$, $p=.05$, $d=.28$. We also reran the aforementioned pairwise comparisons removing the zero contributions. This revealed stronger effects, namely in contributions between the Head 3D ($M=13.18$, $SD=7.76$) and Plant 3D ($M=9.81$, $SD=6.51$) conditions; $t(115)=2.56$, $p=.01$, $d=.47$. We further examined our hypotheses by assessing whether the proportion of those who contributed something rather than nothing differed between conditions by running a Chi-square test of independence for agency vs. non-agency conditions. However, no significant associations were found. Across observed variables, no effect of gender was found.

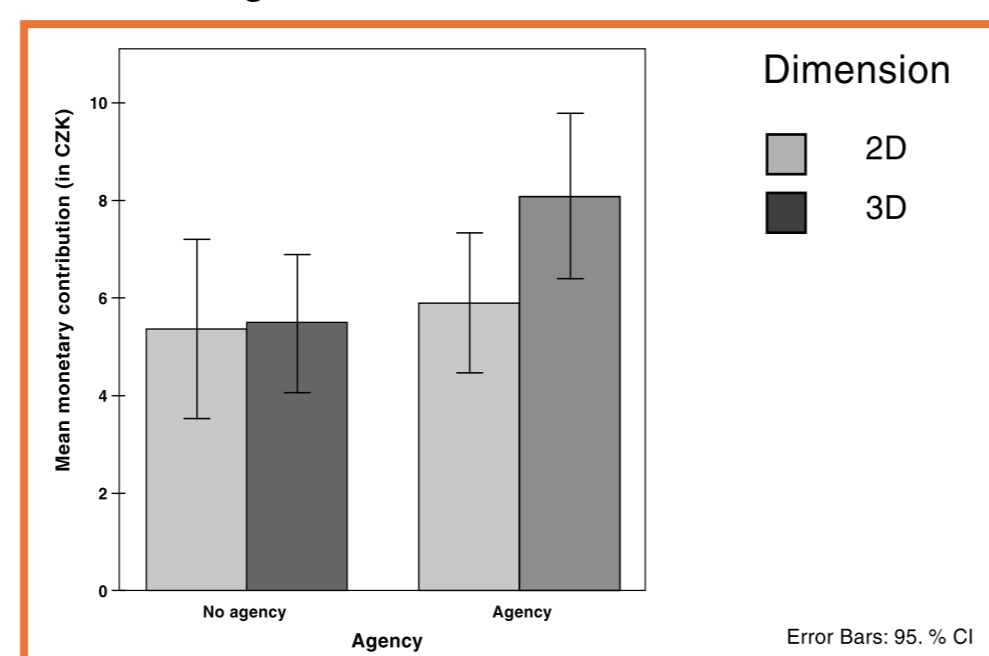


Figure 1: The main effect and interaction of factors

RESULTS SUMMARY STUDY 1

Findings supported both of our hypotheses: contributions were higher when participants were exposed to agency primes and there was a positive effect of dimensionality within the agency factor. Our results did not support the findings of previous studies with regards to the effects of 2D agency stimuli. Also in contrast with previous findings, participants were not more likely to donate something rather than nothing when exposed to agency primes.

STUDY 2

Previous studies have focused solely on the effects that cues of human agency have had on people, presuming reputational concerns to be an important factor in priming these behaviours. Thus, representations of animals should yield prosocial behaviours only when mistaken for socially relevant cues. We expected the animal stimulus to yield little or no effect compared to cues of human agency. Given the results of the first study, we primed the participants with 3-dimensional stimuli only.

HYPOTHESES. Our first hypothesis was that monetary contributions would be higher in the presence of agentive stimuli than in the presence of non-agentive stimuli.

Our second hypothesis was that monetary contributions would be higher in the presence of human agentive stimuli than in the presence of non-human agentive stimuli.

METHOD. One factor with two levels; between-subjects design. Our independent variable was agency (animal stimulus; human stimulus vs. a nonagentive stimulus).

Participants. Two hundred fifty-two participants self-distributed within the experimental conditions: Animal agency ($N=85$), Human agency ($N=81$), No agency ($N=86$).



Stimuli. 3D animal agency stimulus, a pseudo-realistic three-dimensional sculpture of a wolf head (Animal Head) 330mm (width) x 410mm (height) x 205mm (depth). 3D human agency stimulus, a pseudo-realistic three-dimensional sculpture of a human head (Human Head) 310mm (width) x 430mm (height) x 280mm (depth). 3D non-agency stimulus, a succulent plant (Plant) 400mm (height) x 140mm (diameter).

Design and procedure. The experimental design was based on the first study. Due to the lack of gender effect in the first study, the second experiment did not control for gender.

RESULTS. The median contributions were as follows: Animal Head=6, Human Head=5, Plant=5, Plant 2D=5.

Sixty-one participants contributed no money (Animal Head=18.8%; Human Head=24.7%; Plant=29.1%). To test our first hypothesis we conducted an independent sample t-test between agency conditions (Animal Head and Human Head combined) and control (Plant) condition. There was a nearly statistically significant difference, with greater contributions in the agency conditions ($M=8.63$, $SD=9.81$) than in the non-agency condition ($M=6.66$, $SD=6.83$); $t(229)=1.86$, $p=.06$, $d=.23$.

To test our main hypothesis we conducted pairwise comparisons among all conditions. There was no statistically significant difference in contributions between Human Head ($M=6.31$, $SD=5.99$) and Plant ($M=6.66$, $SD=6.83$); $t(165)=.36$, $p=.71$, $d=.05$ conditions. However, there was a statistically significant difference in contributions between Animal Head ($M=10.85$, $SD=12.04$) and Human Head conditions ($M=6.31$, $SD=5.99$); $t(124)=3.1$, $p=.02$, $d=.48$ and also a statistically significant difference in contributions among Animal Head ($M=10.85$, $SD=12.04$) and Plant ($M=6.66$, $SD=6.83$); $t(133)=2.80$, $p<0.01$, $d=.43$ suggesting that the Animal Head condition drove the overall effect in the agency factor.

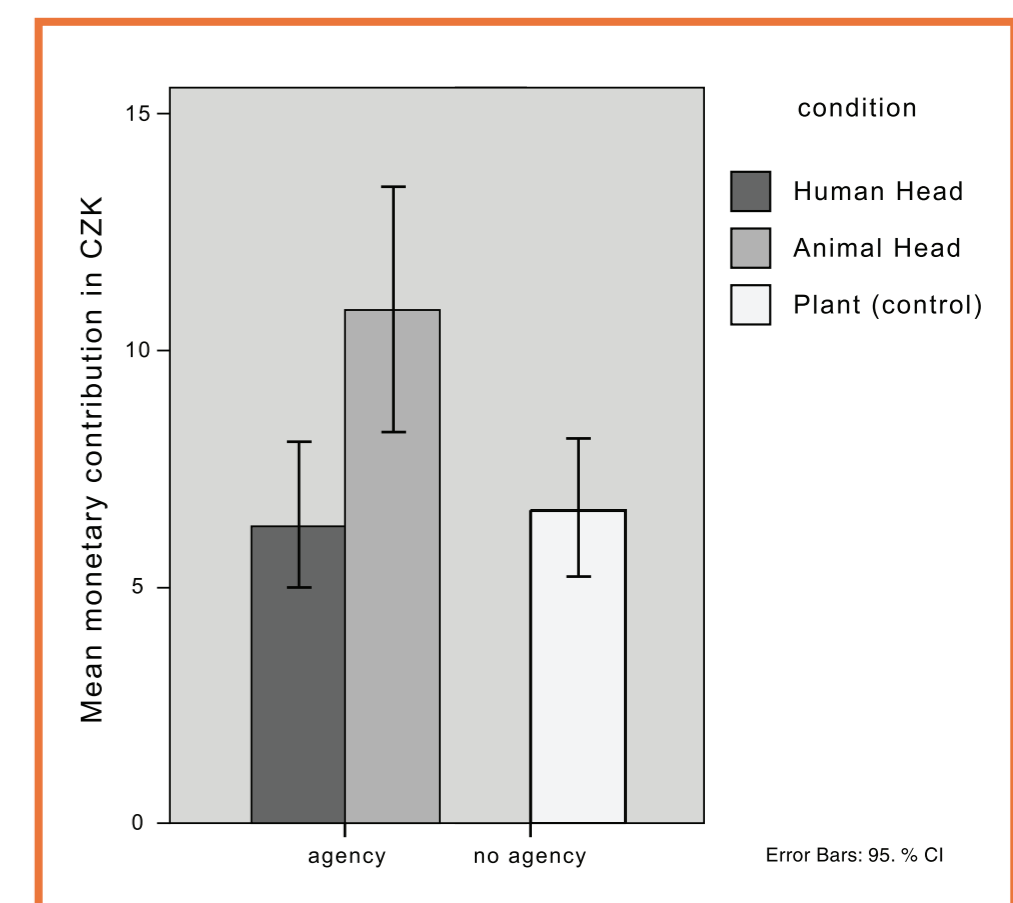


Figure 1: The comparison of effect across experimental conditions

RESULTS SUMMARY STUDY 2

The Animal stimulus showed a strong and highly significant effect compared to the Human stimulus and the non-agentive stimulus. These findings did not support our core hypothesis, that Human agentive stimulus would yield greater prosocial effects compared to Animal agentive stimulus.

Both agentive conditions combined showed a trend towards greater monetary contributions compared to the non-agentive condition.

DISCUSSION (STUDY 1 + STUDY 2) To what extent do the results of the second study conflict with those of the first study? Were we simply unable to replicate the earlier findings? In a 2013 meta-analysis, Sparks & Barclay discussed results of 25 "eyes effect" studies, as they call them, that prime inferences of agency. They listed time of exposure as a critical point for studying this priming phenomenon. They hypothesized the eyes effect to be a fleeting, unconscious response to a false social cue. Additionally, prolonged exposure to these false cues tends to eliminate the effect since people identify the cues as inauthentic and thus, irrelevant. We argue that something similar may have happened in our studies as well. The sculpture of the Human head used in our second study was twice the size of the head we used in the first study; perhaps this significant change in visual salience brought more attention to the cue, subsequently eliminating its effect which, above all, depends upon subtlety. The surprisingly strong and highly significant effect of the Animal agency stimulus is a novel finding hard to explain using present frameworks and we plan to design future studies to investigate this phenomenon.

FUTURE RESEARCH Future research may require a greater degree of control over the experiment. Such factors as exposure time, human vs. animal stimuli, stimuli size, and the presence of other people may need to be more carefully controlled in order to illuminate the phenomenon at hand.