Journal of Experimental Social Psychology 49 (2013) 1023–1026

Contents lists available at ScienceDirect

Journal of Experimental Social Psychology

journal homepage: www.elsevier.com/locate/jesp

Physical aggression facilitates social information processing

Henry Markovits

Psychology Department, Universite du Quebec a Montreal, Montreal, QC, Canada

HIGHLIGHTS

- Hypothesized that physical aggression makes information processing more efficient.
- A social cue learning task differing only in expectations of outcome was created.
- Cues were learned more accurately when outcome involved physical aggression.

ARTICLE INFO

Article history:
Received 30 January 2013
Revised 7 July 2013
Available online 14 July 2013

Keywords:
Social cognition
Aggression
Social information processing
Social rules

ABSTRACT

Physical aggression appears to have a much stronger effect on behavior than its overt frequency of occurrence would suggest. Studies examining effects of observing aggressive behavior and others looking at cognitive differences related to aggressive behavior suggest that physical aggression might be processed preferentially by the cognitive system. In order to examine this hypothesis, adult participants were given a social cue learning task. Study 1 presented three conditions which were identical except for the description of one potential outcome. Participants learned the cue more often when this outcome involved physical aggression (hit) compared to non-physical aggression (steal) or being friendly. Study 2 showed that the specific nature of the cue had no effect on success rates. Study 3 compared unusual outcomes involving aggression (being hit with a suitcase) and non-aggression (dancing). Results show that people were more accurate with the former. These results provide evidence that physical aggression is processed more efficiently than other forms of social interaction and gives a cognitive basis for the specific impact of physical aggression on behavior.

Introduction

Understanding aggressive behavior and its impact is a continuing problem on many levels. Both the variety of theoretical accounts of aggression, varying from evolutionary (Archer, 1988, 2009) to social theories (Anderson & Bushman, 2002; Bandura, Ross, & Ross, 1961) and the prevalence of aggressive behaviors bear witness to its importance. Psychological research into aggressive behavior has concentrated on two major themes, both of which imply that aggressive behavior has a particularly strong influence on the cognitive system. A first strand of research has shown that witnessing violent behavior in the community (Margolin & Gordis, 2004; Spano, Rivera, & Bolland, 2006) and in more indirect settings such as television and video games (Anderson, 2004; Anderson et al., 2003) is related to increases in aggressive behavior. The second strand of research has been developed in the context of Social Information Processing theory (SIP) (Crick & Dodge, 1994; Dodge et al., 2003). This theory suggests that aggressive individuals construct internal models of aggressive behaviors that are inaccurate, leading them to interpret a larger class of behaviors as aggressive, thus creating vicious cycles of aggressive behaviors and reactions (Dodge, Bates, & Pettit, 1990; Dodge et al., 2003). Both of these strands of research suggest that aggressive behavior has a particularly high level of salience, compared to other forms of social behavior. This is illustrated by research showing that incorporating a single aggressive child into a group of less aggressive children produces an overall increase in levels of aggression (Dishion, McCord, & Poulin, 1999).

In fact, a straightforward cost–benefit analysis suggests that physical aggression should be particularly salient. Physically aggressive behavior can have an immediate negative impact, with the possibility of varying degrees of personal harm. Other kinds of aggressive or prosocial behaviors have less immediate consequences and more variability in outcomes. Physically aggressive behavior is potentially dangerous in the short-term, and being able to predict the occurrence of such behavior would have a direct impact on survival. Thus, it should be particularly useful to process social cues predictive of physically aggressive behavior more efficiently than cues related to other forms of behavior.

We examine this hypothesis by using a social cue learning task. This involves sequences of animated interactions in which the participant takes the viewpoint of a person who has left their cell phone on a bench, and approaches another person who has taken the phone. In each sequence, the animated character with the phone looks and

E-mail addresses: henrymarkovits@gmail.com, markovits.henry@uqam.ca.

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http://dx.doi.org/10.1016/j.jesp.2013.07.005

dresses differently, and uses a variety of gestures. At some point in each sequence, the character will either (A) put two hands down with fists clenched or (B) put both hands behind their back. We compare three conditions, all of which use exactly the same visible information. For half the sequences in each condition, the character gives the phone back to the participant. The cue for this outcome is the character putting both hands behind their back. In the Hit condition, the alternative outcome leads to the participant being hit by the character. In the Steal condition, the character runs off with the phone. In the Talk condition, the character gives the phone back and is friendly. In all three conditions, the cue for the alternative outcome is the character putting two hands down with fists clenched. Participants view the potential outcomes fully only once before the learning trials. During the learning phase, they are given only incomplete sequences, with no outcome. Participants are instructed to discover the cue that determines what the outcome of each sequence would be. After each trial (during which they observe only the initial part of the interaction), participants predict the outcome, following which the computer indicates the actual outcome (by a short verbal description). Participants are also given the chance to indicate whether or not they thought that they had discovered the cue.

Our hypothesis was that cue learning would be more efficient when the alternate outcome involved physical aggression (the Hit condition).

Method

Participants

A total of 346 students (average age = 21 years, 2 months) participated in this study. Of these, 60 women and 57 men received the Hit condition, 58 women and 61 men received the Steal condition, and 55 women and 55 men received the Talk condition. Participants were native French speaking students at college level.

Materials

A computer program using Visual Basic 6 was constructed. The initial screen asked for demographic information. In the Hit condition, participants then received the following instructions (translated from the original French):

> "In what follows, we are going to ask you to pretend that you have left your cell phone on a bench. You go back to see where it is, and you see another person taking the phone. You approach them to get your phone back. Sometimes, the person who is approached will give you back your phone, but sometimes they will get angry and hit you. Your task will be to discover how you can anticipate the reaction of the person who is approached."

Instructions in the Steal condition were identical except that the following sentence was used: "Sometimes, the person who is approached will give you back your phone, but sometimes they will run off with it."

In the Talk condition, participants were told that: "Sometimes, the person who is approached will just give you back your phone, but sometimes they will give it back and start talking to you in a friendly way."

Participants were then shown a full sequence with one outcome (e.g. getting the phone back), then a full sequence with the alternate outcome (e.g. hit). Following this, participants received up to 20 learning trials. On each trial, participants were presented with a sequence that showed them approaching the character, which stopped just before the final outcome. After this, participants were given a screen which contained two buttons, labeled with short descriptions of the potential outcomes. The screen also contained the following instructions: "Indicate by clicking on the appropriate button how you think that this interaction will finish." Following each prediction, participants were told on screen whether or not their prediction was correct. After each prediction, participants were asked whether or not they thought that they had discovered a rule. If a participant indicated that they had discovered a rule, and this was followed by four consecutive correct predictions, then the game ended, and participants were asked to indicate their rule on the final screen. Finally, participants who had not indicated discovering a rule that was successful by the 20th trial were also asked to indicate what they thought the rule was at the end of the procedure.

Animated sequences

The animated sequences used in this study were constructed using Moviestorm software. We constructed two equivalent sets of 22 sequences, one with an adult female character and one with an adult male character. Each set varied the clothing (formal, informal), initial position (sitting, standing), associated gestures (use cell phone, put cell in pocket, raise both arms, raise one arm), and critically, whether or not the character that was approached at some point placed both arms down with clenched fists or put both hands behind their back (see Electronic supplementary material for examples). The non-relevant dimensions were randomly varied across all the sequences, so that no two sequences were identical, and no one dimension covaried with any other. Two full sequences illustrating both outcomes were generated. The remaining 20 stopped before the outcome and were ordered in a semi-random fashion, with 10 sequences cuing to each outcome.

Procedure

Participants were approached individually in the library of the college. An explanation of the aims of the study and the maximum time that it would take was given. Participants who volunteered were placed in front of a portable computer, and the program was started by an experimenter. Subsequently, participants interacted only with the computer. Sex of character varied randomly across all participants, and was a between subjects variable.

Results

We first examined the explicit cues given by participants. These were coded into two large categories. Any description that appropriately related at least one of the two cues to the relevant outcome was coded as an Accurate cue. All others were coded as Inaccurate cues. Intercoder agreement with a previous data set gave a κ of .889. We then performed a log linear analysis with Type of cue (Accurate or not) as dependent variable and Condition (Hit, Steal, Talk), Gender of participant and Gender of Character as independent variables. This showed significant main effects of Condition, $X^2(2) = 10.13$, $p < .01$, and Gender of participant, $X^2(1) = 5.00$, $p < .05$. Post hoc analyses were done using individual chi square tests with a Bonferroni correction. This showed that the percentage of Accurate cues was significantly greater in the Hit condition ($M = 64.1\%$) than in both the Steal ($M = 47.1\%$) and the Talk ($M = 45.5\%$) conditions. A higher percentage of women ($M = 58.4\%$) discovered an Accurate cue than did men ($M = 46.2\%$).

We then examined the rate of cue learning. In order to do this, we examined the rate of correct responses as a function of trial. To do this, we divided the trials into 5 sets of 4 consecutive trials each. For each set, we calculated the total number of correct trials (out of 4). We then performed an Anova with Number of correct trials as dependent variable with Set (1 to 5) as repeated measure and Condition, Gender of participant and Gender of Character as