Enhanced memory for cooperators in a face-in-the-crowd task

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Introduction

Human survival relies on accurate social judgments finely tuned by modular cognitive processes. In many social situations, individuals must decide whether another person is someone to approach or avoid, trust or distrust. Many researchers have studied how face recognition is affected by tagged behaviours such as cheating or collaborating. Findings, however, are contradictory. Some results point to an enhanced memory for faces of cheaters; others point to the opposite.

In this study we investigated how memorisation intervals (unlimited or short) affected the recognition of faces associated with different moral behaviours. We also tested face recognition after short retention periods and when faces with tagged behaviours were mixed in a crowd of unfamiliar faces.

Method

To investigate possible memory biases for faces in social exchanges, photos of faces were grouped according to a brief history of cooperation, cheating or irrelevant behaviour (i.e. neutral) towards a hypothetical person.

Participants

Participants were students from Kingston University, enrolled in Psychology, who received participation credits. They had normal to corrected vision. Age varied between 19-28 years.

Stimuli and Apparatus

Colour photos of faces of males and females were from UCL's XMT2VS face database. The photos used had 227 x 182 pixels; the viewing angle was ~4.3 x 5.7 deg at 50 cm . In all experiments, an equal number of females and males were tagged with behaviours adapted from Chiappe *et al*. (2006).

Three randomly presented slides, each containing 4 or 6 faces, were introduced by one of a behavioural description. A distracter task consisting of a series of multiplications followed memorisation. About 5 min later recognition tests were given. Feedback was given after each trial.

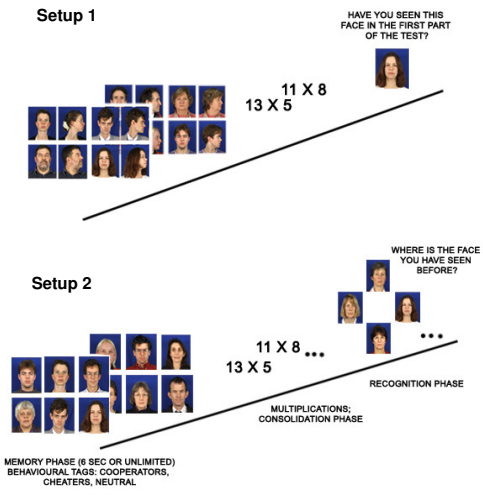


Figure 1. Experimental Timeline

Results

Study 1 – Controls

Independently of whether participants (*N*= 14) had 6 sec to memorise each of 3 face sets or unlimited time (*N*= 14), no difference between face sets was found: ACC_{6sec} ($F_{2,24}$= 1.127, *P*=0.341), ACC_{unlim} ($F_{2,26}$= 1.800, *P*=0.185), RT_{6sec} ($F_{2,24}$= 0.941, *P*=0.404), RT_{unlim} ($F_{2,26}$= 0.766, *P*=0.475).

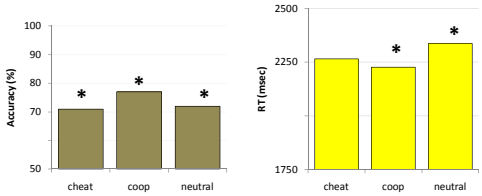


Figure 2. ACC and RT when memorisation was 6 sec per set. *N* = 31; 29 females; 2 males

Study 2 – Viewing Angle (setup 1)

	Acquired behavioural history (Mean ± S.D.)			
	Cheater	**Cooperator**	**Neutral**	**False Alarms**
ACC (%)	60 ± 2.5	77 ± 2.7	65 ± 2.5	28 ± 2.0
RT (msec)	1054 ± 40	907 ± 29	1002 ± 36	

Table 1. Face recognition performance in Study 2. *N*= 54; 33 females; 21 males. Face recognition varied according to reputation: ACC, $F_{3,159}$= 16.590, *P*<0.0005.and RT, $F_{3,159}$= 14.084, *P*<0.0005. **ACC = accuracy; RT = reaction time**.

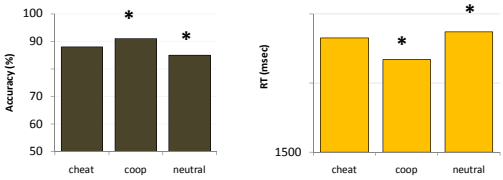


Figure 3. ACC and RT when memorisation time per set was unlimited. *N* = 31; 29 females; 2 males

Recognition of faces of cooperators was better than for cheaters (*P*<0.0005) or neutrals (*P*=0.001). RT for faces of cheaters was as slow as for neutral (*P*=0.771).

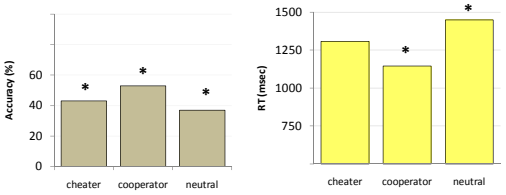
Accuracy for faces in profile was lower than for faces in frontal view, $F_{1,53}$= 8.783, *P*=0.005, while RT was slightly higher than for faces with frontal view, $F_{1,53}$= 6.745, *P*=0.012.

Photos of males were recognised faster than photos of females: *unlimited* $F_{1,52}$= 28.777, *P*<0.0005 and for *6 sec*, $F_{1,30}$= 31.073, *P*<0.0005.

The position of the familiar face also affected RT, *unlimited* $F_{3,156}$= 10.169, *P*<0.0005 and for *6 sec*, $F_{3,84}$= 10.628, *P*<0.0005. Familiar faces on the left visual field were recognised quicker than when they were at the bottom (*P*<0.0005) or in the right visual field (*P*<0.0005). Similar results were obtained for accuracy.

N= 18; 8 females; 10 males

Recall test



$F_{1.494,25.397}$= 6.724, p=0.008

$F_{2,34}$= 3.695, p=0.035

Study 3 – Recognition in crowds (setup 2)

Unlimited vs. short memorisation

In both memorisation conditions, recognition varied according to face behavioural status: *unlimited* $F_{2,104}$= 8.348, *P*<0.0005 and *6 sec*, $F_{2,60}$= 4.096, *P*=0.022. ACC was lower with 6 sec memorisation. Cooperators faces were better recognised than faces associated to cheating (P_{unlim}<0.003 and P_{6sec}=0.026) and quicker than neutrals: *unlimited* $F_{2,104}$= 3.411, *P*=0.037 and for *6 sec*, $F_{2,60}$= 3.479, *P*=0.029.

Conclusions

Recognition of cooperators was higher than cheaters or neutral. Time for memorisation affected accuracy, but memory biases were similar in all experiments. Our results contradict findings by Mehl & Buchner (2008) and Barclay (2008), among others, but are in line with Brown & Moore (2000) and Singer *et al*. (2004). It remains to be checked whether such enhanced recognition for cooperators, instead of cheaters, is maintained after longer testing intervals.

References

- Barclay, P (2008). *Cognition*, 107, 817-828.
- Brown, W.M & Moore, C. (2000). *Evolution of Human Behavior, 21,* 25-37.
- Chiappe *et al*. (2004). *Evolutionary psychology*, 2, 108-120.
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