

Adaptive Memory: Different Effects of Reproductive Processing on Male and Female Memory

Yu Rui^{1,2} and Tao Yun¹

Faculty of Education, Yunnan Normal University¹

School of Humanities and Management, Yunnan University of Chinese Medicine²

As one of the major pressures in human evolution, reproduction may shape the characteristics of human memory. Men and women develop different mate preferences in reproductive tasks, which have different effects on their memory. In this study, face pictures and personality trait words were used as experimental materials to explore the different effect of reproductive processing on male and female memory.

The study set two matching processing conditions to explore whether reproductive processing could bring better memory results to the subjects. One was a blind date condition, representing reproductive processing, and the other was a recruitment condition, representing non-reproductive processing. In experiment 1, the face pictures were used as the experimental material. The result shows that male subjects have better recognition of the faces under the reproductive condition. While, there is no difference in female memory of the faces under reproductive and non-reproductive conditions. In experiment 2, the words representing personality traits were used as experimental materials. The result shows that female participants have better memory of trait words under the reproductive condition, while there is no difference in male memory of trait words between reproductive and non-reproductive conditions.

In conclusion, this study finds that men have better memory of female faces under reproductive conditions, while women have more obvious memory advantages for male trait words under reproductive conditions compared to non-reproductive conditions. These results prove that reproductive processing can bring memory advantages, but also show that there may be differences between the two sexes in memory mechanisms due to different preferences for mate selection.

Keywords: *adaptive memory, reproductive processing, mate preferences, sex difference*

Extended Abstract

Evolutionary psychology holds that human memory is the product of natural selection and adaptation. The pressures that humans have undergone during evolution have shaped numerous characteristics of memory. Survival and reproduction have been the main pressures in humans' long evolutionary history. Many studies have confirmed that human beings have better memory performance under survival processing conditions, a phenomenon known as the survival processing advantage

effect of memory. Is reproduction processing, like survival processing, conducive to human memory performance? This field research provides not only a specific validation of evolutionary psychology theory but also an important exploration of human cognitive mechanisms.

According to evolutionary psychology, men and women have formed different mate selection preferences because of their different physiological mechanisms and reproductive tasks. To better breed offspring, men value

women's health and fertility when choosing a mate. Appearance is a direct embodiment of health, so men may pay more attention to women's looks. Meanwhile, women, who provide more parental investment, show greater preference for male resources, status and reliability, most of which are related to the quality of personality. The different preferences of men and women in mate selection may have different effects on memory. Few studies have explored how the effect of reproductive tasks on memory differs according to gender, which is the topic of our research.

The main purpose of this study was to explore whether reproduction conditions were more conducive to the participants' memory performance than non-reproduction conditions and to examine the differences between the memory performance of male and female participants under reproduction conditions. This study used a blind date scenario as the reproduction processing condition and a recruitment scenario as the non-reproduction processing condition. The participants were asked to evaluate how much they liked the experimental materials under the two different conditions. The only difference between the conditions was that the evaluation criterion under the dating condition was mate selection and that under the recruitment condition was recruitment. In Experiment 1, photographs of faces were used to investigate the effects of gender and processing condition on facial memory. Because men attach great importance to women's appearance in mate selection, we hypothesized that men have better memory of female faces under the reproduction condition represented by the blind date task than under the non-reproduction condition. In Experiment 2, words describing the quality of personality were used to investigate the effects of gender and processing condition on the memory of these words. Because women attach importance to the quality of men's personality in mate selection, we hypothesized that women have better memory of personality trait words under the reproduction condition than under the non-reproduction condition.

The participants in this study were 120 college students who voluntarily participated in the study, half of whom were male and half of whom were female. We used a classical incidental learning paradigm. The study

consisted of three experimental stages: an evaluation stage, a distraction task stage and a recognition test stage. First, the participants evaluated how much they liked the faces or personality qualities of the opposite sex under different conditions. We used two processing conditions for blind date and recruitment to explore whether reproduction processing resulted in better memory outcomes for the participants. They then performed a three-minute distraction task. Finally, they were asked to recognize the faces or personality qualities. For both experiments in the study, we used Pr (the hit rate minus the false alarm rate) to measure the recognition level.

In Experiment 1, photographs of faces were used as the experimental materials. The results showed that the recognition of female faces by male participants under the blind date condition was significantly better than that under the recruitment condition: $F(1, 57) = 4.59, p < .05, \eta_p^2 = .09$. There was no significant difference in the recognition of male faces by female participants under the two conditions. The results also showed that in the dating condition, there was no significant difference in facial recognition ability between the male and female participants. In the recruitment condition, women scored higher than men: $F(1, 57) = 19.08, p < .001, \eta_p^2 = .22$. These results indicated that the reproductive task of blind dating promoted the memory of men but had no effect on women. Furthermore, men's evaluation scores for faces of the opposite sex were found to be significantly higher than those of women across both conditions: $F(1, 56) = 9.48, p < .01, \eta_p^2 = .15$. The evaluation scores of both male and female participants in the recruitment condition were also significantly higher than those in the blind date condition: $F(1, 56) = 17.44, p < .001, \eta_p^2 = 0.24$. There was no significant interaction effect between gender and evaluation condition on evaluation score. The significantly higher evaluation scores of men under the recruitment condition than under the blind date condition showed that men's better recognition of women's faces under the blind date condition was not due to higher evaluation. It also showed that men had higher requirements regarding women's looks under the blind date condition than under the recruitment condition, which is in line with the view of evolutionary psychology that men pay more attention

to women's looks when choosing a mate. Similarly, the significantly higher evaluation scores of women under the recruitment condition than under the blind date condition indicates that women have higher requirements regarding men's appearance when choosing a mate. Furthermore, we found that neither evaluation condition nor gender had a significant effect on evaluation reaction time. There was no significant interaction effect between gender and the evaluation condition on reaction time. These results showed that the time taken to process the experimental materials was not the reason for the differences in recognition level.

In Experiment 2, words describing personality were used as the experimental materials. The results showed that the female participants' recognition performance under the blind date condition was significantly better than that under the recruitment condition: $F(1, 57) = 8.68, p < .01, \eta_p^2 = .13$. Men had similar recognition performance under the blind date and recruitment conditions. Therefore, only women showed a reproduction processing advantage in Experiment 2. Furthermore, there was no significant difference between the evaluation scores of male participants under the blind date and recruitment conditions. Female participants had higher scores under the recruitment condition than under the blind date condition: $F(1, 56) = 7.58, p < .01, \eta_p^2 = .12$. These results indicate that processing conditions have no effect on men's judgment of female personality traits, while women have higher requirements regarding men's personality traits under mate selection conditions. The higher evaluation scores of women for personality trait words under the recruitment condition also indicated that women's better memory of trait words under the blind date condition was not due to higher evaluation of such words. Furthermore, the results showed that neither evaluation condition nor gender had a significant effect on evaluation reaction time. There was not a significant interaction effect between gender and evaluation condition on reaction time. These results indicate that the memory advantage shown by women under the blind date condition was not caused by processing time.

The results of the two experiments showed that under reproduction conditions, men had better memory

of female faces than under non-reproduction conditions, while women had better memory of male trait words. Evolutionary psychology holds that reproduction and survival have been the two major pressures on humans over the course of their evolution and may shape the characteristics of human memory. This theory includes the assumption that memory is adaptable. The results of our experiments support the hypothesis that reproductive tasks shape memory. Evolutionary psychology also suggests that men and women have gradually developed different mate selection preferences over the long history of evolution because of different physiological mechanisms and reproductive tasks. Men pay more attention to women's looks, which reflect their health and reproductive ability, while women pay more attention to men's personality traits, which reflect the level of resources they may have. This study found that reproduction processing causes men to remember more faces and women to remember more trait words, which supports the hypothesis that men and women have developed different mate selection preferences. In addition, this study measured the participants' evaluation scores and reaction times in the evaluation stage. By integrating these two results with those for memory performance, we showed that the memory advantages shown by the participants could not be explained by the consistency effect or processing time.

In conclusion, this study found that reproduction processing can improve human memory performance and that it has different effects on male and female memory.

This study has some limitations. First, there was no deep exploration of whether the emotional value of the experimental materials affected adaptive memory. Second, there was no consideration of the impact of sexual orientation on the results. Third, if more samples could be added, the interaction between the processing condition and gender might become more obvious, as suggested by the results of Experiment 2. In the future, more reproduction and non-reproduction conditions should be set to study the different impacts of reproduction processing on the memory of the two gender groups. This would improve the ecological validity of our experiment, the results for which require more verification.

Nevertheless, this study is still of great theoretical

significance. The results show that reproduction processing can confer memory advantages and that human mate preference affects the mechanisms of memory. Therefore, future research on memory should pay attention to the origins and functions of memory.