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Crockett *et al.* (2010)

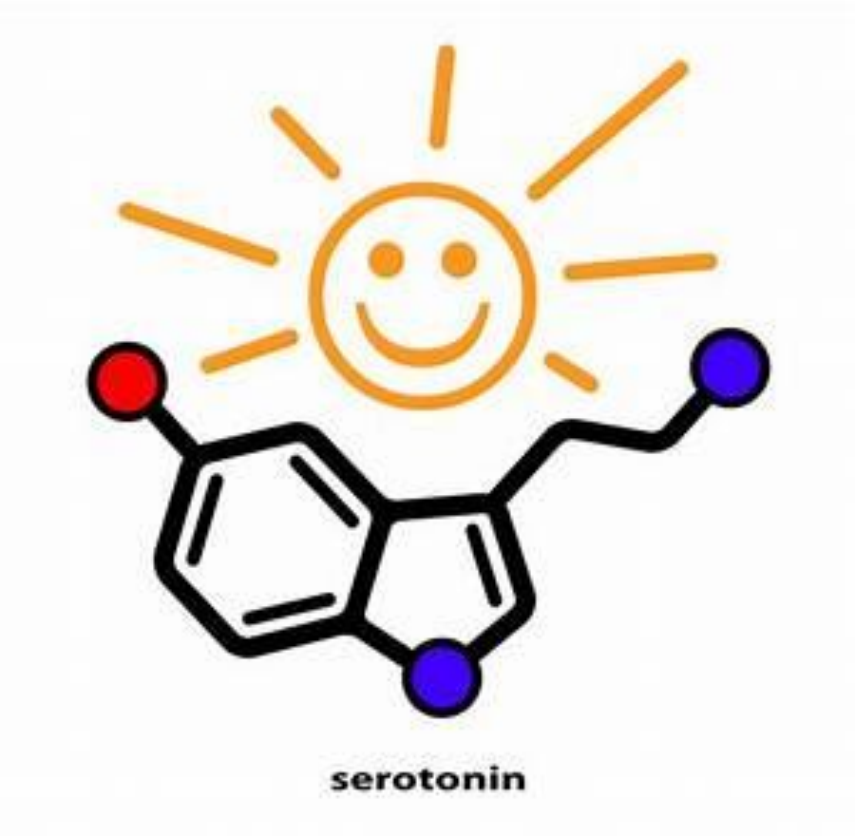
Serotonin Selectively Influences Moral Judgement and Behaviour through Effects on Harm Aversion

This study is used to answer questions on:

Neurotransmitters
Prosocial behaviour

Abstract

This study examined the effects of serotonin on prosocial behaviour. 30 participants (13 males, 17 females, mean age 25.5) attended three sessions at Addenbrooke Hospital in Cambridge, UK. They completed questionnaire about their mood and traits before being given a drug that either raised serotonin levels, raised noradrenaline levels (control group) or a placebo that had no effect (control group). The participants then took part in an ultimatum game and a moral judgement activity. Researchers found that those participants with high levels of serotonin reduced the harm to their opponents in the ultimatum game and also reduced the harm to people in the moral judgement tasks, providing the judgement was emotionally based. Researchers concluded that serotonin increases the need to avoid harming others and thus leads to prosocial behaviour.



Aim

- To see if serotonin is linked to prosocial behaviour
- To see if serotonin can raise individuals harm aversion

Method

Participants

30 healthy participants (13 males, 17 females, mean age 25.5 years old) were tested for any mental or physical health problems before being selected for the experiment.

Procedure

Participants attended three sessions at Addenbrooke's Hospital in Cambridge, UK. First, they completed a mood and trait questionnaire. Then they received single doses of either citalopram (an SSRI which increased serotonin levels), atomoxetine (which increased noradrenaline which increases executive functions and a placebo (which did nothing). The atomoxetine and the placebo were the control groups to measure serotonin against.

After waiting for 1.5 hours in a quiet room (to allow neurotransmitter levels to rise), the participants completed another mood questionnaire and then took part in two activities.

The Ultimatum Game

The participant played the role of responder in the ultimatum game. They played 24 times against different opponents. The ultimatum game involves 2 individuals dividing up a sum of money. 1 person will suggest how the amount of money is divided and the responder will either agree or disagree. If they agree, the money is split as suggested. If they disagree, both individuals receive no money.

In this experiment, the participant was always the responder (they had to either agree or disagree with the proposed money split). They received 8 fair offers (between 40% and 50% of the money), 8 unfair offers (27% to 33% of the money) and 8 extremely unfair offers (18% to 22% of the money). These offers remained the same for all participants and, after competing the game, the participant rated each offer in terms of fairness (fair or unfair on a 7-point Likert-type scale).

Moral Judgement task

Participants read a scenario on a computer screen and were given unlimited time to read. Once finished, they were asked a question that required a 'yes' or 'no' response. Questions were often in the form of 'Is it acceptable to….?'

The scenarios involved two types of moral judgement: personal and impersonal. The personal scenarios involved harming one person to save many and were very emotionally relevant for the participant. The impersonal scenarios involved harming one person to save many but were not emotionally relevant for the participant.

This procedure was repeated three times with at least 1 week between appointments to allow for neurotransmitter levels to stabilise. After the third appointment, participants were debriefed about their impressions of the study and whether they believed the choices they made in the ultimatum game were real and if they had any suspicions about which drug they took.

Results

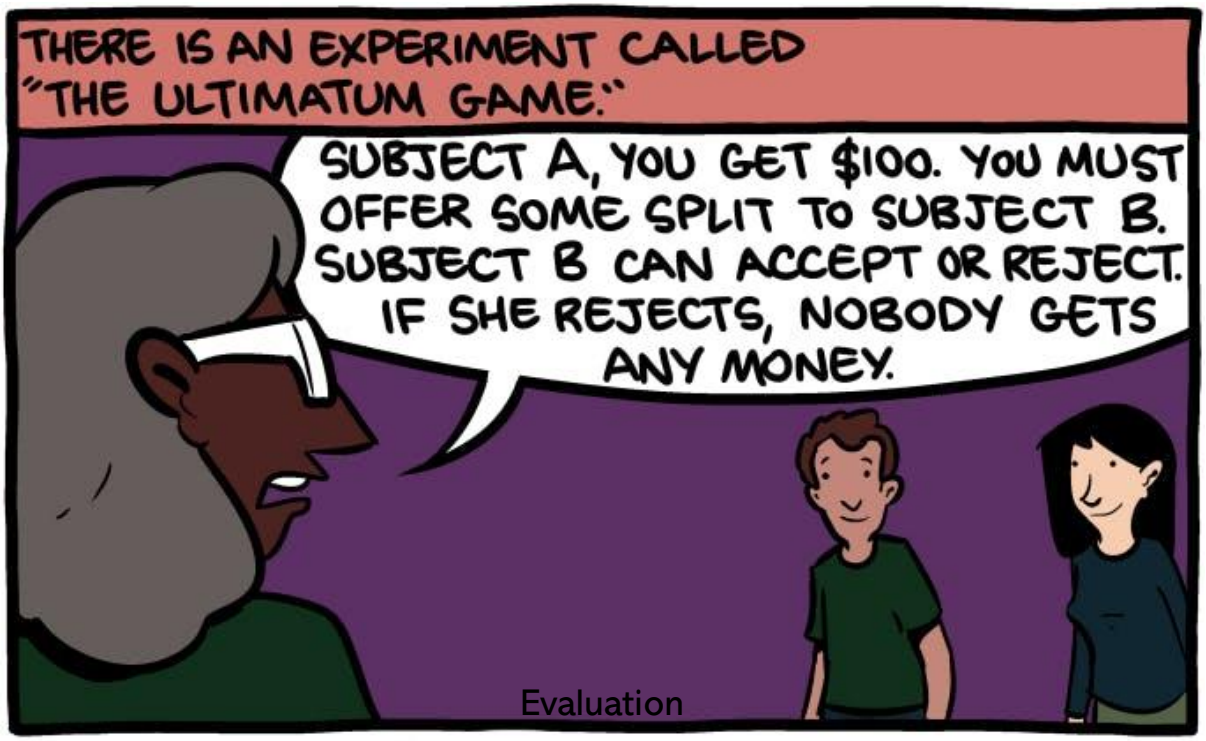
In the ultimatum game, participants with higher serotonin levels accepted unfair offers much more often than the other two sets of participants.

In the moral judgement task, the participants with high levels of serotonin made much more moral choices than the other two sets of participants. However, they only made more moral choices when they were emotional scenarios. Serotonin participants judged actions that hurt others as forbidden, but only where the cases were emotion based.

Those participants whose traits were high in empathy showed the most effects of raised serotonin (i.e. those people who tried to avoid harming others before taking serotonin became even more likely to try and avoid harming others after taking the drug).

Conclusion

Serotonin increases prosocial behaviour. This is likely because raised levels of serotonin enhance harm aversion thus individuals with high levels of serotonin will act in society in ways to prevent others from coming to harm.



Generalisability

- The sample of 30 participants is quite low. Given that this group was then also divided into three separate groups, the number of participants is very low.
- The participants were all from Cambridge in the UK .

Reliability

- The study used questionnaires and a set method of testing, so it is easily replicable.
- The study used scientific measures (medication and data analysis) .

Application to life

- Understanding that high serotonin levels can affect prosocial behaviour could allow programmes to be designed that would naturally increase serotonin levels e.g. through diet and exercise.

Validity

- Two participants were excluded from the study for guessing which drug they had taken which means it is possible other participants may have done so and not reported it.
- Two participants were excluded from the study because they did not believe in the ultimatum game which means it is possible other participants may have not believed in the game and did not report it.

Ethics

- The participant's physical state was altered during the experiment. However, the procedure took place in a medical establishment and was conducted by medical staff to ensure participant safety.