Case Study : 'Testosterone increases the aggressiveness of some men more than others'

the british psychological society
the psychologist

This article has been sourced from the BPS, written by Emma Young on 26 March 2019 and can be accessed directly via the link below:

https://www.bps.org.uk/research-digest/testosterone-increases-aggressiveness-some-men-more-others

Article

Having more testosterone makes men more aggressive – right? It's a popular lay belief that's supported by animal studies, but there's been very little relevant research in humans. Now a **study**, published in *Psychological Science*, reveals a more nuanced picture: some men are more affected by raised levels of testosterone than others.

Shawn Geniole at Nipissing University in Canada and colleagues studied 308 men aged 18 to 40. After completing a personality questionnaire, the participants gave a saliva sample, so their baseline testosterone level could be measured, and also a mouthwash sample, for DNA extraction.

The participants were told they would soon be paired with a partner for an online "decision making game". But first they received a nasal gel, which was either a placebo or contained 11 mg of testosterone, and then they were videoed answering general personal questions, which they were told would be shown to their "partner" who was currently located in another room. To add even more realism to this cover story, the men then watched a video of their partner being interviewed in the same way (actually a researcher who provided scripted answers to the questions).

Next came the "decision-making game", which the men started half an hour after receiving the gel, and which was actually the well-validated "point-subtraction aggression paradigm", which measures aggressive behaviour in response to provocations. (Points can be stolen from the other player, with no benefit to the participant themselves other than the satisfaction of penalising their partner; the number of points stolen is taken as a measure of behavioural aggression.)

After this, the participants completed a questionnaire that asked about their impressions of the game and the other player. It asked, for example, "Did it make you feel good when you stole points from your game partner?" And "To what extent did you become angry when your game partner stole points from you?"

Earlier studies have suggested that testosterone has bigger effects on aggression among men who rank high on a personality measure of dominance. In this study, the researchers considered men who scored higher for dominance, higher for "independent self-construal" (which involves defining yourself in terms of internal attributes, such as traits, rather than in terms of relationships with others), and lower for self-control, as having high "personality risk" for the dose of testosterone making them more aggressive – and this is what they found.

However, this personality effect was even stronger for the more than 200 men in the sample whose DNA analysis showed that they have a variation of the androgen receptor gene (that codes for the receptor that testosterone binds to) that makes the receptor more efficient. This "provides the clearest, albeit correlational, evidence to date that testosterone's effects on human aggression are likely AR [androgen receptor] dependent," the researchers write. They added that this is the first time that such fast-acting effects of testosterone on human social behaviour have been observed.

Further analysis revealed that for the men with the more efficient androgen receptor, testosterone didn't enhance the anger that they felt in response to being provoked — but it did boost the pleasure they derived from being aggressive.

This suggests that the dopaminergic system is involved in testosterone-promoted aggression. The high-risk personality traits noted in this study have also previously been linked to increased reward-related dopaminergic function, the researchers note. "If dopamine-mediated, testosterone may more strongly promote aggression among individuals with this personality profile because the profile may be indicative of an underlying hypersensitive dopaminergic system," Geniole and his colleagues write.

There are some caveats in relation to the work. One, of course, is that it shows correlations between personality and the androgen receptor gene on the one hand and testosterone-linked increases in aggression on the other, rather than demonstrating causal relationships between these factors. It also doesn't look at the effects of testosterone on aggression levels in individual men, but rather across the experimental groups. As the researchers note, further work will be needed to rule out other explanations for their findings. It will also need to look at groups other than white men, who were used in this study.

However, potentially there could be significant real-world implications. For example: "It will also be important to determine whether these interactive personality-risk effects extends to more chronic doses of testosterone, such as those used in the treatment of hypogonadism [testosterone deficiency]," the researchers note.

To access the full paper, please visit the article and follow the link at the very bottom:
https://journals.sagepub.com/doi/abs/10.1177/0956797619826970

Case Study : 'Testosterone increases the aggressiveness of some men more than others'

Links to Specification

3.1 Content

- 3.1.6 The role of hormones (e.g. testosterone) to explain human behaviour such as aggression.
- 3.1.8 Developmental psychology

3.2 Methods

- 3.2.1 Correlational research

3.6 Issues and debates

- Reductionism
- Nature-Nurture
- Issues of social control
- The use of psychological knowledge within society
- Issues related to socially sensitive research

9.1.2 Sampling techniques: random, stratified, volunteer and opportunity.

9.3 Issues and debates

- Reductionism
- Practical Issues in design
- Nature-Nurture
- Issues of social control
- The use of psychological knowledge within society
- Issues related to socially sensitive research

Recommended revision and research activities:

1. "Do you think personality or biology plays a bigger role in aggressive behaviour? *Use the findings from this article and any other research to support your argument.*

2. Using PubMed or Google Scholar (e.g., search: "dopamine aggression reward"), conduct further research to learn more about: Reward-based aggression, Dopamine release in response to dominance or control and/or Aggression as a pleasurable or motivated behaviour.

3. Challenge task: Using this article conduct some wider research to see how testosterone is used in medicine or sport.

Exam style questions

1. Explain one weakness of hormones as an explanation of aggression. (2)
2. Explain one weakness of this study. (2)
3. Explain one strength of this study. (2)

(Click here to view Model Response sections)

Additional questions for which the content of the article can be used as part of a response

1. Evaluate the use of correlational research to investigate aggression. (8)
2. Jake, is 15 and his friends have noticed he's become more irritable and enjoys arguing, especially when he feels challenged. Jake also has a naturally dominant personality and struggles with self-control. He says it "feels good" to put people in their place.

   Discuss using biological psychology why Jake has become aggressive. (8)

*Exam style questions are not necessarily the exact format of those that will appear in the qualification examination papers but are written to elicit student responses that meet the assessment criteria, which are exemplified by the answers provided. The length of response in the answers is not indicative of expected student responses, and are provided to support centre teaching, student practice and self-assessment.

Case Study : 'Testosterone increases the aggressiveness of some men more than others'

Model Response - Click here to return to question page

Exam style questions:

1. **Explain one weakness of hormones as an explanation of aggression. (2)**
   - One weakness of the hormone explanation of aggression is that Geniole found that testosterone did not increase anger from being provoked. Instead, it increased the pleasure derived from being aggressive. This points to the dopaminergic reward system being involved (linked to reward and motivation) rather than just having higher levels of testosterone as a reason for aggression. Suggesting that testosterone on its own it an incomplete explanation of aggression as other factors such as the dopamine reward pathway. Making it a reductionist explanation.

2. Explain one weakness of this study. (2)
   - One weakness of this study is its use of self report. For example, the participants completed a questionnaire that asked about their impressions of the game and the other player. It asked, for example, "Did it make you feel good when you stole points from your game partner?" And "To what extent did you become angry when your game partner stole points from you?" This could have led to demand characteristics because the ppts may have answered the questions in the way that they thought the researcher wanted them to, such as saying that they felt good when they stole points. This is a weakness as the responses given may have been inaccurate and therefore lower the overall validity of the results on testosterone and aggression.

3. Explain one strength of this study. (2)
   - One strength of this study is that the data collected was objective. For example, the participants gave a saliva sample, so their baseline testosterone level could be measured, and also a mouthwash sample, for DNA extraction. This is a strength because objective baseline levels collected from the saliva would be quantitative and therefore removes researchers bias from the interpretation of the results from the baseline levels of testosterone. This makes the study's results on factors such as personality affective aggression accurate and therefore valid.

Marks awarded and commentary

1. This response would achieve full marks: identifying a study that refutes the hormone hypothesis(1) and justifying that as an explanation on its own it is incomplete and theory reductionist.

2. This response would achieve full marks: identifying the weakness of self report (1) and justifying how the questions could lead to demand characteristics and therefore inaccurate results making it less valid(1).

3. This response would achieve full marks: identifying the data collected being objective(1) and justifying how the objective data removes researcher bias leading to accurate results being valid (1).

Case Study : 'Testosterone increases the aggressiveness of some men more than others

Model Responses - (Click here to return to question page)

Additional questions for which the content of the article can be used as part of a response

1. Evaluate the use of correlational research to investigate aggression. (8)

The following paragraphs could form part of the answer to this question:

(AO1) Correlational research investigates the relationship between two co variables. The two covariables are operationalised so that they can be measured. Correlations can determine if the relationship is positive (as one variable increases so does the other variable), negative (as one variable decreases the other variable increases) or if indeed there is no correlation.

(AO3) One weakness of using correlations to investigate aggression is that cause and effect conclusions cannot be drawn. This is because researchers can only determine a relationship between the two variables. For example, Ginole found correlations between personality and the androgen receptor gene on the one hand and testosterone-linked increases in aggression on the other, rather than demonstrating causal relationships between these factors. This is a limitation as there might be other factors involved in aggression and testosterone and therefore cause, and effect cannot be determined. Consequently, correlational research into aggression and hormones is less valid which lowers the application of the research into aggression to real life.

2**. Jake, is 15 and his friends have noticed he's become more irritable and enjoys arguing, especially when he feels challenged. Jake also has a naturally dominant personality and struggles with self-control. He says it "feels good" to put people in their place.**

Discuss using biological psychology why Jake has become aggressive. (8)

(AO1) Biological psychology suggests that there maybe relationship between genes and aggression. For example, Ginole found that in 200 men in the sample whose DNA analysis showed that they have a variation of the androgen receptor gene (that codes for the receptor that testosterone binds to) that makes the receptor more efficient. This "provides the clearest, albeit correlational, evidence to date that testosterone's effects on human aggression are likely AR [androgen receptor] dependent," the researchers write.

(AO2) This can explain why Jake's friends have started to notice that he enjoys arguing more, especially when he feels challenged. This could be due to Jake having the gene variation on the androgen receptor gene. This causes his gene to be more efficient and therefore more likely Jake will be irritable or enjoy arguing. The consequence is that the variant on his gene affects his testosterone levels and therefore the reason why he struggles with self control.

Level awarded and commentary

1. Evaluate the use of correlational research to investigate aggression. (8)
The first paragraph (AO1) demonstrates accurate and thorough knowledge and understanding of correlations. Paragraph two (AO3) identifies the weakness of a lack of cause and effect, which is then exemplified by the study. This is followed by a justification linked to lack of real- world application. AO3 is linked to the question and is not generic With the inclusion of a competing argument and similarly structured paragraphs including other features of correlations this would be a level 4 response overall.

2. Discus using biological psychology why Jake has become aggressive. (8)
The first paragraph (AO1) demonstrates accurate and thorough knowledge of a biological factor linked to the study. Paragraph two (AO2) is applied to Jake to explain why he is behaving aggressively. With the inclusion of other biological factors and competing arguments this would be a level 4 response overall.