

Gov 50.08: Biology & Genes

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1

Learning Objectives

- Explain the connection between testosterone and aggression.
- Develop hypotheses about the effects of testosterone on foreign policy behavior.
- Explain existing IR research that tests claims about testosterone at the micro- and macro-levels.
- Explain how a "neurobiological approach" assesses individual variation in political violence.
- Identify the relationship between MAOA-L and propensity for violence.
- Evaluate the implications of neurobiological research for IR research and policy.

2

Biology, Psychology, and IR

- **Basic premise:** individual differences in propensity for aggression can help predict political violence/foreign policy aggression.
- Biological factors – including genes and biochemistry (hormones) – explain variation in levels of aggression.
- But we know that $B=f(P,E)$.
 - The environment matters, too.



3

Does high testosterone predict foreign policy aggression?

- Some things we know about testosterone:
 - There is variance in base testosterone levels among humans.
 - Base levels are much higher in men than women.
 - >40% of the variance is hereditary.
 - Levels slowly and predictably decline over time, especially in men.

4

Does high testosterone predict foreign policy aggression?

- Some things we know about the link between testosterone and aggression:
 - T levels predict aggression, dominance, and sensation-seeking.
 - Evidence from animal studies: "the relationship between testosterone and aggression has repeatedly been observed" (Rosen 2005, p. 77).
 - Status moderates the effect: macaques at the top of the status hierarchy are 3x more aggressive than low status.
 - On average, men commit more violent crime/display more aggressive behavior than women.
 - There are also some differences within male and female populations.

5

Testosterone and Aggression in Simulated Crisis Game

- McDermott, Johnson, Cowden, and Rosen (2007) want to understand the relationship between testosterone and aggression in foreign policy crises.
- What is their empirical approach?

6

Testosterone and Aggression in Simulated Crisis Game

- Laboratory simulation game:
 - Pretend to be a world leader in conflict with a neighbor over newly discovered diamond mines. Mine workers in the disputed territory were killed – time to deal with a crisis.
 - \$100 million fake endowment, which could be used to a) **buy army battalions** (\$10 mil/each), b) **increase industrial production**. Whomever ends the game with the most industrial production wins (and gets a \$10 bonus in real life).
 - Across 6 rounds, choose whether to do nothing, negotiate, threaten, or go to war with the partner.
 - If war, probability of victory related to the # of battalions. Losing a war costs all the battalions, plus money from the industrial production account (in short: bad to lose a war!).
 - Communication in each round about the # of battalions, bluffing allowed.
 - Measure T levels pre-game, mid-game, and at the end.

7

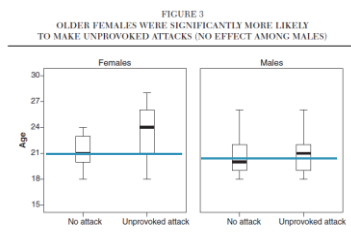
Testosterone and Aggression in Simulated Crisis Game

- What were their expectations/hypotheses?
 - Younger males will have higher levels of testosterone and show greater aggression.
 - Older females will have higher levels of testosterone and show greater aggression.
 - Individuals with higher levels of testosterone will be more likely to engage in aggressive action than those who possess relatively lower levels of testosterone.
 - Men in long-term relationships will be less likely to engage in aggressive action than their unmarried or divorced counterparts.

8

Testosterone and Aggression in Simulated Crisis Game

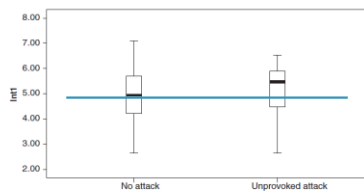
- "... those women who made unprovoked attacks were significantly older than the women who did not attack" (McDermott et al. 2007 p. 25).



9

Testosterone and Aggression in Simulated Crisis Game

FIGURE 6
SUBJECTS WITH HIGHER INITIAL LEVELS OF TESTOSTERONE
WERE SIGNIFICANTLY MORE LIKELY TO MAKE UNPROVOKED
ATTACKS ON THEIR OPPONENTS



NOTE: There was no such effect within either sex alone, suggesting this relationship is driven by male-female differences: males have higher testosterone and attack more.

10

Testosterone and Aggression in Simulated Crisis Game

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11

Testosterone and Conflict

- "The strongest and clearest finding that this study generates is that high-testosterone individuals are more likely to engage in unprovoked attacks against their opponents. Since testosterone is about five times higher in men, and men engage in such fights more than women, there is an automatic statistical link between testosterone and aggression that is hard to separate from other possible gender-based causes" (p. 31).
- Based on what we know about testosterone and aggression, craft a) one testable hypothesis about the relationship between testosterone and international conflict or foreign policy attitudes, and b) an approach to researching it.

12

Testosterone and Conflict

- Two examples:
 - Horowitz, McDermott, and Stam (2015) investigate the relationship between leader age, regime type, and militarized interstate dispute initiation.
 - Results:
 - On average & in democracies, older leaders are more likely to initiate disputes.
 - In personalist dictatorships, younger leaders are more likely to initiate disputes.

13

Testosterone and Conflict

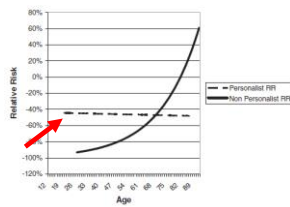


Figure 6. Impact of Personalist Regimes on Relative Risk of Dispute Initiation for State A—Including Age-Regime Type Interaction
NOTE: The figure was produced using the `postest2` command in STATA 8.0. The relative risks were calculated by dividing the risk at a given age from the baseline risk, the state A median leader age in a state A baseline regime.

14

Testosterone and Conflict

- Two examples:
 - Horowitz, Ellis, and Stam (2015) investigate the relationship between gender and conflict initiation.

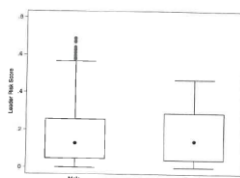
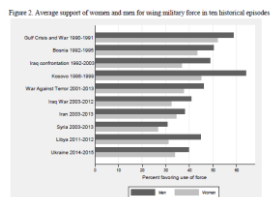


FIGURE 1.1. Comparing the risk scores of male and female leaders.



Source: Eichenberg (2017)

15

Can genes explain political violence?

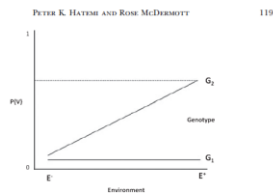
- Hatemi and McDermott (2012) argue that a complete understanding of political violence requires a closer look at individual differences.
- What are the alternative explanations for political violence that they discuss?
- Describe the "behavior-genetic approach." How does it complement existing theories about political violence?



16

Can genes explain political violence?

- Genes "provide the platform for the synthesis of proteins which then trigger a series of chemical processes which have neurological, cognitive, and emotive implications among other effects, dependent on environmental cues" (117).



17

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18

The "Warrior Gene"

- Monoamine oxidase A (MAOA) gene
 - Low-activity version (MAOA-L) is found in roughly 33% of Western men, and is a less active, shorter allele on the X chromosome.
- "In many, many studies it appears implicated in behaviors that look like they're related to physical aggression or some kind of conduct disorder" (Rose McDermott).



19

The "Warrior Gene"

- 2009 experiment: Why do some individuals engage in costly punishment?
- **Independent variables:** 1) how much money an anonymous partner takes from a game participant and 2) **MAOA-L/MAOA-H**
- **Dependent variable:** amount of hot sauce administered to the person who took earnings.



20

The "Warrior Gene"

Monoamine oxidase A gene (MAOA) predicts behavioral aggression following provocation

Rose McDermott¹, Dustin Tingley^{2,3}, Jonathan Cowden⁴, Giovanni Frazzetto⁵, and Dominic D. P. Johnson^{6,7}

- "Low-activity MAOA subjects displayed slightly higher levels of aggression overall than high-activity MAOA subjects."
- This relationship was stronger in the high-provocation condition, suggesting an important interaction between genes and the environment/situation.

21

Can genes explain political violence?

- "There is no such thing as a gene for aggression, there is no such thing as a gene for fear, or a gene for Republicanism. It's much more complicated" ([Rose McDermott](#)).
- Expression of aggression among people with MAOA-L more likely among those who experience traumatic childhoods.
- What is the connection between genes and the propensity to engage in political violence – and how might that inform prevention strategies?
- What are the ethical implications of this approach?

22

Fin.

Next time: How IR affects individuals

23