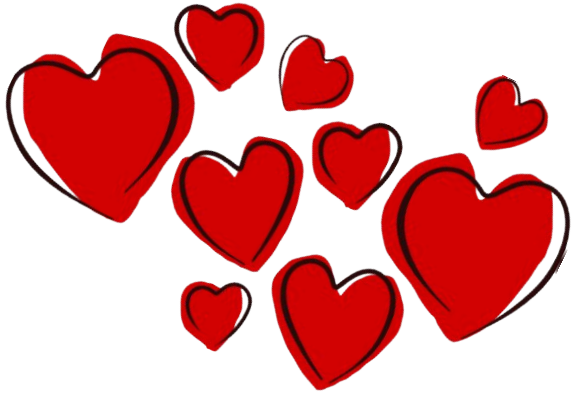
Team Croc Explores Oxytocin



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Research Question & Hypothesis

Cat and Happy	Dog and Happy	Crocodile and Happy
Cat and Sad	Dog and Sad	Crocodile and Sad

- Sitting with different types of pets (cat, dog, crocodile) and experiencing different types of memories (happy and sad) will change blood oxytocin level
  - **cat** or **dog** or **happy**: blood oxytocin levels increase by at least 0.05 pg/mL
  - **crocodile** or **sad**: blood oxytocin levels decrease by at least 0.05 pg/mL
- Curious to know interactional effects between the two factors

Variables

- Factors: sitting with a cat, dog, or crocodile (each for 10 mins) as well as experiencing happy or sad memories (each for 1 min)
- Response: change in blood oxytocin level in pg/mL before and after treatment
- Nuisance: blocking for gender
- Uncontrolled: treatment order, subject's location, wealth, marriage status, etc
    - randomize sampling and assignment to treatment to prevent influence

Experimental Design

- Completely randomized 2x3 factorial design with blocking
- Using sample() in R
  - Randomly generated 5 digit phone numbers
  - Randomly assigned treatment order as well as treatments to subjects
- We wanted to detect a relatively small difference in sample means of 0.05 pg/mL which is about 0.35 standard deviations
- In order to have a power of 0.7 we needed 16 repetitions (8 per block)

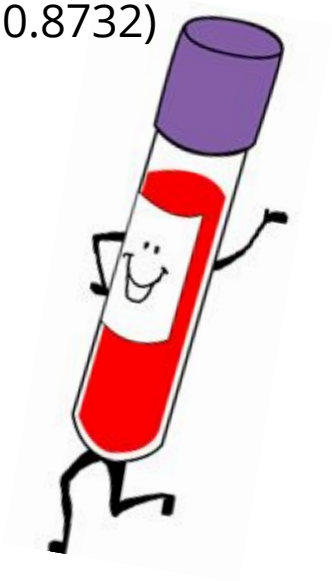
Data Analysis

Not Significant

- Sitting with different types of pets (cat, dog, or crocodile) has no significant impact on blood oxytocin level. ($p = 0.1675$)
- The interaction between the two treatments is not significant. ($p = 0.8732$)

Significant

- Experiencing different types of memories (happy or sad) has a significant impact on blood oxytocin level. ($p = 0.0101$)
- We were correct in blocking by gender because there is a significant difference in the variation of the groups. ($p = 0.0392$)

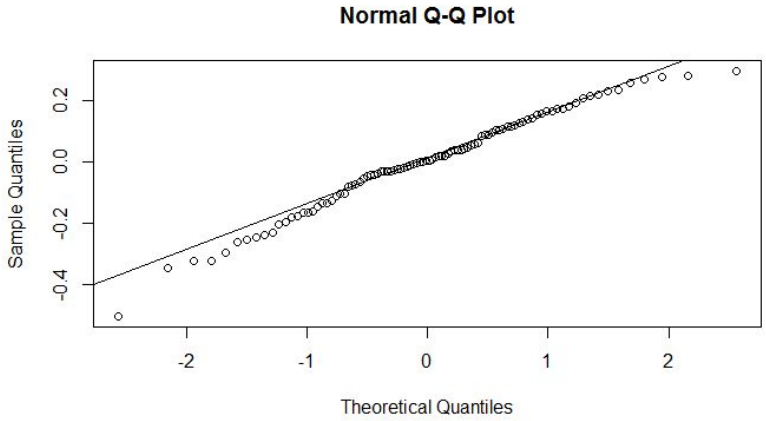


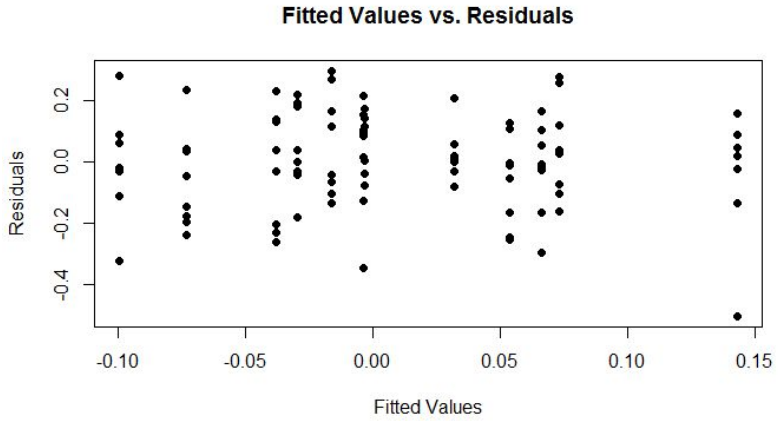
Data Analysis: Final Model and Residual Analysis

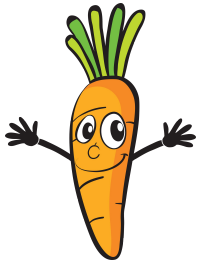
Regression Model

➢ Δ blood oxytocin level = $0.01771 - 0.08792x_{Memory\_Sad} + 0.07000x_{Gender\_Male}$

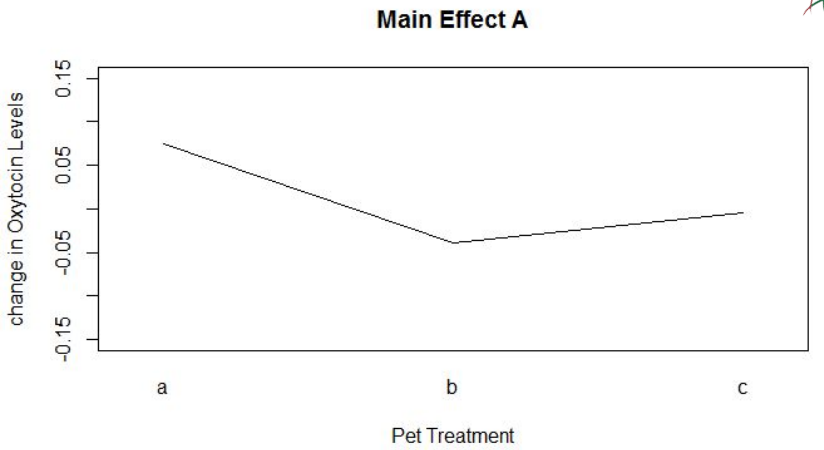
Residual Analysis

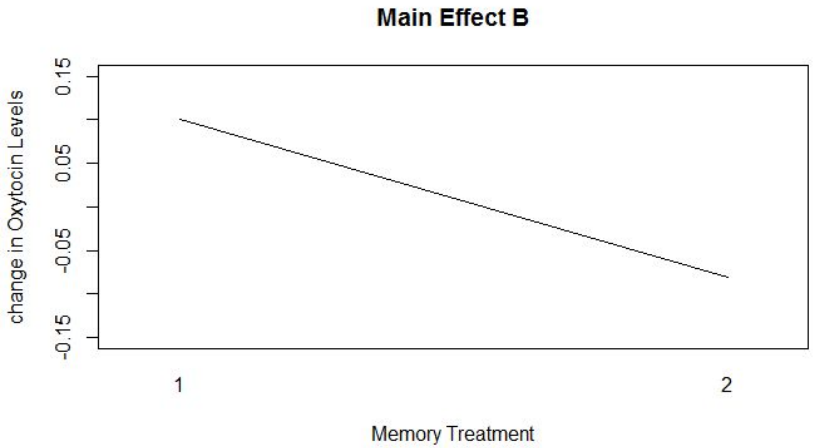




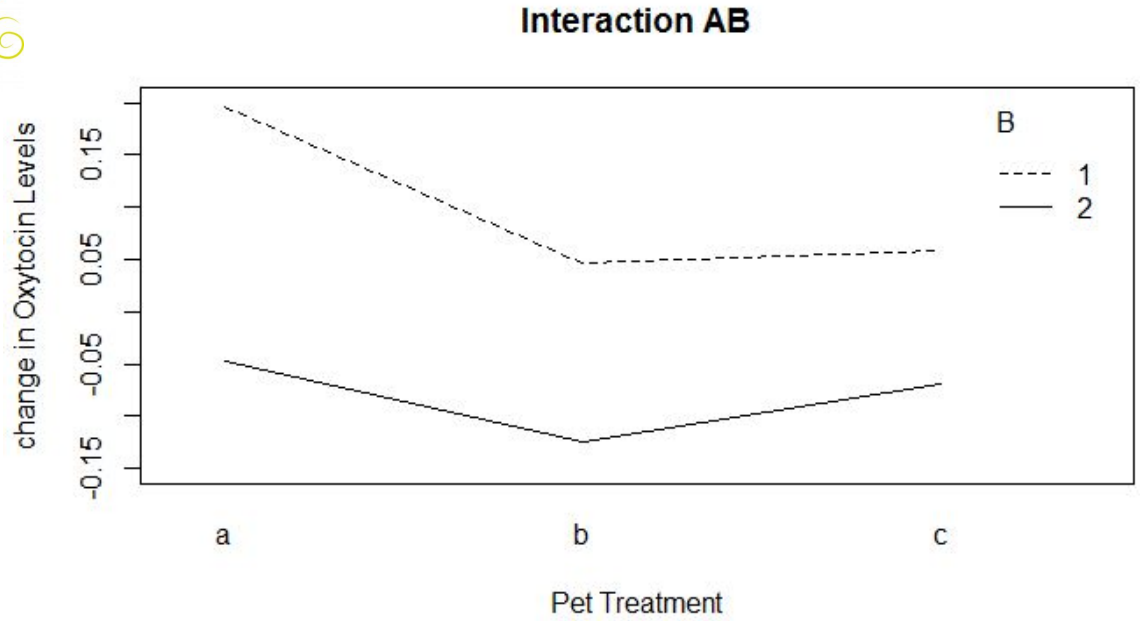


Data Analysis: Main Effects Plots





Data Analysis: Interaction Plot



Conclusions

- Two ways to interpret results:
  - As if we are studying a computer simulation
  - As if we were studying real people

Conclusions

- As if we are studying computer simulation…
  - Memories, but not pets, impact oxytocin levels
  - Experiencing memories categorized as “Mental Task”
    - Programmers would very likely include a mental (neurochemical) effect
  - Sitting with pets categorized as “Environment”
    - Programmers wouldn’t necessarily include a mental (neurochemical) effect

Conclusions

- As if we are studying real people...
  - Oxytocin related to social contact & bonding
  - Memories impact oxytocin levels
    - Integrated society in which positive/negative memories are social
  - Animals do not impact oxytocin levels
    - Society in which animals are not seen as companions

We thank you for listening with some TBT pics