




## Effects of Temperament and Animal Handling on Fertility

**Applied Reproductive Strategies in Beef Cattle**

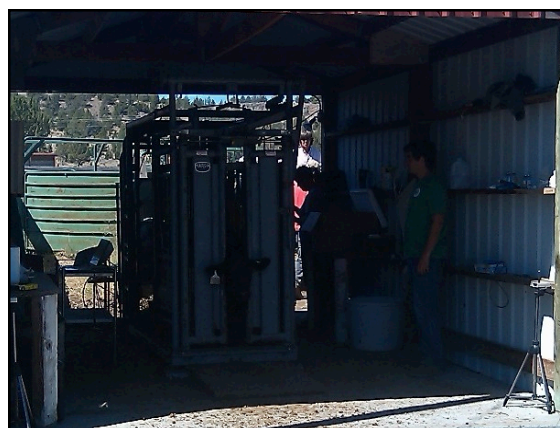
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Oregon State University – EOARC, Burns

### What is Temperament?

- Behavioral responses of cattle when exposed to human handling
- As cattle temperament worsens
  - Response to human contact becomes more agitated and/or aggressive
- Selection for temperament (docility)
  - Heritable trait – up to  $h^2 = 0.50$
  - Mainly for safety reasons
  - Productive implications not well established

### How to assess temperament?

- Chute Score
  - Cattle are individually restrained in the chute
  - Scored in 1-5 scale according to behavior
    1. Calm with no movement
    2. Restless movement
    3. Frequent movement with vocalization
    4. Constant movement, vocalization, shaking of chute
    5. Violent and continuous struggling
      - Better open the chute, otherwise buy another one



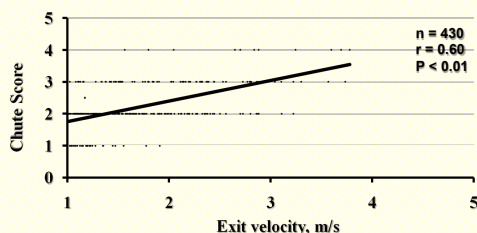
### How to assess temperament?

- Exit Velocity or Score
  - Speed of cattle after it leaves the chute
  - Methods for measurement
    - Electronic
      - Establish distance to be traveled by the animal (feet)
      - Measure time (chronometer, infrared sensor in seconds)
      - Classify animals according to speed (feet/second)
    - Visual
      1. Walks away from the chute
      2. Trots away from the chute
      3. Runs away from the chute



## How to assess temperament? Chute Score and Exit Velocity

- Use scores individually
- Average both scores = **Temperament Score**



Cooke et al. (2009)

## How to assess temperament? Temperament type

- Based on Temperament Score
  - Adequate temperament (TS ≤ 3)
  - Excitable temperament (TS > 3)
- Maintain “some” temperament in the herd
  - Without impairing safety and productive traits
  - Cow-calf systems
    - Pairs survive challenges of extensive environments
  - Feedlot systems
    - Competition for bunk space

## Factors that affect temperament

- Sex
  - Females are more temperamental
- Age
  - Young animals are more temperamental
- Production system
  - Range animals are more temperamental
- Breed type
  - Brahman animals are more temperamental
- **HANDLING**

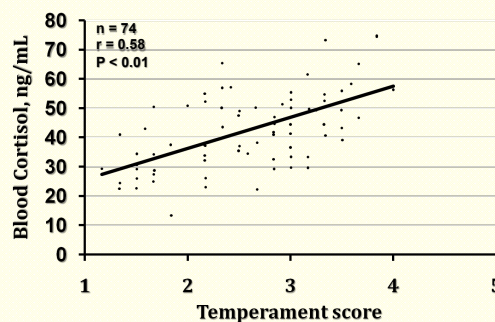
## Temperament x Production traits What's the relationship?

- Excitable temperament is a stress response
- What is a stress response?
  - Reaction to factors that influence well-being
    - Psychologic stress – Fear
  - Failure to cope with human presence/handling
    - Become aggressive → **Stressed animal**
    - **Response not only behavioral!**
    - Several detrimental effects on production

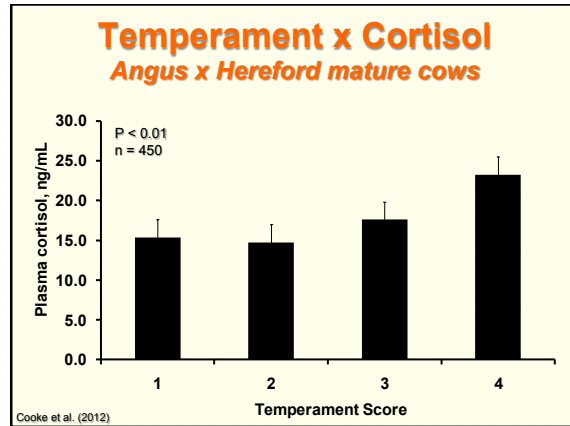
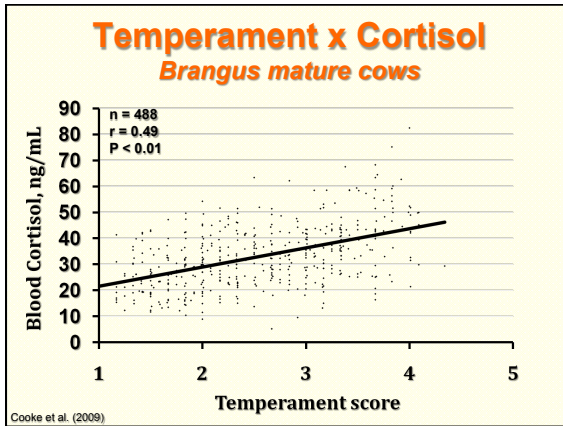
## Temperament x Production traits What's the relationship?

- Excitable temperament
  - Stimulates several hormonal response
    - Epinephrine
    - Inflammatory processes
  - One culminates with **cortisol** production
    - Known as the stress hormone
    - Our area of research
  - Several studies confirmed that temperamental cattle have increased cortisol concentrations.
    - Cow-calf and feedlot scenarios

## Temperament x Cortisol Brangus replacement heifers



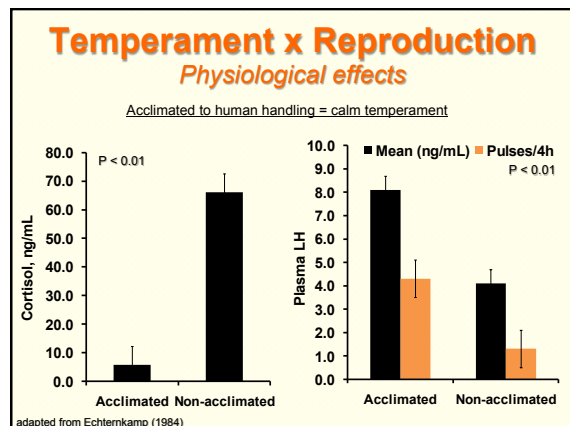
Cooke et al. (2009)

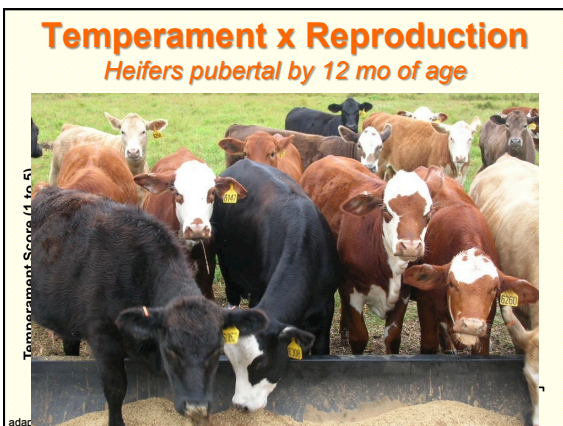
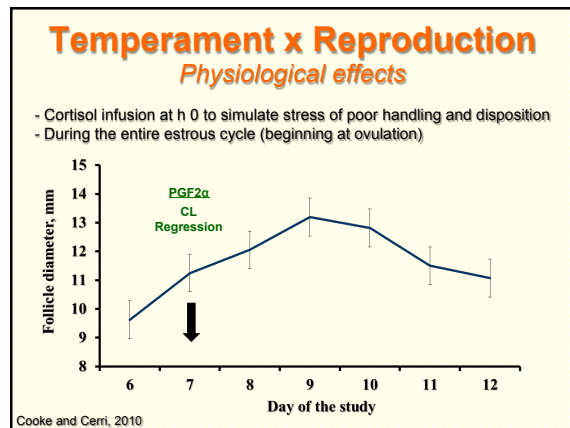
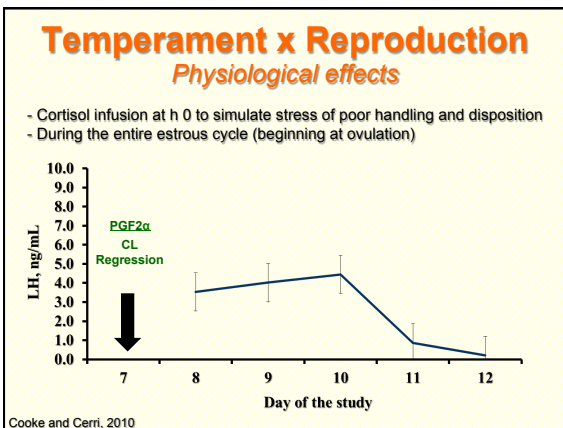
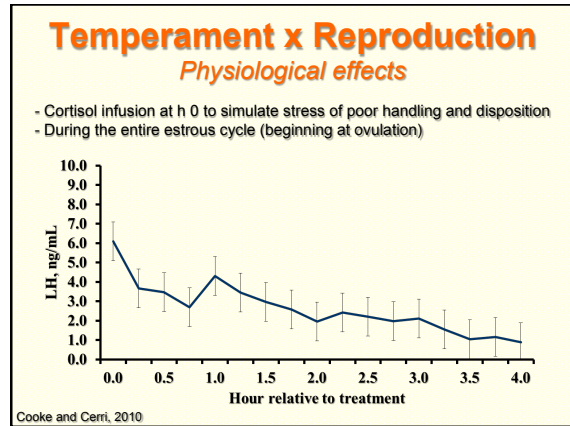
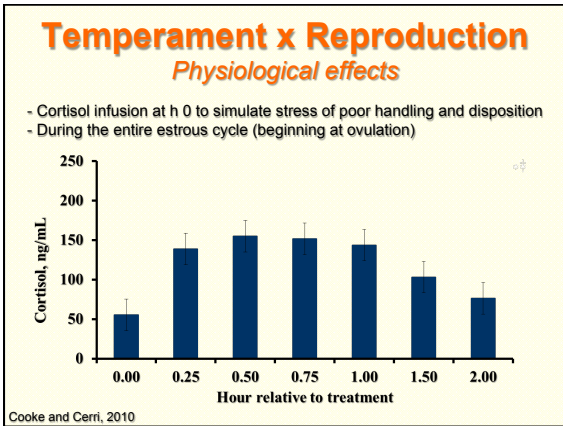


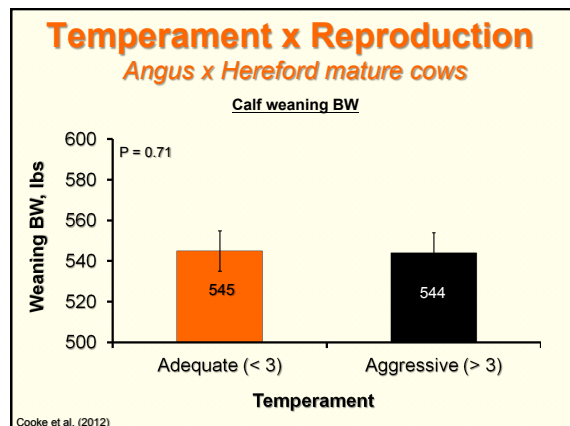
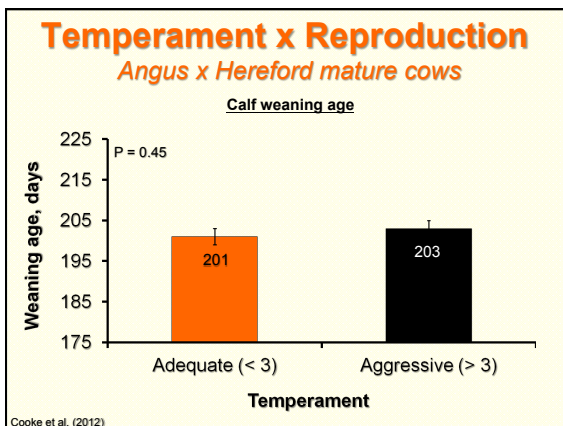
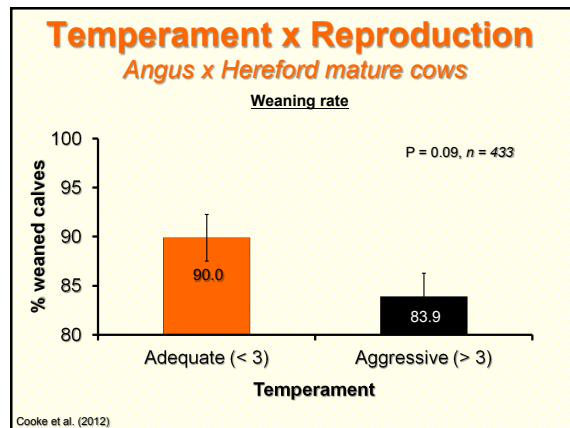
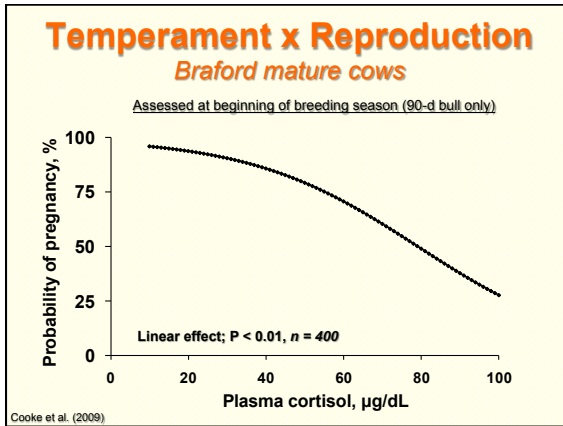
- ### Effects of Stress Hormones
- Prepare the animal to fight the stressor!
    - Cortisol, in addition to other hormones
      - Epinephrine, norepinephrine, CRH, ACTH
    - “Fight or flight response”
      - Increased heart beat, respiration, metabolism
        - Requires a lot of nutrients
    - Detrimental effects on other aspects
      - Growth
      - Immune response
      - Reproduction

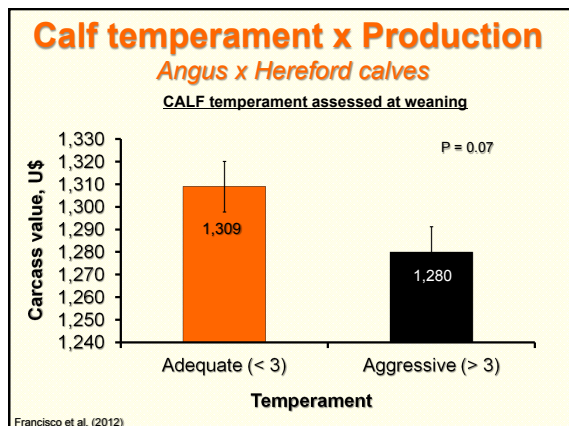
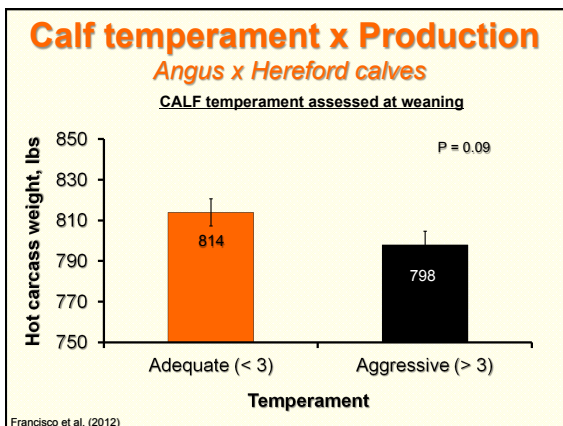
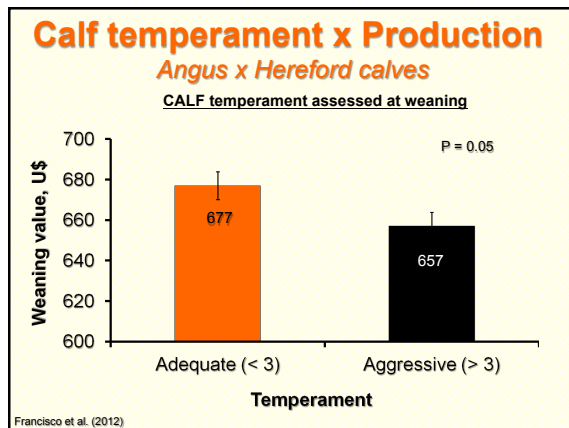
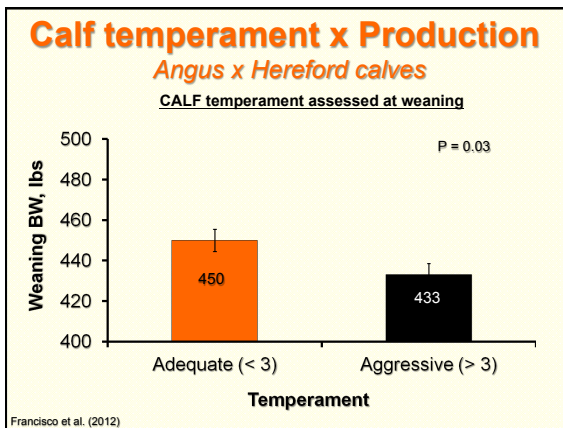
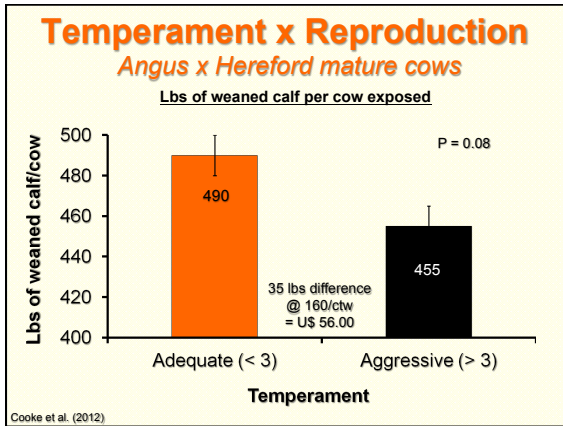
## How Temperament May Affect Cattle Reproduction?

- ### Temperament x Reproduction
- Indirect effects?
    - Reducing feed intake and nutritional status
      - Increased metabolism = Nutrient sink
  - Physiological effects?
    - CRH – ACTH - cortisol axis
      - Impairs GnRH - LH/FSH - ovarian axis
      - Pregnancy maintenance
  - Genetic effects?
    - Relationship among behavioral and reproductive traits is still unknown – deserves investigation









### Initial Conclusions

- Excitable temperament is detrimental to:
  - Reproductive performance of females
  - Production efficiency of the calf crop
- But how?
  - Nutritional status was accounted in studies
  - Physiological effects (cortisol, *what else?*)
  - Genetic relationship
    - Still unknown... Future efforts
- Improve temperament of the cowherd
  - Benefit production in beef operations. But how?

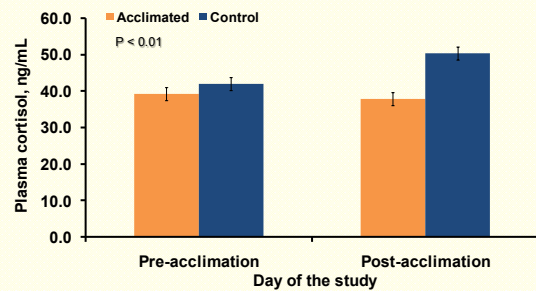
### Improving Temperament

- Acclimate cattle to human handling
  - Research studies conducted at UF and EOARC
- Grazing heifers
  - UF = Brangus/Braford
  - OSU = Angus x Hereford
  - Exposed or not to acclimation after weaning
    - 4 weeks total
  - Brought to the cowpens 3x/week
    - Exposed to common handling procedures
  - Growth, temperament, and reproduction



### Acclimation of Heifers - UF

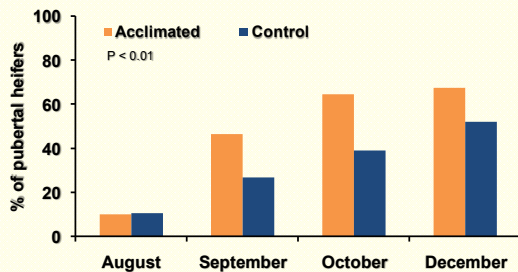
- After the acclimation process



Cooke et al. (2009)

### Acclimation of Heifers - UF

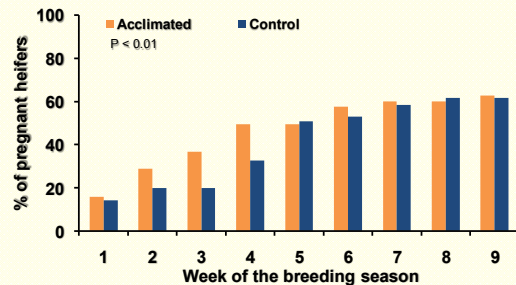
- Puberty attainment during the study



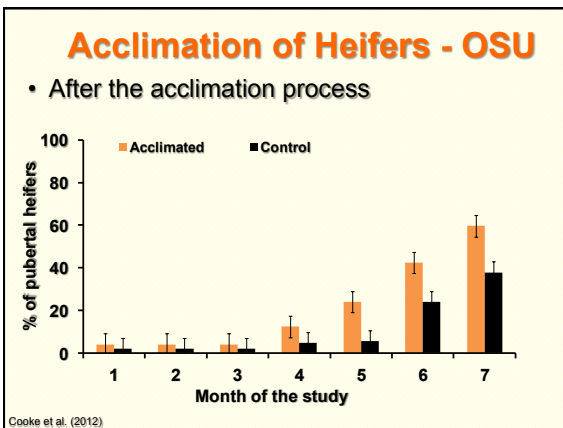
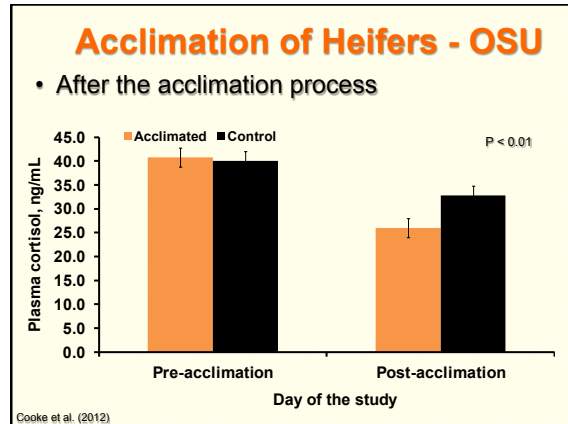
Cooke et al. (2009)

### Acclimation of Heifers - UF

- Pregnancy during the breeding season



Cooke et al. (2009)



- ### Acclimation of Heifers
- Acclimation of heifers to human handling
    - Decreased cortisol concentrations
    - Hastened reproductive development
    - Independent of breed type
  - Effects on mature cows?
    - No positive effects detected
    - Improve temperament of mature cowherd
      - Include temperament in selection/culling criteria
      - Overall positive effect in the herd = heritable trait
    - Proper cattle handling

- ### Conclusions
- Excitable temperament is detrimental to:
    - Reproductive performance of females
    - **Overall productivity of beef operations**
      - Independent of breed type
  - How?
    - Physiological + Genetic effects
    - Worse when cattle are not handled properly
  - Improve temperament of the cowherd
    - Benefit production in beef operations
      - Selection for temperament / acclimation to handling

