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Introduction

- Stressful events early in life increase the risk for stress-related illness later in life
- In rats, the adult stress response is mediated by early postnatal experiences
- Adult offspring of mothers with high levels of maternal care showed reduced levels of stress
- Understanding the factors that influence maternal care behavior is critical for understanding what controls stress responses in offspring
- Endogenous sex hormones during pregnancy influence maternal care
- How hormone disruption affects maternal care is not well understood
- Hypothesis: Exposure to extreme levels of sex steroid hormones during gestation will alter levels of maternal care behavior

Methods

- Pregnant dams were dosed with dihydrotestosterone propionate (DHTP, 8 mg/kg), estradiol benzoate (EB, 50 µg/kg) or corn oil on gestational days 15.5-17.5
- Litter sizes and sex ratios were standardized to 4 males and 4 females
- Home cage videos on days 7 and 14 post birth:
 - Cage moved to isolated room
 - 10 minutes of habituation
 - 20 minute video taken
 - Move cage back
- Home cage videos analyzed using Jwatcher software

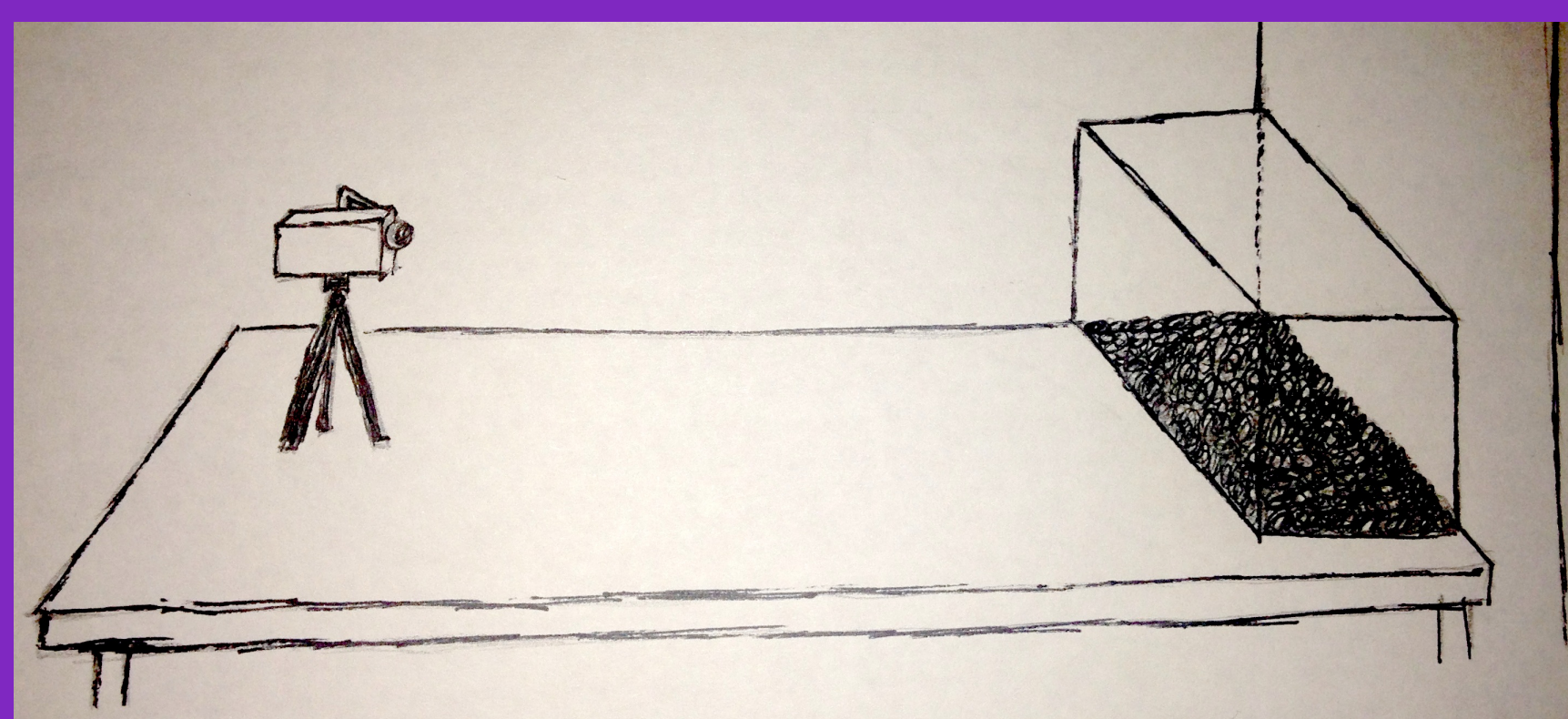


Figure 1. Home cage video set-up

Results

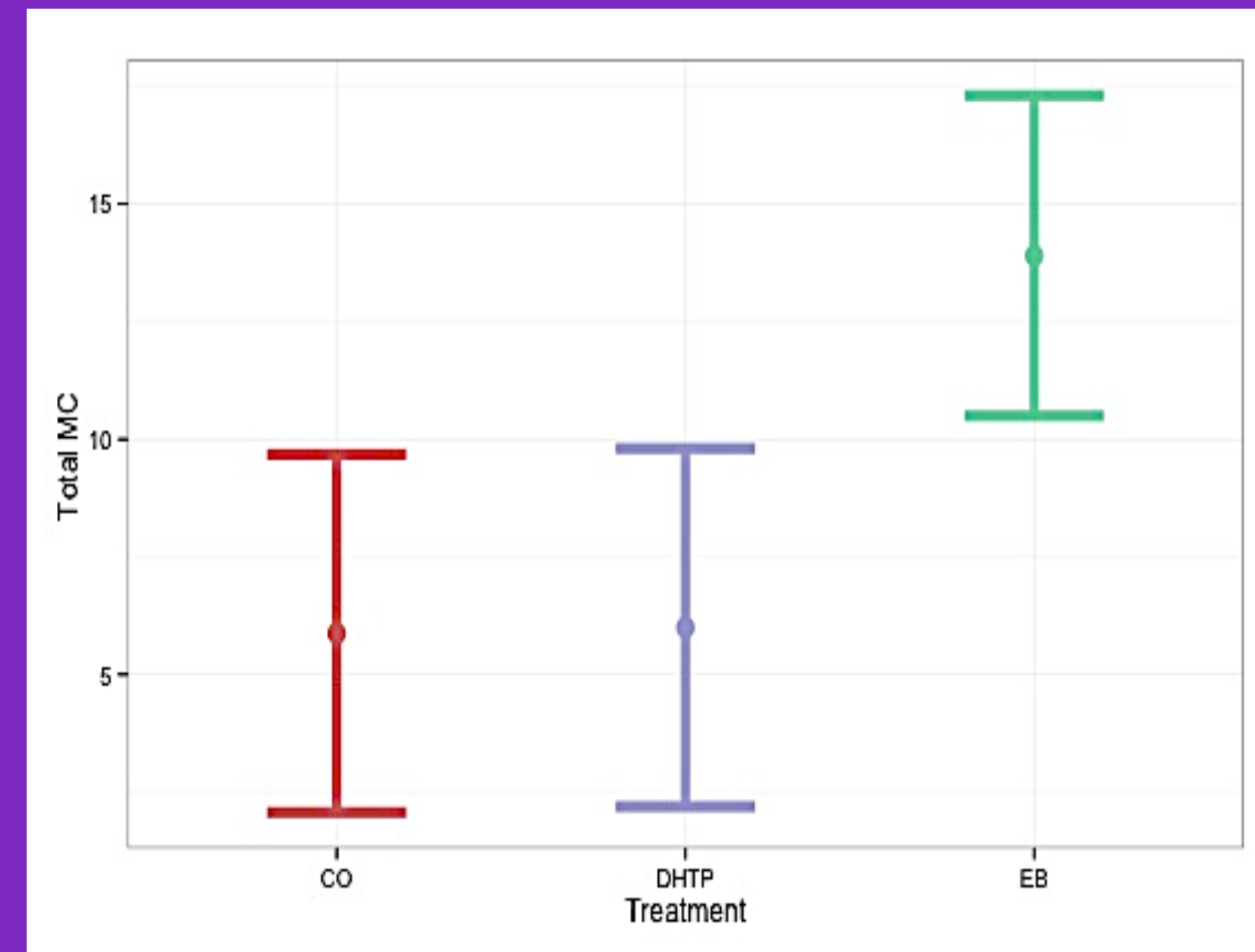


Figure 2. Means and standard error for total maternal care (MC) behavior separated by treatment groups on days 7 and 14. These behaviors included carries, arched nursing, licking and grooming, and passive nursing.

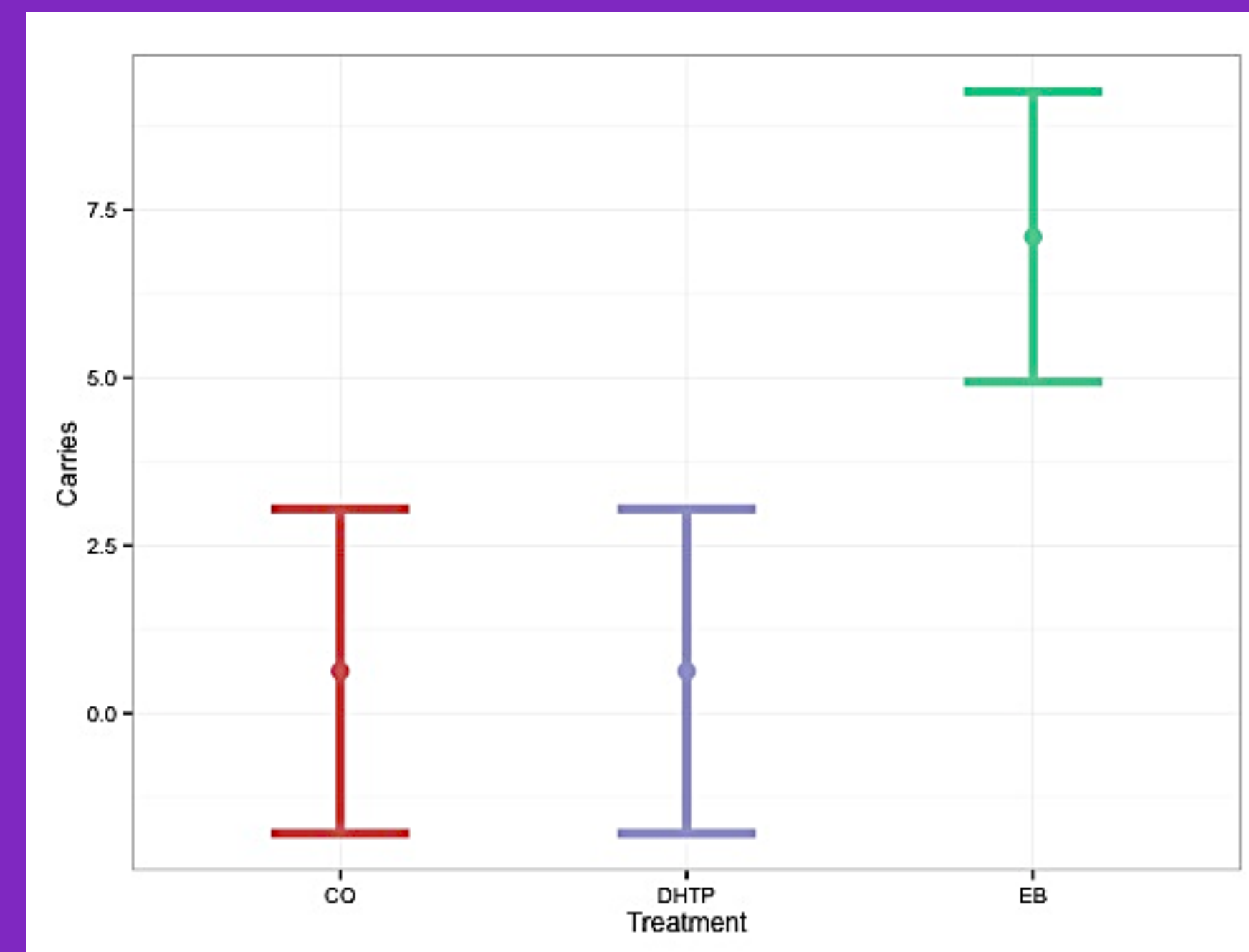


Figure 3. Means and standard error for carries separated by treatment groups on days 7 and 14. Moving the pups around indicates “motivation” to be maternal.

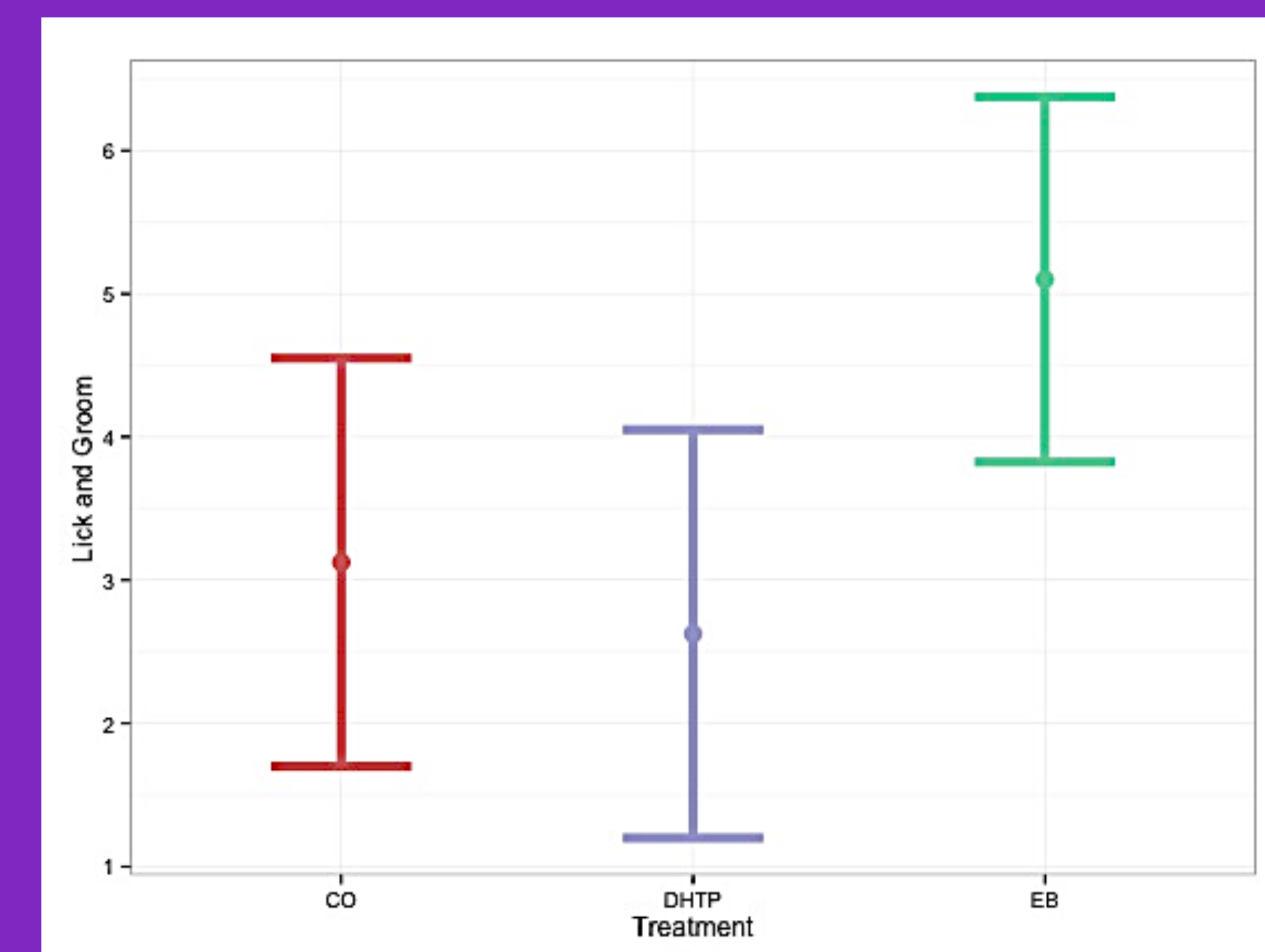


Figure 4. Means and standard error for licking and grooming separated by treatment group. Important for stimulation of neurological and emotional development.

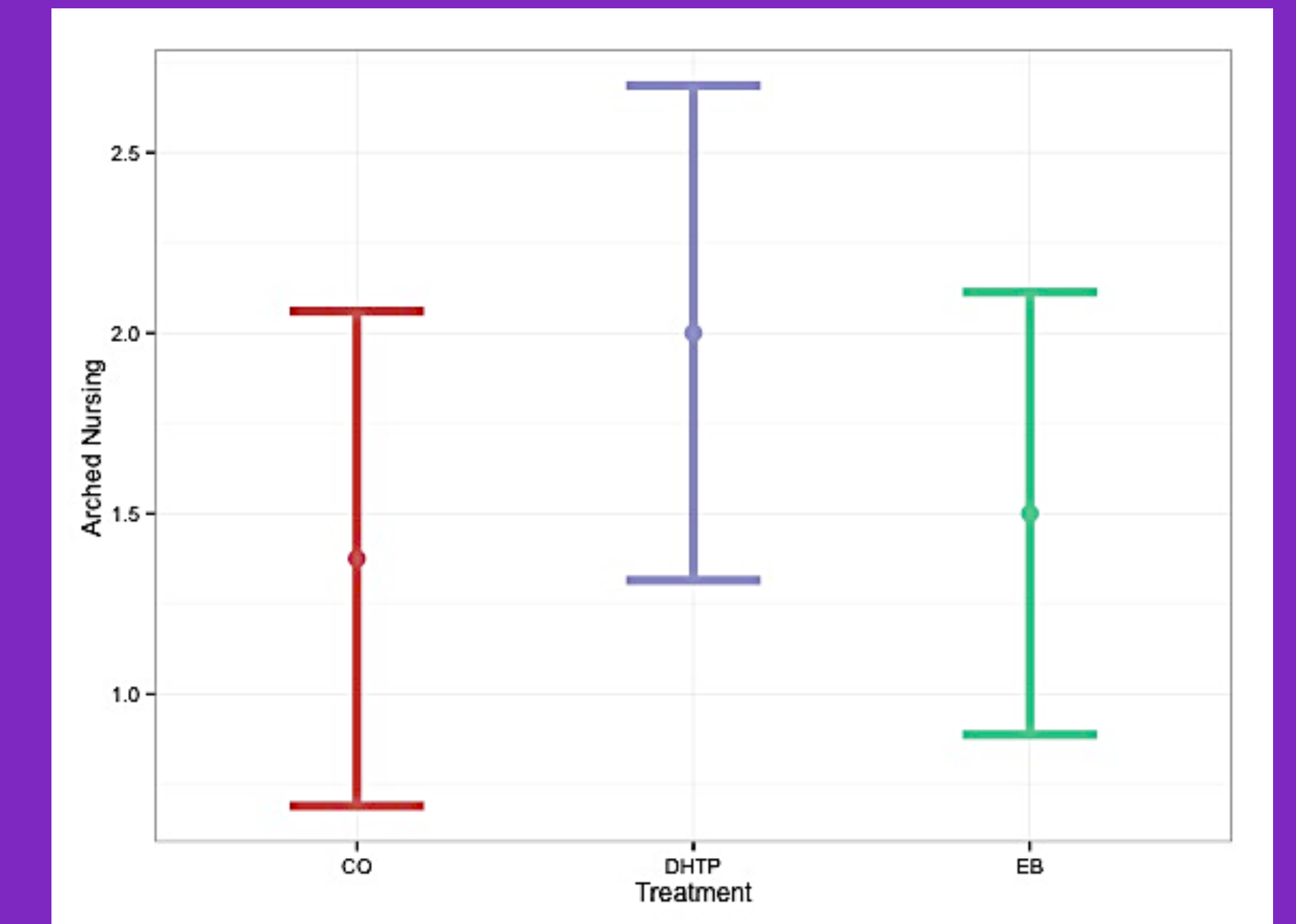


Figure 4. Means and standard error for arched nursing separated by treatment groups. Arched nursing is important in development of pups; gives pups access to milk, regulates their temperature, and protection from the environment.

Ethogram

- Carrying: mother picks up a pup and moves it
- Arched nursing: mother’s back is arched during nursing
- Licking and grooming: mother licks and/or grooms pups

Discussion

- EB treatment groups showed an increase in maternal care overall.
- Carrying behavior showed increase in the EB treatment group.
- Licking and grooming behavior showed increase in the EB treatment group.
- Arched nursing behavior showed slight increase in the DHTP treatment group.

Future Directions

- Continued analysis of maternal care behavior
- Evaluation of stress response in the offspring:
 - Induced stress test behavior
 - Physiological measures (cortisol in blood and fecal samples)