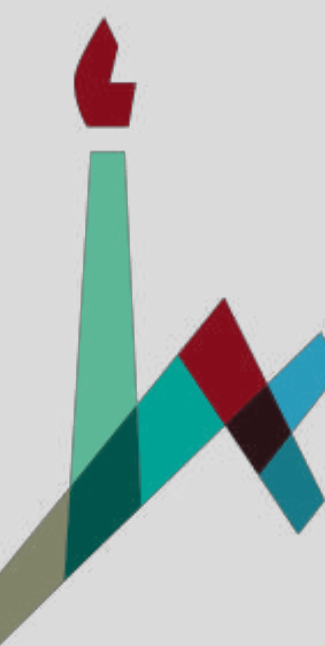


Plasticity in Auditory Cortex During Fatherhood

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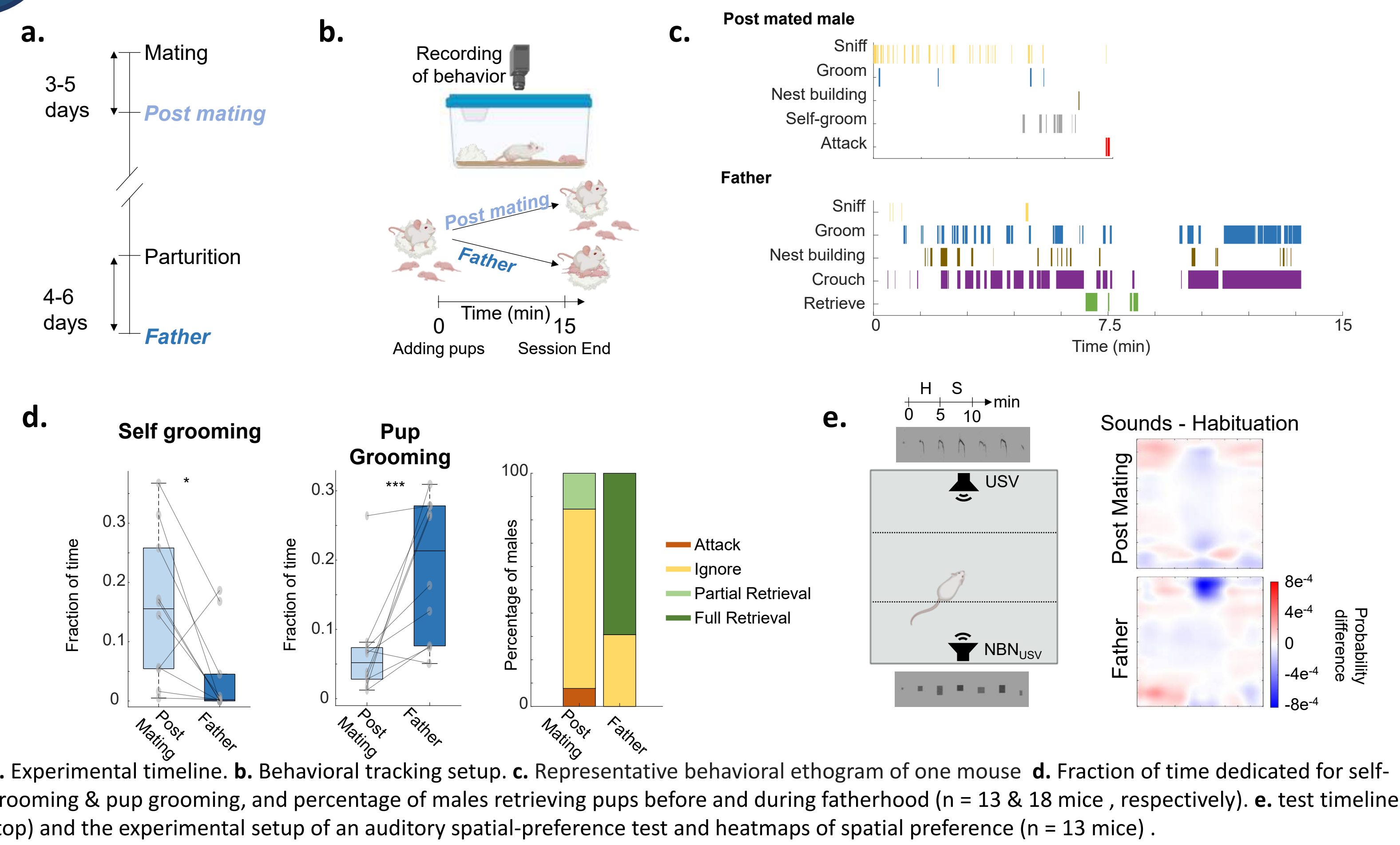
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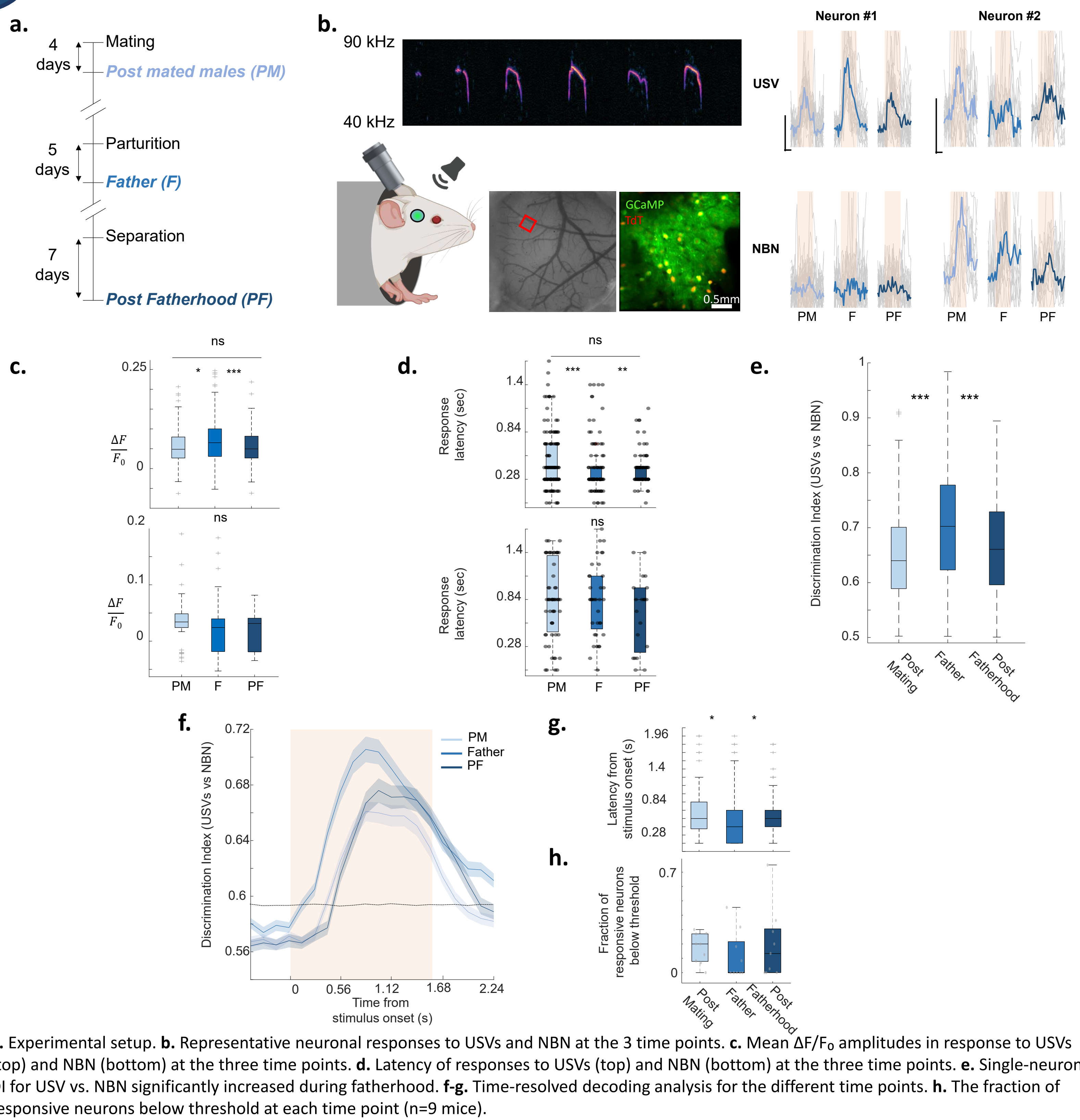
BACKGROUND

Parental care is a fundamental and highly prevalent behavior found throughout the animal kingdom. Parental behavior is sexually dimorphic and varies across species and strains. In mammals, the female is the main caregiver and only 3-5% of mammalian species exhibit paternal care. Becoming a parent is accompanied by significant physiological, hormonal, and behavioral changes that enable optimal care of the offspring. Although less studied compared to females, males also undergo significant behavioral changes, including a shift from infanticide of pups to paternal care. The mechanisms behind this remarkable behavioral transition are still unknown. Here we studied behavioral, physiological and hormonal-related events in male mice following fatherhood, focusing on the auditory cortex.

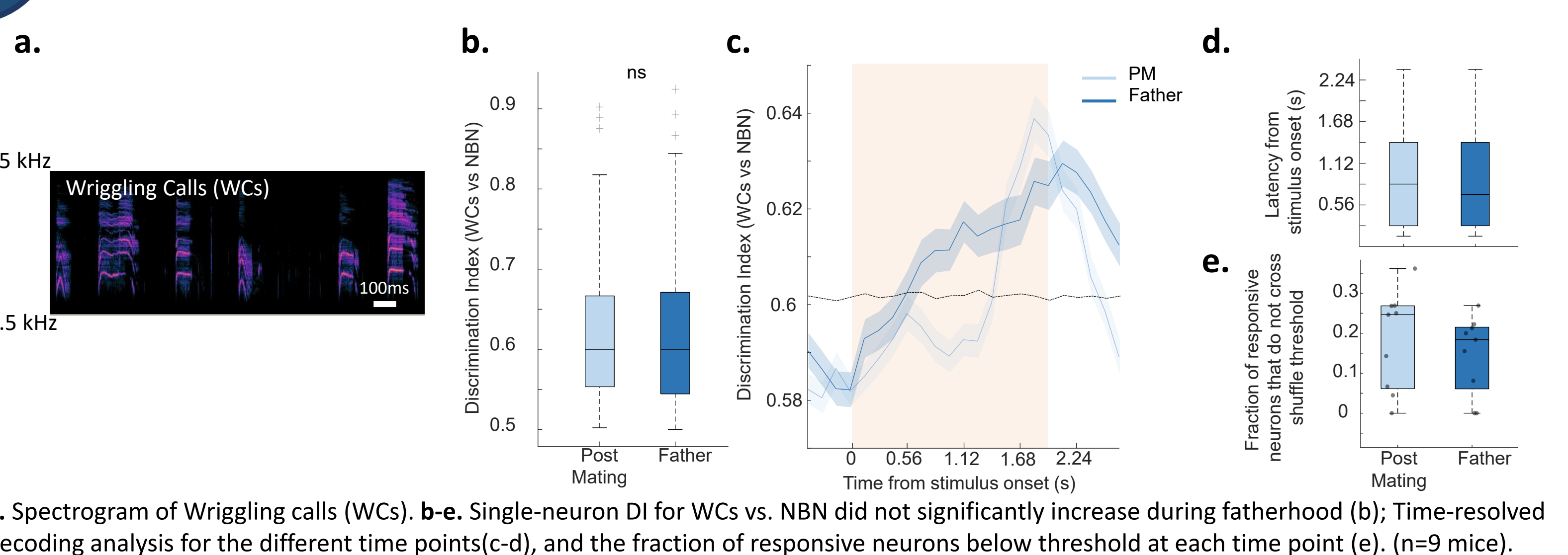
1 Fatherhood induces a transient shift to paternal care



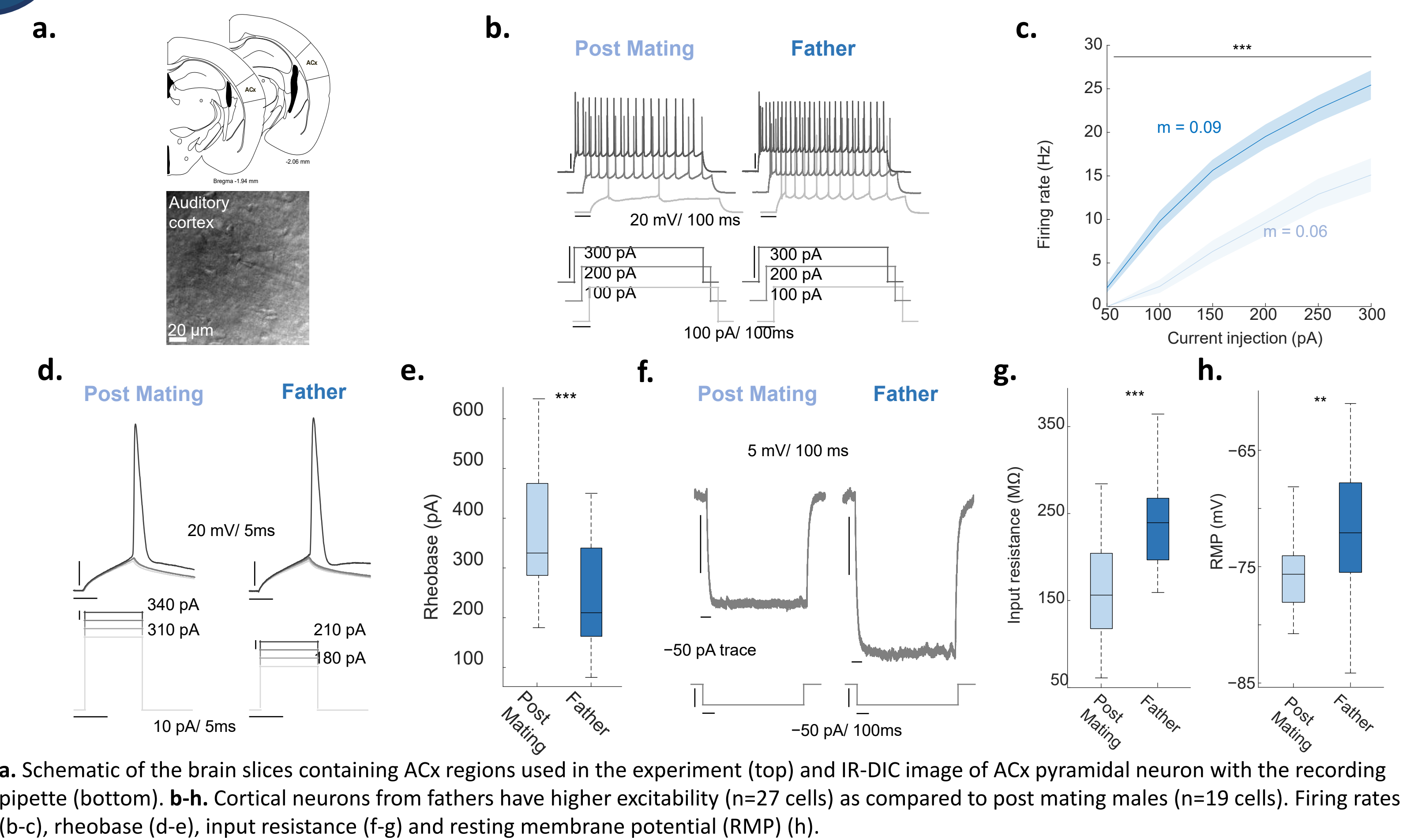
2 Neuronal discriminability of pup distress calls is elevated and faster during fatherhood



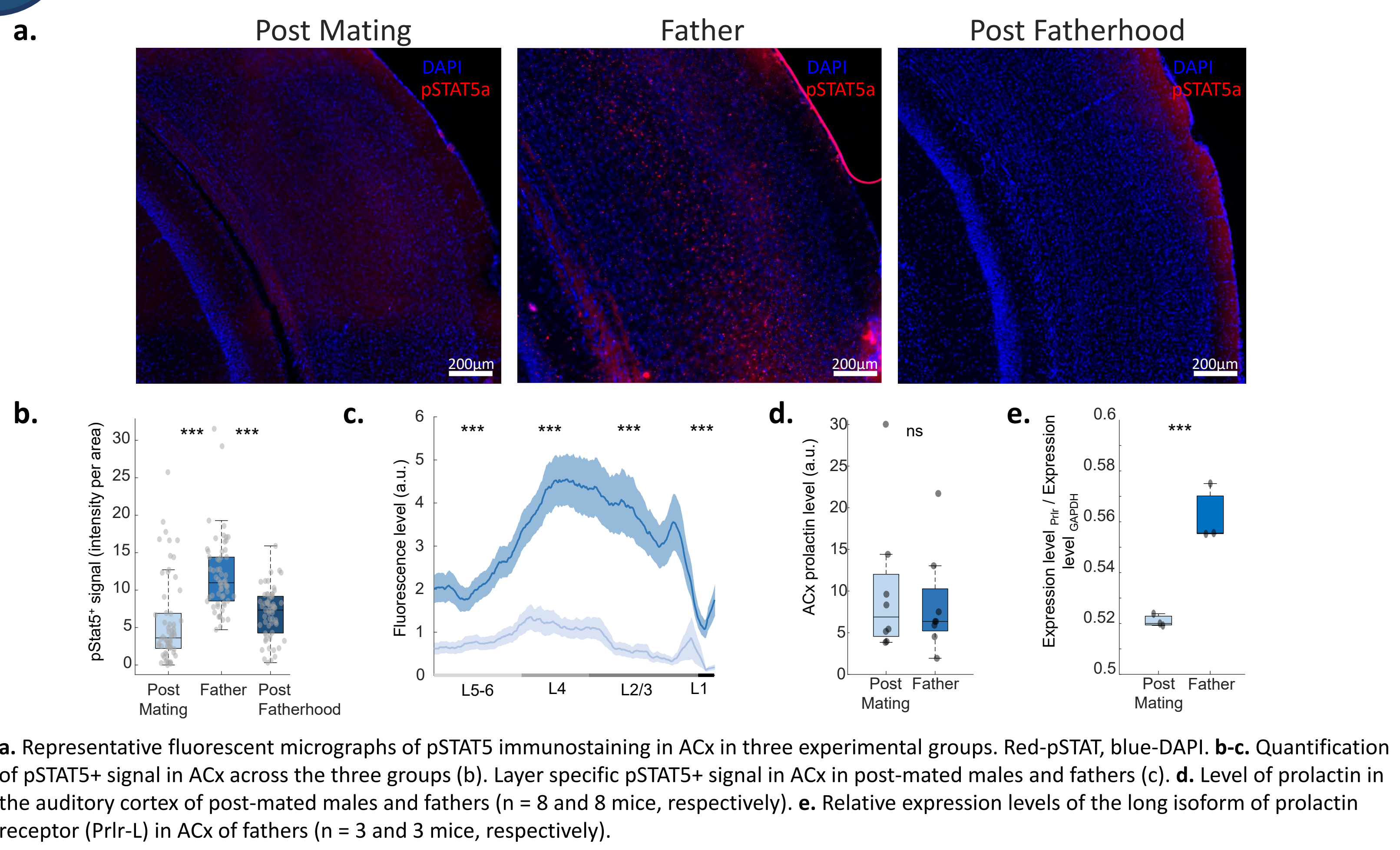
3 No changes in neuronal discriminability of non-distress calls



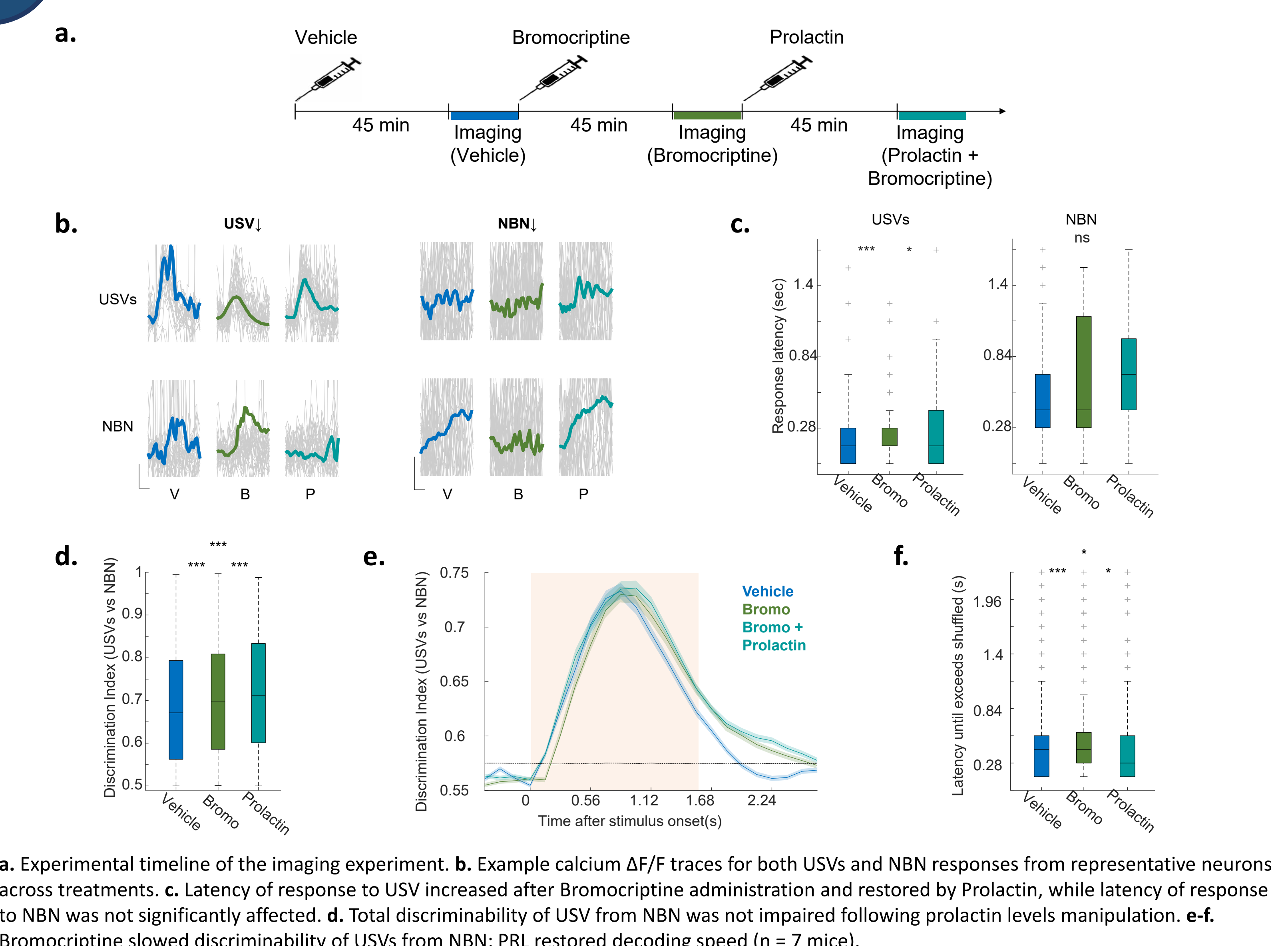
4 Intrinsic excitability of auditory cortical neurons is elevated in fathers



5 Prolactin signaling is higher in the auditory cortex of fathers



6 Prolactin modulates temporal discriminability of pup USVs in fathers



SUMMARY

Fatherhood induces a transient shift toward paternal care and enhances cortical discrimination of pup ultrasonic vocalizations. In the auditory cortex, fathers show faster pup-call coding, increased neuronal excitability, and elevated prolactin signaling, while non-distress pup calls are not similarly affected. Pharmacological manipulation of prolactin alters the timing, but not the overall accuracy, of pup-call discrimination, suggesting that prolactin shapes the temporal dynamics of fatherhood-related sensory plasticity. Together, these findings reveal a fatherhood-specific mechanism by which hormonal signaling modulates cortical processing of offspring cues.