

Emotion regulation in congenital adrenal hyperplasia

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INTRODUCTION

- ❖ Cortisol is involved in generating and regulating emotional responses to stimuli^{1,2}
- ❖ In addition, emotion regulation brain networks overlap with working memory networks that have been found to have structural changes in patients with CAH at adult age^{3,4}
- ❖ The life-long disturbance of cortisol, in addition to brain changes could therefore contribute to problems with emotion regulation in patients

AIM

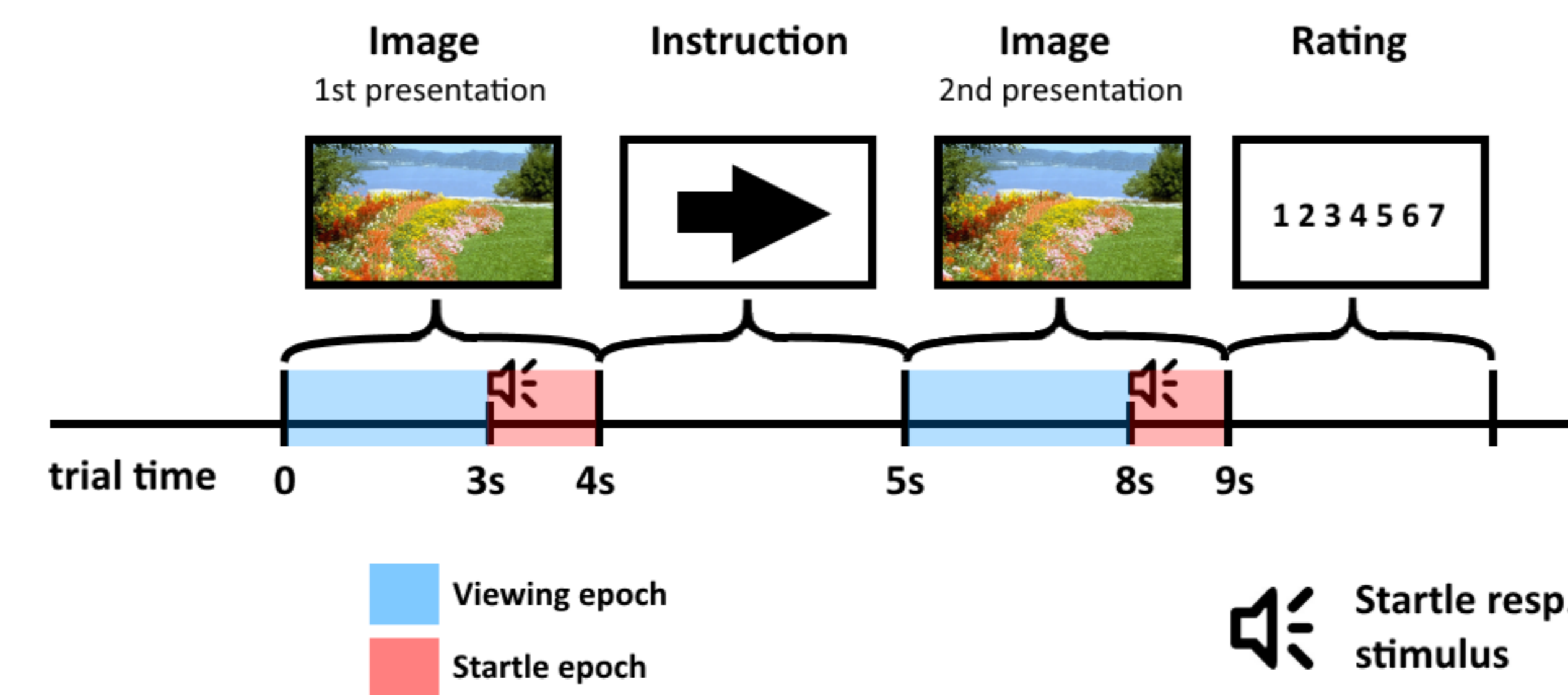
- ❖ The present study aimed to address emotion regulation skills in adult patients with CAH compared to population controls

METHOD

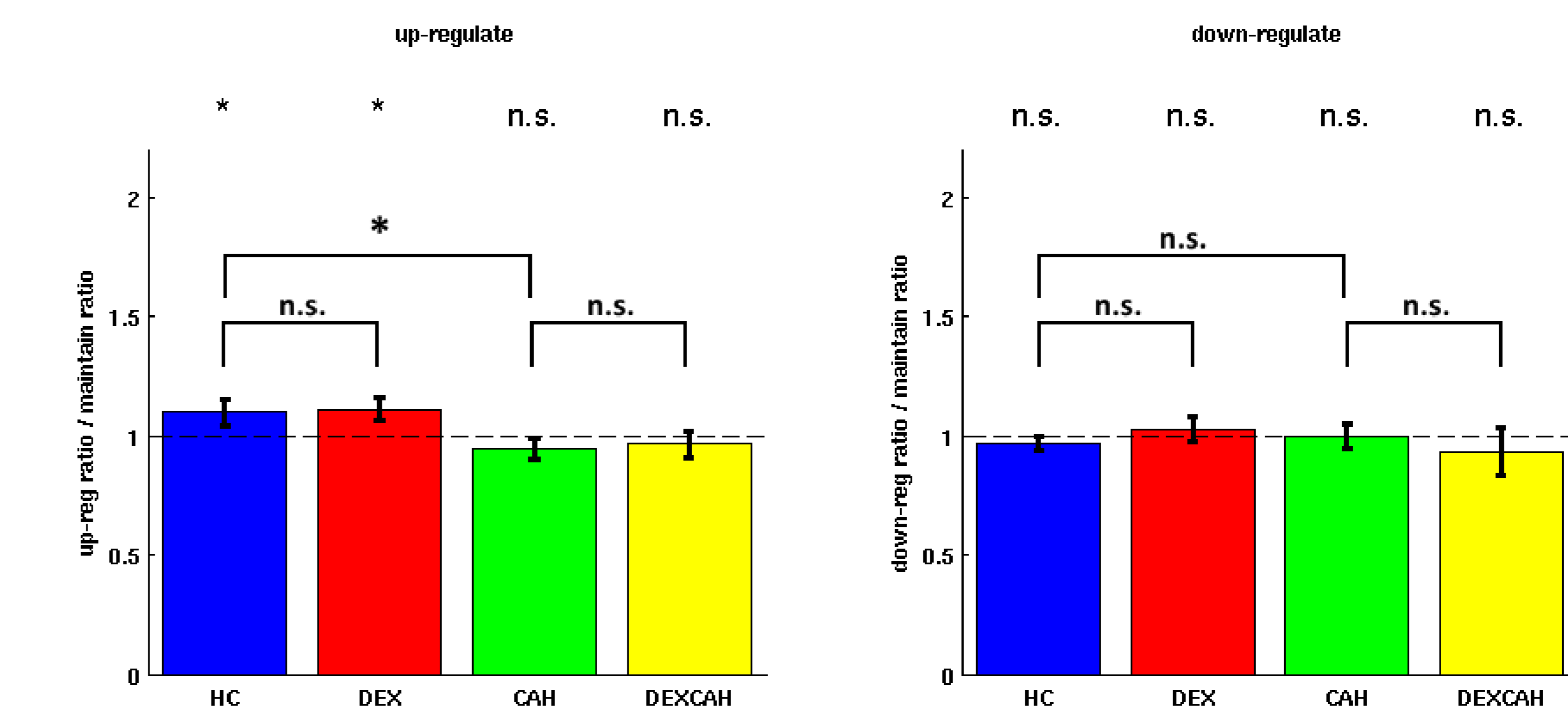
- ❖ 32 CAH patients (20 females) and 37 healthy controls (23 females), aged 16-33, performed an emotion regulation task
- ❖ Emotional reactivity to negative pictures was measured as the amplitude and likelihood of a startle response to an acoustic stimulus, measured with facial electromyography (EMG)
- ❖ The ability to up- and downregulate emotions was measured by the change in startle response amplitude and likelihood after emotion regulation instruction

RESULTS

- ❖ Compared to controls, patients with CAH showed a **smaller upregulation** of the **likelihood** of an acoustic startle response when viewing negative stimuli
- ❖ However, the amplitude of the startle response after the upregulation instruction did not differ between groups
- ❖ There were no differences in either startle amplitude or likelihood after downregulation instruction



During the task, participants were asked to either upregulate, downregulate or maintain their emotional responses to negative or neutral images. During image presentation, a sound burst was presented to evoke an acoustic startle response. Emotional reactivity to the sound was measured with facial EMG of the left orbicularis oculi muscle to assess amplitude and likelihood of startle responses



Bars represent ratios between effects of up-/down-regulation and no regulation ('maintain' trials), with the effect referring to the ratio of post-instruction/pre-instruction. Therefore, values are calculated by [(post-upregulation amplitude/pre-upregulation) / (post-maintain amplitude/pre maintain)].

CONCLUSIONS

- ❖ In general, patients with CAH were able to regulate their emotions to the same extend as controls
- ❖ However, they showed somewhat reduced upregulation ability compared to controls
- ❖ Failure to upregulate startle likelihoods could potentially be associated with the flexibility of baseline arousal, related to altered adrenal medulla function
- ❖ We therefore propose to investigate emotion regulation in relation to adrenal medulla function in patients with CAH

REFERENCES

1. Kalafatakis K, Russell GM, Harmer CJ, Munafò MR, Marchant N, Wilson A, Brooks JC, Durant C, Thakrar J, Murphy P, Thai NJ, Lightman SL. 2018. Ultradian rhythmicity of plasma cortisol is necessary for normal emotional and cognitive responses in man. *Proc Natl Acad Sci U S A* 115:E4091-e4100
2. Jentsch VL, Merz CJ, Wolf OT. 2019. Restoring emotional stability: Cortisol effects on the neural network of cognitive emotion regulation. *Behavioural brain research* 374:111880
3. Van't Westeinde A, Karlsson L, Thomsen Sandberg M, Nordenstrom A, Padilla N, Lajic S. Altered Gray Matter Structure and White Matter Microstructure in Patients with Congenital Adrenal Hyperplasia: Relevance for Working Memory Performance. *Cereb Cortex* 2019
4. Zaehring J, Falquez R, Schubert AL, Nees F, Barnow S. 2018. Neural correlates of reappraisal considering working memory capacity and cognitive flexibility. *Brain imaging and behavior* 12:1529-1543

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