Intranasal Administration of Vasopressin Reduces Cognitive Empathy

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INTRODUCTION

- At the core of human social communication is the ability to accurately perceive another’s emotions and to respond to them in an appropriate way.
- Empathy is a multi-faceted concept that consists of at least two processes: cognitive empathy – the ability to perceive what the other is feeling, and emotional empathy – matching emotional response to the feelings of the other.
- What drives empathic understanding?
  - Arginine vasopressin (AVP) is an important neuromodulator of activation in various brain areas involved in emotion regulation, including the limbic system. AVP is considered a prime candidate to modulate human social perception and communication.  
  - In humans, AVP has been connected to decreased perceived friendliness of facial expressions in males.
  - In the current study, we used intranasal administration of AVP to look at the effect of AVP on cognitive empathy in human males.

METHODS

- Participants – 39 Male Israeli university students (mean age= 24.69, SD=2.52)
- Procedure – In a between-subject, double-blind design, participants were randomly assigned to placebo or treatment groups. Participants self-administered into both nostrils a 250 µl solution containing 20IU of AVP (diluted in 0.9% NaCl, Sigma, Germany) or placebo (sterile saline, 0.9% NaCl).
- After a 45-minute waiting period, subjects were presented with the task.
- Measures –
  1. Reading of the Mind in the Eyes Test (RMET) – A measure of cognitive empathy, comprised of 36 emotion expressive photos of the eye area.
  2. Interpersonal Reactivity Index (IRI) – A self-report measure of trait empathy, comprised of 28 items on a 5-point Likert scale.

RESULTS

1. We first looked at the effect of treatment on accuracy in the RMET. AVP significantly decreased accuracy of emotion recognition vs. placebo (p=0.034). These effects were substantial (D=.72).

2. Division of the exhibited emotions by valence reveals an interaction effect of the treatment. AVP significantly increases errors in RMET only for negative emotions (p=0.023), but not for positive emotions (p=.960).

3. We then looked at the effect of treatment on accuracy, conditioned on trait empathy as measured by the IRI. A linear regression with treatment and IRI as predictors was conducted (Figure 4).
   
   - The analysis revealed that participants with low trait empathy were negatively affected by the treatment, causing an increase in error rate (Treatment: b=.749, p=.506; IRI: b=-.169, p=.011; Interaction: b=-.273, p=.037).

CONCLUSIONS

- This study provides an important step in understanding the role of AVP in modulating human social communication and demonstrates that AVP has a specific effect on cognitive empathy in males. Specifically, AVP may influence male aggression by predisposing individuals to respond to negative emotional stimuli with a lack of empathy, possibly exhibiting a propensity towards aggression.
- Importantly, the effect of AVP was conditioned on trait empathy, suggesting the involvement of other dispositional mechanisms that interact with AVP to affect cognitive empathy.
- These findings may have clinical implications for the treatment of psychopathologies characterized by deficits in empathy such as autism and schizophrenia.